Chapter-1
INTRODUCTION

1.1 Preliminaries
In this educationometric study an attempt has been made to estimate the relationship of Graduate Record Exam (GRE) score and its determinants and there by forecast the GRE score and control of its determinants.

More than seven lacs students per year from the whole world take GRE and many other similar tests like Graduate Management Test(GMAT), Scholastic Aptitude Test(SAT).

Out of these one lac are from India itself (OIE, 2013). Many students take professional coaching for improving their scores. The significant change in the scores of students confirms the hypothesis that a successful coaching curriculum can improve their performance at final GRE score for relevant success.

This study is based on a comprehensive set of data from the students enrolled in a leading coaching class of India ‘Swati Jain Academy’ Indore for GRE/GMAT/SAT in the last five
years. A sample of 722 students, appeared in GRE after coaching, is taken into consideration of this research.

1.1.1 Graduate Record Examinations (GRE) General Test

The Graduate Record Examinations (GRE) General Test, which is widely used in assessing the academic qualifications of applicants for admission to graduate school, is designed to measure verbal, quantitative, and analytical abilities that are developed gradually through both formal and informal learning over a relatively long period of time. Previously, the test was offered at five regularly scheduled during each testing year- in October, December, February, April, and June. Now the GRE General Test is offered as an internet-based exam administered at Prometric testing centers everyday all over the world.

During the First World War, Robert Yerkes, a leading member of the new IQ testing movement, persuaded the U.S. Army to let him test all recruits for intelligence. This test--the Army Alpha--was the first mass administered IQ test by one of Yerkes' assistants, who was a young psychologist, named Carl Brigham. After the war, Brigham began adapting the Army Alpha (mainly by making it more difficult) for use as a college admissions test. It was first administered experimentally to a few thousand college applicants in 1926. In 1933, James Bryant Conant, on becoming President of Harvard, decided to start a new scholarship program for academically gifted boys who did not come from the Eastern boarding schools that were the regular suppliers of Harvard's students. He gave Henry Chauncey, an assistant dean at Harvard, the task of finding a test to evaluate candidates for these scholarships. Chauncey met Carl Brigham, and came back to Conant with the recommendation that he use the Scholastic Aptitude Test (SAT). Conant liked the test because he thought it measured pure intelligence, regardless of the quality of the taker's high school education. In 1938,
Chauncey talked to all the member schools of the College Board into using the SAT as a uniform exam, but only for scholarship applicants. In 1942, because of the World War II, all the pre-existing College Board admissions tests were abolished, so the SAT became test for all applicants. In 1944, under contract to the Army and the Navy, Chauncey administered the SAT to more than 300,000 people all over the country on a single day. In 1948, the Educational Testing Service was chartered and the SAT was on its way to becoming the basic college admissions device for millions. The test has changed over the years, but not completely.

Since these tests consists of scores of two basic components English and Math up to high school level, an assumption underlying the interpretation of these scores is that the students are well prepared by their schools for the basic skills tested. Yet, not all the students perform well in these tests and are unable to get admission into the college of their dreams. Critics for these tests question the appropriateness or accuracy of numerical measures of individuals worth, especially when it is multiple-choice questions (Owen, 1985). They also ask if the test measures the full range of aptitude and intelligences that American education seeks (Gardner and Hatch, 1989). For students from India, understanding the concept is more difficult basically for two reasons: firstly, English is their second language and secondly, the reading passages are excerpts taken from the texts taught in High Schools of the US. Therefore, students need rigorous coaching of English reading before they can comprehend these passages. A professional help for the exposure to American History, Geography, Politics, and lifestyle, which is not covered by national or regional curriculum of India, is needed by students. Since one of the criteria for judging a students’ eligibility for admission into top universities is the score in these aptitude tests (standardized tests), many students seek out
coaching with well designed courses with the hopes that they can improve their test scores. Sometimes students do not score well in these tests because of the quantitative section sometimes are very bright in reading and writing and vice versa. Just because of their deficient knowledge they drop the idea of attending a good university. Now, in the multidisciplinary era, it is becoming more important for universities to admit students who have good mathematical and verbal skills. Wheelock (1998) writes that with mathematics, coaching plays an important role in closing the gap between students’ abilities. So is the case with verbal. In this multicultural environment, aptitude tests have become global assessment tools for selections in top Universities. Today, it has become important to find the determinants of global tools for measuring the achievement and attitudes of students from all cultures and nations. As Blum et al. (2001) points out there are certain things that are culturally or educationally specific so that exact translations are impossible, and in many cases it is not possible predict on advance which these item are. GRE Guide to the Use of Scores by ETS says, “Men generally have higher mean scores in these standardized tests. Non-U.S. women have a higher mean score on the verbal measure and mean scores for non-U.S. citizens are higher than those for U.S. citizens on the quantitative and analytical measures, and lower on the verbal measure” (Educational Testing Service [ETS], 2005). Besides citizenship and gender there are other factors like culture, bilingualism, aptitude and high school training that affects in the scores in the individual section of the test takers. Research conducted by ETS shows that, “An applicant with 300 on the verbal measure and 800 on the quantitative measure is very different from an applicant with 800 on verbal and 300 on quantitative. The former applicant might do well in a mathematics program, but the latter probably would not. Similarly, the student with 800 on the verbal measure might have a
high probability of success in an English literature program.” (Educational Testing Service [ETS], 2005, p. 4).

1.1.2. Necessity of Coaching

The re are large discrepancies in the abilities of students to perform well on these exams and coaching serves to coaching serves to level the playing field. Though coaching plays an role in the development of student’s academic gain, learning performance is affected by numerous factor including gender, age, teaching faculty, students schooling, father/guardian social economic status, residential area of students, medium of instructions in schools, tuition trend, and daily study hour. Many researchers conducted detailed studies about the factors contributing student performance at different study levels. Graetz (1995) suggested “A student educational success contingent heavily on social status of student’s parents/ guardians in the society. Considine and Zappala (2002) noticed the same that parent’s income or social status positively affects the student test score in examination. According to Minnesota (2007) “the higher education performance is depending upon the academic performance of graduate students. Durden and Ellis quoted Staffolani and Bratti, (2002) observed that “the measurement of students previous educational outcomes are the most important indicators of students future achievement, this refers that as the higher previous appearance, better the student’s academic performance in future endeavors.

1.1.3. Determinants of Aptitude Tests

Lot of studies have been conducted in the area of students achievement and these studies identify and analyze the number of factors that affect the academic performance of the student at school, college and even at university level. Their finding identify students’ effort, previous schooling, parent’s educational background, family income, self motivation of students, age of student, learning preferences and entry qualification of students as important factors that have effect on student’s academic performance in different setting. The utility of
these studies lies in the need to undertake corrective measures that improve the academic performance of graduate students.

It is generally assumed that the students who showed better or higher performance in the starting classes of their studies also performed better in future academic years at degree level. From the last two decades it has been noticed significantly that there is great addition in research literature and review material relating to indicators of academic achievement with much emphasis on this dialogue, whether traditional achievement measures of academic performance are best determinants of future academic gain at university or higher level or innovative measures. However, it is also observed that many of the researchers do not agree with this view point or statement. Reddy and Talcott (2006) disagree with these assumptions that future academic gains are resolute by preceding performance. In their research on the relationship between previous academic performance and subsequent achievement at university level, they found that students learning or studying at graduate level and the score secured did not predict any academic achievement at university level. They also cited Pearson and Johnson (1978) who observed that, on the whole, grade association is of only 0.28 between high school level marks and university degree achievement. It is also confirmed in the study of Oregon State University (2003) on graduate admissions that normal measures of educational potential and academic performance such as high school GPA (Grade Point Average) scores showed only 30% of the deviation in initial or starting (first) year at college. It is important to note that even these studies do not agree with the former studies who explored that previous achievement affect the future performance of the students in studies, they confirmed that the admission scores are related to academic performance at university level but to a very minimal extent.
McDonald et.al (2001) also suggested that the scores of graduate level studies still out perform any other single measure of cognitive aptitude in predicting success at university level. Parent’s socio-economic condition, which includes parents’ academic and professional qualification, revenue and occupational affiliation, is also associated with academic gain of students. The results of many studies confirmed that academic achievement of students is contingent upon parent’s socio-economic condition. So the students belonging from higher social economical backgrounds will perform better than other students associated with low social economic backgrounds. “Social and economical status of student is generally determined by combining parents’ qualification, occupation and income standard” (Jeynes, 2002). Among many research studies conducted on academic achievement, it is not very surprising to observe that Socio-economic status is one of the main elements studied while predicting academic performance. Graetz (1995) conducted a study on socio-economic status of the parents of students and concluded that the socio economic background has a great impact on student’s academic performance. Main source of educational imbalance among students and student’s academic success is contingent very strongly on parent’s socio economic standard. Considine and Zappala (2002) also having the same views as Graetz (1995), in their study on the influence of social and economic disadvantage in the academic performance of school students noticed that the parents or guardians have social, educational and economical advantage definitely strengthen the higher level success in future. But it is also noted that these parents make available sufficient psychological and emotional shore up to their children by providing good educational and learning environment that produce confidence and improve the skills needed for success.
On other hand, Pedrosa et al. (2006) in their study on social and educational background pointed out that those students who mostly come from deprived socio-economic and educational background performed relatively better than others coming from higher socio-economic and educational area. They named this phenomenon Educational Elasticity. It is obvious and true that the criteria for categorizing socio-economic standard in different countries are different depending of their norms and values. The criteria for low socio-economic status for developed country will be different from the criteria of developing nations and same will be in the case of developing and under developing countries. “The total income of families, monthly or annually and their expenditures also put a great effect on the learning and academic opportunities accessible to youngsters and their chances of educational success.” (Escarce, 2003) Furthermore, he also pointed that due to residential stratification and segregation, the students belonging to low-income backgrounds usually attend schools with lower funding levels, and this situation reduced achievement motivation of the students and high risk of educational malfunction in future life endeavors. Considine and Zappala (2002) observed that children coming from families having low income make subsequent models tell more in terms of learning outcomes: low literacy level, low retention rate, problems in school behaviour and more difficulty in their studies and mostly display negative attitude towards studies and school. The view point of Considine and Zappala is more strengthen by this statement of Eamon, According to Eamon (2005) “Those students usually come out from low socio-economic status or area show low performance in studies and obtained low scores as compared to the other students or their counter parts”. It is also assumed that children learning outcome and educational performance are strongly affected by the standard and type of educational institution in which students get their education. The
educational environment of the school one attends sets the parameters of students’ learning outcomes. **Sparkles (1999)** showed that schools environment and teachers expectations from their students also have strong influence on student performance. Most of the teachers working in poor schools or schools having run short of basic facilities often have low performance expectations from their students and when students know that their teachers have low performance expectations from them, hence it leads to poor performance by the students. **Kwesiga (2002)** approved that performance of the students is also influenced by the school in which they studied but he also said that number of facilities a school offers usually determine the quality of the school, which in turn affect the performance and accomplishment of its students. **Sentamu (2003)** argue that schools influence educational process in content organization, teacher and teaching learning and in the end evaluation of the all. All these educationists and researchers agreed with this principle that schools put strong effect on academic performance and educational attainment of students.

Students from elite schools are expected to perform good because they attend these elite schools and the main reason behind is that these schools are usually very rich in resources and facilities. Some researchers have the view that school ownership and the funds available in schools do indeed influenced the performance of the student. **Crosne and Elder (2004)** noticed that school ownership, provision of facilities and availability of resources in school is an important structural component of the school. Private schools due to the better funding, small sizes, serious ownership, motivated faculty and access to resources such as computers perform better than public schools. These additional funding resources and facilities found in private schools enhance academic performance and educational attainment of their students.

It is concluded that the type of schools in which students study greatly influence the
educational performance and academic achievement of the students. Miller and Birch (2007) summarized the views of many researcher and educationist in their study on the influence of high school attended on university performance. This study let the research scholar to hypothesize that the background to the students positively correlates with the academic attainment of graduate students.

1.2 Objective

The main objectives of this study are as follows:

To forecast the final GRE score by studying the determinants of aptitude tests.

To control the determinants of aptitude tests for good GRE scores based on data of past 5 years.

To understand the effectiveness and role of coaching in getting higher scores.

1.3 Scope

The data collected for this study is taken from a single coaching class. It is a longitudinal study. The forecasting and control is achieved on the basis of evaluation test given in the beginning of the course by the Academy. Because this study is only for Swati Jain Academy’s students, therefore its results may or may not be externally valid. It is recommended that this study should be conducted at a wide level of India, so that its result become valid for whole country creating awareness about aptitude tests for Global placement to improve economic condition of families and society at large.

1.4 Rationale

This research studied the determinants of Aptitude Test Scores and efficiency optimization based on available personal energy with forecasting and control of Graduate Record Exam (GRE). This has brought out the effect of sub-component of aptitude tests like psychological support, exposure to real exam, improving weaknesses, length and Curriculum design, comparison with other techniques of exposure to exam.
This research can be used to know how much coaching helps in the preparation of standardized tests. A significant improvement in the scores of students from the day students join the class to the time they go for the final exam is observed. These better results are because of greater clarity of the fundamentals, practice, and drills through coaching.

1.5 Plan of Thesis

Present study is organized as follows:

Chapter two presents a review of existing literature. A brief review of determinants of aptitude tests is conducted. The literature related to aptitude assessment as a global tool, coaching effectiveness and various factors affecting the final scores is done.

Chapter three deals with hypothesis and methodology. The Verbal score, quantitative score, 10th and 12th standard marks, financial background of parents, and the stamina of a student (number of hours studied daily) are considered to be important determinants for the GRE score. The sign of first four determinants are hypothesized positive and the sign of fifth is assumed to be negative.

The score increases due to high positive levels of first four determinants and sixth variable. The score decreases due to high negative value of fifth variable( financial background of parents).

Simple random sampling technique was employed in the selecting the sample from the targeted population. The researcher personally went to the respondents and filled out the questionnaires so that the true responses could be obtained. The data are collected from Swati Jain Academy Indore where students come from different states of India.

Analysis of ranking performance is based on residuals of estimated regression. The effectiveness of Coaching is examined through comparison of mean
score (before coaching and GRE results. using Regression on Dummy variable means equation (dummy variable). For testing the hypothesis that the GRE score varies with determinants Highest Residual is calculated and hence best students score is forecasted.

Forecasting of GRE score and control of its determinants are based on estimated regression of GRE scores on various determinants.

Chapter 4 deals with Data Collection.

The data were collected from Swati Jain Academy Indore with a sample of 722 students who took coaching and appeared in GRE from 2007 to 2013.

Chapter 5 deals with Empirical Analysis of the data through Estimated Multiple Regression Equation. It is found that the overall model is highly significant. All other coefficients of determinants are highly significant except percentage of 12\textsuperscript{th}. The coefficient of percentage of 12\textsuperscript{th} is less hence its contribution is less too. Also, income versus GRE score relationship is negative. This is significant too.

The Estimation of the Best Student is done by Highest Positive Residual model. The student who has got highest positive residual is relatively best student. This is a standard combination at the time for policy making. Using dummy variable approach for comparing means (scores before training and GRE score) it is concluded that in general the coaching is effective and beneficial.

Forecasting of the Final Score of a student entering is estimated based on estimated regression model. Similarly, for other possible combinations, the GRE score can be forecasted based on estimated regression model.
Controlling of the Score is also illustrated in this fifth chapter. However, in practice, the emphasis should only be given to time of study per day by the students, keeping all other determinants constant and case by case. By this model the control of GRE score was made by changing determinant(s) to plan for final score.

Chapter 6 deals with conclusion and policy implications.