Chapter – 2

Review of related literature
REVIEW OF RELATED LITERATURE

A literature review is a systematic, explicit and reproducible method for identifying, evaluating and interpreting the existing body of recorded work produced by researchers, scholars and practitioners (Fink, 1998).

Once the problem has been identified, it is natural for the investigator to want to get the research underway as soon as possible. It is important to keep in mind, however, that a prerequisite to successful research is the investment of time in surveying what is already known about the subject. With this literature review, a researcher will understand research gaps in terms of the areas which appeared to be relevant and should have been studied but not studied; variables/parameters should have been given emphasis but not have been given; particular data should have been used but not used; particular analytical tool should have been employed to analyze and understand the issues in question but not have been employed, etc.

It is impossible to solve a problem with the same mind that created it (Einstein). It is in this regard that literature reviews take their rightful place. Stated another way, the more one learns about the topic, and the findings of prior investigations, the better prepared one will be to address the problem at hand. Not only should one be interested in knowing the results of prior studies, but it is also important to know the design used to gather data, the character (for e.g. demographics) of the study group, the site of the study, the statistical procedures used to analyze the data and the recommendations for further study that arose out of the findings. According to Blaxter, et al. (2002), a literature review is a critical summary and assessment of the range of existing materials dealing with knowledge and understanding in a given field.

Therefore, an essential part of the research is the review of literature, which serves to place the current study in a chronological as well as a theoretical context. A review of the literature makes it possible for the practitioner-researcher to
discover what has been reported by others. Not only will the reader learn of the findings, a review of the analysis portion of the unpublished paper or article will offer clues to the various ways data have been treated. One can acquire useful ideas in this regard. The review of literature involves the identification, location and analysis of documents that contain information pertaining to that problem. Only such studies are reviewed in some depth of details as have considerable bearing on this investigation. Although some more could be added for the purpose but the investigator has to be selective for obvious reasons.

A substantial body of research has accumulated over the last few decades concerning the importance of various factors towards achievement in science. Researches have examined an array of variables that are believed to be related to students’ achievement in science. The science education literature is filled with numerous research articles that suggest that many factors are helpful in increasing the achievement levels and knowledge of students in the area of science. Such studies are also to be included in this regard for both interest as a well as their implicit relationship with the present problem.

2.1 General features of attitude towards multimedia

Hiltz and Johnson (1990) found in their study that females viewed computer-mediated communication more favourably than males because, as they suggest, females may "appreciate the opportunity to have their say" when normally this may be more difficult to do. Colley et al. (1994) found that participation in a computer course significantly reduced anxiety and increased confidence among both males and females. The relationship between the amount of experience on a home computer and attitudes was different, however, for male and female students. Home use was associated with greater liking for computers among female students, greater confidence among male students and lower anxiety for both sexes. Shashaani (1997) conducted a study related to gender differences in computer and Internet usage. He concluded that boys tend to be
more interested in computers than girls, contributing to gender differences in Internet usage. Also, Internet usage is becoming widespread among not only males but also females.

Students who were more knowledgeable in computers had used computers more frequently and had greater access to home computers. They were also more interested in computers and had more confidence working with them. Liu, Macmillan & Timmons (1998) perceived integrating computers into a learning system as a complex instructional system in which student learning is impacted by lecturers, students, administrative and technical staff, computer hardware and software resources, and the computer laboratory and classroom settings. They reported that students' with positive attitudes toward using computers also have positive attitudes toward using computers for their learning. Mitra & Steffensmeier (2000) concluded that a networked learning institution where students have easy access to computers could foster positive attitudes toward the use of computers in teaching and learning. They found that a computer-enriched learning environment was positively correlated with students' attitudes toward computers in general, and the role of computers in facilitating teaching and learning.

Hong, Ridzuan & Kuek (2003) investigated the success of a technology and Internet-enriched teaching and learning environment in molding positive attitudes among students toward using the Internet for learning at a university in Malaysia. Students were provided with computers facilities, required to complete two compulsory generic courses in information technology, and the lecturers actively encouraged the use of information technology, in particular, the Internet in the teaching and learning processes. Results from the study indicated that students had positive attitudes toward using the Internet as a learning tool, adequate basic knowledge of the Internet, and viewed the learning environment as supportive of using the Internet for learning. Students with better basic Internet skills and who viewed the learning environment as promoting the use of the Internet favored
using the Internet for learning. Donnel (2004) examined the relationship between faculty attitudes toward computer technology and student attitudes toward computer technology in advanced arts classes at Middle Tennessee State University during spring semester 2004. The researcher concluded that both arts faculty members and students had more positive attitudes toward computers when more competent with computers. Because of the student exposure to computers, preconceived attitudes tended to dominate student attitudes toward computers. The overall responses from both arts faculty and students toward computers were positive however, the response level suggested only conservative attitudes toward computers that were consistent with the arts academic discipline culture.

Popovich; Gullekson; Morris & Morse (2008) examined how computer attitudes have changed from 1986 to 2005, the Attitudes Towards Computer Usage Scale (ATCUS) was given to 254 male and female current undergraduate students. When comparing the 1986 with 2005 results, the amount of time spent using a computer was still positively related to computer attitudes; however, the number of college computer courses was not. There is no longer a significant relationship among any of the factors with college computer courses. Males and females no longer significantly differ in their attitudes toward computers, number of college computer courses, amount of time spent using computers, or degree of self-reported computer anxiety.

Timothy(2008) found that computer attitudes play a key role in influencing the extent to which students accept the computer as a learning tool and in determining the likelihood that computer will be used in the future for learning and study. A sample of 183 students reported their computer attitudes using a Likert-type questionnaire with three subscales, computer importance, computer enjoyment, and computer anxiety. One-way MANOVA revealed no significant differences in computer attitudes by gender although male students reported more positive towards the computer than female students. There were significant differences between students who own computers at home and those who do not
and students who own a computer at home also reported a lower level of computer anxiety compared to those who do not.

2.2 Science achievement and attitude towards multimedia

Mann (1997) examined the impact of student access to computers in 55 New York school districts. He found that students in classes where there was a 7 : 1 student-to-computer ratio achieved higher than in classrooms with the national average of 9 : 1 and the New York State average of 10 : 1. Mann’s report concludes that increased access to technology supported student achievement. In addition, these gains reached across schools and districts with different educational policies and socio-demographic backgrounds. A study by Frear & Hirschbuhl (1999) examines the effects of interactive multimedia instruction upon the variables of achievement and problem solving skills on non-science majors in an environmental science course at a mid-western university. The findings indicate that the interactive multimedia had a significant effect on both of the variables. The findings are discussed in terms of the impact on self-study when students are learning outside of the classroom in a distance learning environment. Owston & Wideman (2001) studies the relationship between computer access in classrooms and student achievement. They concluded that optimal learning occurs in classrooms where every child has access to their own computers in schools.

Papanastasiou, Zembayas & Vrasidas (2003) observed that Computer use was negatively associated with high student achievement in some countries. It was not computer use itself that has a positive or negative effect on the science achievement of students, but the way in which computers were used. Science achievement was negatively related to the use of certain types of educational software. Computer availability for the students at home and in the library was associated with higher levels of science literacy. Ali & Elfessi (2004) examined student performance and attitudes towards the use of information technology in virtual and conventional settings. The findings revealed that there were no
significant performance and attitude differences between the two groups. Relationship between computer use and achievement was the subject of study by Papanastasiou; Zacharia & Zembylas (2004). The results of this study indicates that students who frequently used the internet to communicate with other students, and who had teachers who frequently used computer in their classrooms tended to have lower scores in science than other students with fewer such opportunities. Finally, a non-surprising result of this study was that the students who own computers in their homes tend to have higher academic achievement than the students who do not have them.

Delgado-Hache; Evans; Hunley; Krise; Rich & Schell (2005) investigated the relationship between adolescent computer use and academic achievement. The correlation between computer use and grade point average was not found to be significant. However, gender differences were found across grade point average and time spent doing homework on and off the computer. Estimates of time spent per week using the computer were correlated with the time recorded logs. Jackson; Eye; Biocca; Barbatsis; Zhao & Fitzgerald (2006) examined the antecedents and consequences of home internet use on children’s academic performance. Findings indicated that children who used the internet more had higher scores on standardized tests than children who used it less. Vellaisamy (2007) examined the effectiveness of multimedia on achievement of pupils in Science at VIII standard. The pre-test and post-test were used to arrive at the following conclusion. The pupils of the experimental group achieved more than the pupils of the control group in science at upper primary level. This is due to the favourable impact of the multimedia approach in the learning of the VIII standard pupils. Erdogan; Bayram & Deniz (2008) investigate the factors that affect learners’ academic achievement and attitudes in web based education. It was revealed that web based education have positive effects on the improvement of academic achievement. The effect of web based education on attitude toward learning suggested that web use had positive effects mainly on motivation for learning and interested in the lessons.
2.3 Science achievement and socio-economic status

Chopra (1964) studies the influence of SES on academic achievement of secondary school students. His study reveals that fathers’ education and occupation, family, type of lodging, size of the family, cultural level of home, students belonging to the higher qualitative groups showed significantly higher mean achievement than the students coming from lower categories. In the year 1969, Satyanandam studies the effect of SES on academic achievement. He found that the children of graduate parents performed far better than the children of matriculate parents. The children of upper economic strata and lower economic strata differed very significantly. The upper and the middle economic groups differed significantly. The middle and the lower economic groups did not differ significantly. However, the middle economic group was better than the lower economic group. Sex had no bearing upon the achievement level. Khanna (1980) studied the relationship between socio-economic background and their academic achievement at junior school level. Socio-economic status was positively and significantly related with academic achievement. The students’ achievement was related with his socio-economic status irrespective of whether his income home town was a village, a town or a city. The correlation was more consistent in urban than in rural areas. The academic achievement of rural and urban students was closely related with their guardians’ income. There was a positive and significant correlation between socio-economic status and academic achievement in case of boy and girl students of rural and urban areas. The academic achievement of the students of different types of schools was significantly related with the socio-economic condition of their families. The academic achievement of the children of educated parents, illiterate parents and educated mothers was significantly correlated with the socio-economic status of the family. The scholastic achievement of the students of junior high school classes were directly and significantly with their family’s socio-economic status.
According to Young & Fraser (1993), the average socio-economic status of students attending the school was strongly and positively related to school mean science achievement. Students from more affluent backgrounds tended to have higher scores, irrespective of whether the school was public or private. Gender differences in science achievement were found to vary across schools, with boys outperforming girls by 0.284 points on average. The socio-economic differences in science achievement is often purported to be jointly influence by school type and average socio-economic status of students attending the school.

The findings of Kesamang & Taiwo (2002) suggested that there is a significant negative relationship between Botswana junior secondary school students’ socio-cultural background and their achievement in science. Botswana junior secondary school students with low socio-cultural background scores appear to be more positively disposed to science than their counterparts with high socio-cultural background scores. Yang (2003) reported that the cultural dimension (cultural resources and atmosphere) had the greatest impact on students’ mathematics and science achievement. At the school level, only a general economic dimension (community wealth) was found in most countries which were highly related to school mean math-science achievement. The ownership of a set of household materials can be used as SES indicators in exploring its multifaceted feature at both individual and school levels. The latent structure of SES at individual level is different from that at the school level, and that SES dimensions have different effect on mathematics and science achievement at individual and school levels.

Olubadewo & Ogwu (2006) examined the influence of socio-economic status on students’ academic performance. The findings revealed that combined male and female students from parents of high SES performed better in English than medium and lower SES groups. It was revealed that SES did not influence performance in English language by female students. In mathematics, children from middle and lower SES performed better than those from middle and lower
SES groups. Female students from low SES performed significantly better in mathematics than those from high and middle SES. Mikk (2007) conducted study on economic, educational and cultural predictors of science learning in Lithuania and Estonia. The characteristics of the students’ socio-economic status were the most powerful predictor of their TIMSS 2003 science score. Books and computers in the students’ homes were related to their science score. The parents’ educational level was a predictor of the TIMSS 2003 science score in both countries.

2.4 Science achievement and personal factors

Patnaik (1986) reported that there is no significant difference in achievement among boys and girls. Tamir (1988) studies gender differences in high school science in Israel. He found that more boys like to study math and science more than other school subjects. Significantly more boys aspire for science oriented careers. Boys achieve better than girls in physics and in earth science, but their achievement in biology and chemistry is similar to that of girls. The achievement of non-science girls is alarmingly low and with the exception of biology much lower than that of boys. The evidence obtained from the study conducted by Jegede & Inyang (1990) on sample consisted of 1454 boys and 1336 girls with a mean age of 14.7 years indicates that there are real differences in achievement between males and females in integrated science in junior secondary schools. Klein; Jovanovic; Stecher.; McCaffrey.; Shavelson; Haetel & Comfort (1997) reported that girls tended to have higher overall mean scores than boys on the performance measures, but boys tended to score higher than girls on certain type of questions within a performance task. Differences in mean scores among racial/ethnic differences groups on one type of test (or question) were comparable to the differences among these groups on the other measures studied. The type of science test used is unlikely to have much effect on gender or racial/ethnic differences in scores. Eriba & Ande (2006) studies gender differences in achievement in calculating reacting masses from chemical equations among
secondary school students in Makurdi Metropolis. His study reveals that boys perform better than girls in chemistry problem solving which requires the use of mathematics. There are fewer girls opting for chemistry at the Senior Secondary School level and for, the few who dare to do the subject the dropout rate is alarmingly high. The results of study conducted by Pandey & Ahmad (2008) on a sample comprising 621 students of class XI concluded that there is no significant difference between male and female adolescents on the measures of academic performance.

Gupta (1983) found that differences in the achievement of Hindu-Muslim students are significant. Indira (1991) explored the relationship between religion and academic achievement. She found that students belonging to different social classes differed in their academic achievement. Hindu, Muslim and Christian students differed in their academic achievement scores. Khatoon (1996) conducted a study on a sample of 550 secondary school students from urban and rural colleges of U.P. She found that Hindu students had significantly better achievement test scores than Muslim students. Findings of the study by Neathery (1997) led to the conclusions that gender was not identified as a predictor for science achievement. Ethnicity was not a predictor of science achievement. Minorities performed with as much success on the science subtests of the standardized achievement test as the non minorities for every grade. Alam (2001) reported that the academic achievement of non-muslim children has been found superior in comparison to their muslim counterparts.

Fraser (1969) researched on the effects of home environment on 408 Aberdeen children academic achievement and discovered that two variables with highest correlation with educational attainment are parental encouragement and parental education. Carpenter & Hayden (1987) compares the effects of parents’ occupational status on girls’ academic achievement in girls’ schools and coeducational schools. They found that mother’s education was the most important independent predictor of the type of school a girl attended. The sex
composition of the school did not affect academic achievement. Trivedi (1988) conducted a study on a sample of 120 students (60 each) of working and non-working mothers. Questionnaire, and marks scored by students in High school and Junior High school were used to derive relevant data. The difference between the achievement score of the children of working and non-working mothers was not significant. The difference between the achievement scores of the children of educated and uneducated mothers was not significant. According to Kingdon (1999), father’s education and occupation were not significant but mother’s education had significant effect on achievement. Farooque & Viswanathappa (2006) found that there exists a significant difference among the achievement of students whose fathers’ occupation is in the administrative or managerial field scoring comparatively higher and a significant difference of scores is discerned among children whose mothers were in different occupations.

Shukla (1984) studies the influence of family size on achievement of primary school children. Children belonging to the large family size category had significantly better academic achievement than those of average and small family size categories. There was a tendency of better achievement among the children belonging to the small family size category. The structure of family, whether joint or unitary, had no significant differential impact on academic achievement. Narang (1987) found that the number of siblings seemed to affect performance. Most high achievers had only one sibling. In the village areas most of the respondents among all categories of achievers had three siblings. Indira (1991) reported that family size of the students had its effect on the academic achievement of the students. Birth order of students had its effect on their academic achievement. Kingdon (1999) observed that number of siblings in the family exerts a strong negative influence on achievement.

Lalithamma (1975) reported that private tuitions taken by students influences the achievement in mathematics. Rehman, (2003) observed that there was significant difference between the mean achievement scores of children
having guidance from their parents and coaching/tution from their tutor. Gafoor & Sunnummel (2007) attempted to find the influence of private tution on achievement in science among secondary school pupils of Kerala. A sample of 664 students from government and government-aided schools was selected. The tools developed by the investigators assessed achievement in science and extent of private tution. Results revealed that there is significant difference between achievement in science of pupils belonging to tution and non-tution groups.

Cooper (1989) observed a positive linear relationship between hours per week spent on homework and achievement. Holmes & Caroll (1989) reported that levels of time on homework show a fairly strong association with performance in school examinations, with a consistent tendency for increased amounts of time spent on homework to be associated with higher examinations scores. Peng & Wright (1994) found that the correlation with hours spent on homework (.17) indicates that more time spent on homework was related to higher achievement scores. Dange & Vijayalakshmi (2006) reported a relationship between study habits and achievement in Physics.

Narang (1987) documented that the exposure to mass media or the extent of exposure did not affect school achievement. Where the non-academic programme of the school was concerned, participation in co-curricular activities was related to high achievers. However, the type of activities or hobbies pursued or the type of games played did not affect it. A study published by the American Sports Institute (1996) reported on the effects of a yearlong high school course program, which used sports to enhance academic achievement. The grade point average (GPA) was the primary measure for evaluating the program results. Analysis of the study’s data revealed that the program students outperformed those in the control group on all of the applicable measures, including GPA and academic eligibility for extracurricular activities. These findings showed that by participating in the program, students of the program improved their academic performance as measured by overall GPA. In a separate study, Jordan (1999) examined the effects
of participation in school-sponsored sport activities on school engagement and achievement for black high school students. He found a small but consistently positive effect of sport participation on academic achievement, when other variables in the equation were held constant. This pattern of the effects of sport participation varied little across the different racial/ethnic groups. The researcher also reported that sport participation improved school engagement and academic self-confidence of all student athletes.

Pietkoto (2004) analyses the effects of extracurricular activities in a school system on academic achievement. MANOVA and ANOVA analysis show that the participation in extracurricular activities has major effects on school achievement. Furthermore data analyses show that the underachievers are those who have more benefits from that participation. Din (2006) conducted a study to determine whether participating in sport activities had any impact on students’ academic achievement in rural high schools. Results of data analyses indicated that no significant differences were found between the students’ pre-season and post-season grades, which suggest that participating in school-sponsored sports activities did not affect the academic achievement for the participating rural high schools students. Fujita (2006) found that participation in extracurricular activities has a positive effect on academic performance. Students feel that participation in sports, watching television, and participation in community service each improve academic achievement, while participation in musical performance does not improve academic performance. Lipscomb (2006) investigated the extent to which involvement in school-sponsored clubs and sports constitutes human capital investment. He found that athletic participation is associated with a two percent increase in math and science test scores. Club participation is associated with a one percent increase in math test scores. Finally, involvement in either type of activity is associated with a two percent increase in Bachelor’s degree attainment expectations.
Sharma (1988) conducted a study of factors in pupil academic achievement in different streams of courses of the higher secondary stage and found that the choice of the courses depended upon the interest. Science stream attracted the most intelligent students. Beaton et al., (1996a) reported that students who indicated they like science generally achieved better scores in science than those who indicated that they do not. Liew (2004) reported that student’s educational expectations, perceived usefulness and reasons for doing well in the subject were significant predictors of mathematics and science achievement.

Blatchford; Burke; Farquhar; Plewis & Tizard (1985) study the relationship between educational achievement in the infant school and their influence of ethnic origin, gender. Differences between boys and girls in test score were just statistically significant at the 0.05 level. There was no evidence that black boys were doing worse than the white boys. Within the group of parental socio-demographic characteristics, the strongest association with total test score was found for mothers’ educational qualifications. There was almost 30 points difference in mean test scores between those mothers’ with no formal qualifications (43%) of the interviewed sample and those with something more than O-level (14%). There were also statistically significant associations with fathers’ educational achievement, (F (4.137) = 4.83, p < 0.01), and mothers’ and fathers’ occupation (F (2.183) = 5.51, p < 0.01; F (3.146) = 4.79, p < 0.01) but, these became unimportant after controlling for mothers’ education. There were no significant associations with family size, one-parent family status and whether or not the mother employed. Schibeci & Riley (1986) investigated the influence of students’ background and perceptions on science attitude and achievement. Sex, race, and the home environment were shown to have substantial influence on student achievement in science. The study of Okpala & Onocha (1988), dealt with the relationship of student factors and achievement in physics. The nine student factors (age, gender, home language, word knowledge, interest in physics, study habits, attitude towards physics, mathematical ability and test anxiety), when taken
together, seem to be effective in predicting students’ achievement in physics. There is an indication that a combination of nine student factors into a predictor set could account for 63% of the total variance in physics achievement. Mathematical ability appears to be best predictor, followed by attitude towards physics, word knowledge, study habits, test anxiety, gender and home language in that order. Interest in physics and age however, could not contribute significantly to the prediction of physics achievement. Daiz (2006) found that the performance of girls is far better than that of boys. Mother’s studies are able to predict significantly performance while grade level and father’s level of studies negatively predict the number of school years repeated. 34% variation in performance is due to personal variables such as age, academic self-concept and the locus of control; academic variables such as grade level, social relationships in class and friendship relations; and family variables such as father’s level of studies and relationships with parents and adults.

2.5 Science achievement and institutional factors

Patnaik (1986) reported that there is significant difference in achievement of pupils of U. P. and M. E. schools i.e., the pupils of U. P. schools are much superior in achievement to pupils of M. E. schools. Children of municipality schools are superior in achievement to children in the schools under the control of D.I. of schools. A study conducted by Kingdon (1999) revealed that private unaided school is strongly associated with higher achievement than government funded schools. Dange & Vijayalakshmi (2006) concluded that there is significant difference between boys and girls in their achievement in physics. They also found significant difference between government and private college students’ achievement in physics.

Vimala & Rina (1989) reported that different types of schools like public and missionary schools were having the highest achievement and government schools showed the lowest achievement. Young & Fraser (1990) found that there
were no significant differences in overall science achievement between girls and boys in government, Catholic and independent co-educational schools. Both boys and girls attending single-sex schools showed significantly higher than their counterparts in co-educational schools, when socio-economic status had been controlled. Male and female students in both single-sex and co-educational independent schools showed higher achievement than their counterparts (co-educational) government schools. Kim & Placier (2004) revealed that attending a Catholic school or a non-Catholic private school did not make any difference in the science achievement scores of students.

Young & Fraser (1992b) reported that girls and boys in single-sex schools outperform their peers attending coeducational schools with particular reference to physics achievement. The relationship between the school, the home and the student’s performance in physics was also explored tentatively using multilevel analysis. The average home background was found to contribute towards student achievement to a greater extent when compared with such school effects as school type and sex composition of the school. Harker (2000) found that the difference in the average academic attainment in science of girls who attend single-sex as against coeducational schools is more apparent than real. When adequate control is exercised for the different ability levels and the social and ethnic mix of the two types of schools, the initial differences between them disappears. The results of the study by Dhindsa & Chung (2003) were that the science achievement of male as well as of female students in single-sex schools was moderately better than that of students in co-educational schools. There was a moderate level of gender differences in achievement in single-sex schools, but no sex difference in co-educational schools. The performance of girls in single-sex schools was much superior than that of girls in co-educational schools, whereas performance of boys in the single sex school was only marginally better than that of boys in co-educational schools. Carter (2005) investigated whether girls achieve better results in Physical science in single-sex environments or in coeducational classes.
Thirteen independent South African schools where children were of similar socio-economic background were considered. There were significant differences found by the administration of the Bonferroni (Dunn) t-tests and Scheffe’s Tests in 2000, 2001 and 2002 to indicate that girls in single-sex schools achieved better results in science than the coeducational schools. However, in 1999 and 2003 there was no significant difference in the results achieved, and so there may be other factors that are more important predictors of achievement than whether the schools are mixed or single-sex.

Garg & Chaturvedi (1992) observed that the mean academic score of rural students was lower than the mean academic score of urban students. Fan & Chen (1998) examined differences in some major areas of school learning among rural/suburban/urban school students. Data from the National Education Longitudinal Study of 1988 (NELS: 88) was used in the study. The results showed that there are statistically significant differences among the rural/suburban/urban students. The students from private schools performed better than those from the public schools, regardless of school locality and grade. Young (1998) reported differences in student achievement between rural and urban schools in Western Australia, after controlling for student background variables. By using multilevel modeling techniques, this study demonstrated that the location of the school had a significant effect upon student achievement, with students attending rural schools not performing as well as students from urban schools. School and classroom differences in student achievement were smaller than the student differences, with classroom effects explaining much more of the variation than school effects.

A pilot study conducted by Srivastava & Khatoon (1980) in the schools of Mysore city with standard eight students showed that the English medium students scored significantly better than those in Kannada medium. Raveendranathan (1983) conducted a comparative study of the impact of medium of instruction on the science achievement on a sample of 800 secondary school pupils chosen by the application of stratified random sampling method. He found that the science
achievement of the pupils of English medium classes were higher than those of pupils of Malayalam medium classes. Singh (1988) reported that significant differences did not exist between the means of achievement scores in mother tongue and foreign language (English) of over-achievers and underachievers. Narsimhan, et al. (1988) studied the relationship between medium of instruction and achievement. They reported that both in the school final and polytechnic diploma examinations the English medium students performed better as compared to their Telugu medium counterparts. The correlation coefficient between their scores in school final and diploma examinations were significant. Yip, Tsang & Cheung (2003) compares the science achievement of Chinese students learning science through a second language, English, with that of students receiving instruction in their mother tongue, Chinese. Based on the scores on a science achievement test made up of multiple-choice and free-response questions, the English medium students, despite their higher initial ability, were found to perform much more poorly than their Chinese medium peers.

2.6 Miscellaneous

Sanquinetty (1983) studied influence of students’ family background and school quality on academic achievement. Science scores reveal a strong correlation between family factors, such as parental educational background and academic achievement but do not show a strong correlation between academic achievement and school factors. Although student moves to higher grade levels, school factors do not seem important at any stage in explaining academic achievement as long as minimal physical facilities are available. Shukla (1984) studies the influence of socio-economic status on achievement of primary school children. There were no sex and rural-urban differences in the academic achievement of primary school children. SES was positively and significantly related to academic achievement. Ghosh (1985) conducted a study on achievement of students in chemistry in relation to some determinants. His results reveal that
urban students did not show better performance in the achievement test of chemistry than rural students. Boys did not show superiority in chemistry over girls. There was positive correlation between the scores in achievement test in chemistry and education as well as occupation of the parents. Misra (1986) reported a positive relationship between socio-economic status, and academic achievement of the students. The academic achievement of the rural students was lower than the achievement of the urban students. The academic performance of girls was superior to the performance of boys.

Hariharan; Meena; Dash & Acharya (1987) reported that the main affect of achievement was found significant in case of all the competence scores, as high achievers were found more competent than low achievers in academic motivational, personal, social and total competence areas. The schools main effect was found significant only on academic competence, as the students of unisex schools were found to be more academically competent than those of co-educational schools. The grades main effect was found significant only in personal competence as the students of grade 6 were perceived as personally more competent than students of grade 9. Narang (1987) found that socio-economic status did not affect academic performance in the city, town and village areas. Rao (1990) compared biology achievement of boys versus girls, English medium versus Telugu medium schools, private versus govt. schools, residential versus non-residential schools and rural versus urban schools. The achievement in biology was average. The rural schools, government schools, English medium schools and residential schools were better in achievement.

According to Young & Fraser (1992a) the correlations between student characteristics and their science achievement indicated that sex, attitude towards science, and ethnicity of the student are comparatively weak correlates of science achievement and that verbal and quantitative ability and socio-educational level had much stronger correlations. School effects found to be statistically significant in influencing student differences in science achievement. No statistically
significant variations in sex differences in science achievement between schools were found. Kingdon (1999) examines the institutional as well as home background factors that boost student achievement in India. Male students perform significantly better than female students. Those who take private home tuition do worse than other pupils. Low caste pupils have significantly lower achievement than their non-low caste colleagues. Ma & Klinger (2000) found that gender, socio-economic status and native ethnicity were significant predictors of academic achievement. School mean SES was significant in mathematics, reading, and writing achievement, as was disciplinary climate in mathematics, science, and writing. School size and parental involvement significantly affected only the relationship between mathematics achievement and individual SES. The findings of the Das & Naval (2001) indicated that in terms of correlation between SES and achievement, schools differ irrespective of their area (rural/urban) and medium of instruction (Gujrati/Hindi/English) it was found significant and positively correlated. Achievement of students with high SES is significantly higher than that of students with low SES. Achievement of female students is significantly higher than that of male students. There were no significant differences between the mean achievements of students of different classes.

In an investigation Muller, Stage & Kinzie (2001) found that socio-economic status and previous grades strongly and positively related to eighth-grade achievement across all racial-ethnic by gender sub groups. Locus of control was strongly related to eighth-grade science achievement for all sub groups except Asian American males. The quantity of science units completed in high school was the only consistent predictor of science growth across al racial-ethnic by gender sub groups. The relationships between individual-level factors and science growth rates differed greatly for the remaining individual variables. Wobmann (2003) found that the students’ personal and family characteristics have substantial effects on their performance in science. On average, girls performed lower than boys. The educational level achieved by the students’ parents was strongly
positively related to the students’ educational performance. Students from geographically isolated communities performed worse than those from more urban areas. All these effects of students and family characteristics are highly statistically significant.

Liew (2004) studies the factors affecting mathematics and science achievement in Malaysia. He found that male students performed significantly better in mathematics and science achievement than female students. Mother and peer’s perceived usefulness of the subject were significant predictors of science achievement. Parent’s education and family structure were significant predictors of mathematics achievement. There is some evidence that engagement in extra classes outside formal schooling is associated with science achievement when controls for school characteristics were added. All school characteristics (schools located in geographically isolated, village/rural area, sub-urban, or urban area) are significantly related to mathematics and science achievement. Another study by Barry (2005) reported that students from low socio-economic status have lowest test scores. Increase in number of siblings and participation in positive activities with peers decreased test scores while participating in extracurricular activities increased test scores. Minority students scored less than non-minority students. Students who do not have English as first language scored less than students with English as their first language.

Elijio & Dudaite (2005) studies the impact of some social, economical, and educational factors on students’ mathematics achievement. The home-related factors include parents’ education and possession of various educational resources at home. A very strong relationship between the mathematics and the type of school locality (urban/rural) was found. According to Moriana; Alos; Alcala; Pino; Herruzo & Ruiz (2006) there was no significant difference in the study’s main socio demographic variables (student age, parents’ age and number of siblings). Students in the extra-curricular activity group obtained significantly
better results than those does not participated. Students who are involved in mixed activities (sports related activities) obtain better academic results.