RELATIONSHIPS BETWEEN SELF-CONCEPT, SELF-EFFICACY, CLASSROOM ATMOSPHERE AND MATHEMATICS ACHIEVEMENT OF IRANIAN HIGH SCHOOL STUDENTS

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Dedicated to

To my Beloved wife and Daughter

in gratitude

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ABSTRACT

This research studied the level of achievement in mathematics by concentrating on the role of classroom atmosphere on Iranian high school students. Self-efficacy is the key element in this study which relates individual's conception of his/her ability to a particular task. Self-efficacy is one of the factors affecting mathematical performance. Mathematics is one of the subjects to assess educational performance and prospective occupation.This research was based on quantitative methodology using a survey for a correlational study. Random sampling technique was used to select 400 respondents among students of Tehran, Iran. The research investigated the relationship between self-concept, classroom atmosphere, self-efficacy and achievement in mathematics of Iranian high school students. The study examined the significant difference between the achievements in mathematics among male and female high school students, and the good fit of the structural model. Data analysis was done using Statistical Package for Social Science (SPSS version 22.0) and Analysis of Moment Structures (AMOS version 22.0). A separate two-tailed t-test was used to calculate the difference between the utilized scales in the Iranian sample. Structural Equation Modeling (SEM) was used to analyze the goodness of fit of the model by studying the relationships among the variables. The goodness of fit of the statistic value indicated that the Chi-square [$\chi 2$ (N= 400, df = 86) = 273.235] was significant at p = .000; cmin/df= 3.177 (good because it is less than 5). Comparative Fix Index (CFI) =. 911was very good, because it is more than .95, reflecting a good fit. Furthermore, the Root Mean Square Error of Approximation (RMSEA) = .074 was acceptable. The results of this study showed that the learning environment can influence the level of students' mathematics learning, and showed that self-efficacy, self-concept, and classroom atmosphere influenced the learning of mathematics. The results also confirmed the validity (factorial validity) of the hypothesized models. The findings of the study also showed that the roles of learning class atmosphere, self concept, and self- efficacy mathematics for learning are crucial, and teachers are recommended to pay attention to these aspects of learning. The study has validated the achievement in mathematics based on self – concept, self-efficacy, and the classroom atmosphere hypothesized model.

ABSTRAK

Kajian ini mengkaji tentang tahap pencapaian dalam matematik dengan penumpuan kepada peranan atmosfera bilik darjah pelajar sekolah tinggi di Iran. Efikasi kendiri adalah elemen utama dalam kajian ini, yang berkaitan dengan konsep keupayaan individu dalam sesuatu tugasan. Efikasi kendiri merupakan salah satu faktor yang mempengaruhi prestasi matematik. Matematik maerupakan salah satu mata pelajaran untuk menilai prestasi pendidikan dan prospek pekerjaan. Kajian ini adalah berdasarkan kaedah kuantitatif yang menggunakan kaji selidik untuk ujian korelasi. Teknik persampelan rawak digunakan untuk memilih 400 responden dari kalangan pelajar di Tehran, Iran. Kajian ini mengkaji hubungan antara konsep kendiri, suasana bilik darjah, efikasi kendiri dan pencapaian dalam matematik pelajar sekolah tinggi di Iran. Kajian ini mengkaji perbezaan yang signifikan antara pencapaian dalam matematik dalam kalangan pelajar lelaki dan perempuan di sekolah tinggi, dan *good fit* bagi model struktural tersebut. Analisis data dilakukan dengan menggunakan *Statistical Package for Social Science* (SPSS versi 22.0) dan *Analysis of Moment Structures* (AMOS versi 22.0). Ujian-t dua hujung berasingan telah digunakan untuk mengira perbezaan di antara skala dalam sampel Iran. *Structural Equation Modeling* (SEM) telah digunakan untuk membuat analisis *goodness of fit* dalam mengkaji hubungan antara pembolehubah. Nilai statistik bagi *goodness of fit* menunjukkan bahawa *Chi-square* [$\chi 2$ (N= 400, df = 86) = 273.235] adalah signifikan pada p = .000; *cmin/df*= 3.177 (nilai adalah baik kerana kurang dari 5). *Comparative Fix Index* (CFI) =. 911 adalah baik kerana nilai melebihi .95, menunjukkan model mempunyai *good fit*. Tambahan pula, *Root Mean Square Error of Approximation* (RMSEA) = .074 boleh diterima. Keputusan kajian ini menunjukkan bahawa persekitaran pebelajaran boleh mempengaruhi tahap pembelajaran pelajar yang mempelajari matematik dan ini menunjukkan bahawa efikasi diri, konsep kendiri dan persekitaran bilik darjah mempengaruhi pembelajaran matematik. Keputusan juga mengesahkan kesahihan (kesahan faktorial) bagi model hipotesis. Dapatan kajian juga menunjukkan bahawa peranan suasana kelas pembelajaran, konsep kendiri dan kecekapan diri dalam pembelajaran matematik adalah penting, serta guru-guru juga adalah disarankan agar dapat memberikan perhatian kepada aspek pembelajaran tersebut. Kajian ini telah mengesahkan model hipotesis bahawa pencapaian dalam matematik adalah berdasarkan konsep kendiri, efikasi kendiri, dan suasana bilik darjah.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Psychologists and experts in the field of educational sciences have always been attempting to prepare favorable educational and learning conditions in their researches and theories. While behaviorists ignore the intrinsic factors by placing emphasis on extrinsic factors in explaining behaviors, cognitivists accentuate individual and intrinsic factors (Pervin, 2001). Albert Bandura's socio-**cognitive theory plays a significant role in justifying the process of teaching-learning and its conceptual dependents in a way that this theory has been used as a reference for many scientific books and articles in the past decades (Pervin, 2001).**

Self-efficacy is the key element in this theory, which relates to an individual's **conception of his/her ability in doing his/ her particular tasks. Self-efficacy mentioned as one of the factors affecting the mathematical performance. Anjum (2006), Martin et al (2004), Pahlevan Sadegh (2005), Nasr Isfahani (2003), Peterson et al (2000), Kabiri (2003), Pajares and Miller (2003), Pirhosseinloo (2003) and Wilkins et al (2004) reported the direct and indirect effect of self-efficacy on achievement in mathematics. Mathematics self-**efficacy could be defined as "the assessment of individual's confidence in his**/ her ability to solve or complete a** certain mathematical problem successfully" Hacket and Bets (cited by Pajares et al., **2003).**

Mathematics is one of the core and effective subjects in individual's **educational performance and future job. It is the center of attention due to its inherent beauty as well as its various applications. One of the fields in studying this issue is the analysis of parameters related to the achievement of students in mathematics. This field has caused several extensive researches based on the importance of mathematics and the weakness of the majority of students in this subject.**

The other effective variable in the achievement in mathematics is self-concept. Several researches (Pahlevan Sadegh, 2005; Nasr Isfahani, 2003; Wilkins, 2004; Pajares and Miller, 2003; Martin et al., 2004; Peterson et al., 2000; Anjum, 2006; Poorasghar, 2004).verified the effective role of self-concept in the mathematical progress in separate studies. One's take and perception on him/herself **which s/he greatly values is called self-concept by Rogers (cited by Kadivar, 2007).**

It could be said that an individual's learning and educational progress are **under the influence of complicated conditions. These conditions have various elements, each affecting this issue in its particular way. One of the elements of these conditions is the background and the environment of teaching (Bigs et al., 2003). Accordingly, it could be said that people who have more various experiences in more appropriate environments will be more efficient individuals in comparison with those deprived of such environments. With respect to the effect of the learning atmosphere on learning, it can be inferred that the recognition of those classes that are more appropriate environments is significant (Fraser, 2002) and the change of learning atmosphere has always been one of the intervening factors in better learning. (Ramsden, 1988).**

The classroom atmosphere, sometimes known as "learning situation" or "learning context" is a general phrase indicating **various aspects of educational environments. The learning atmosphere of a class is defined as the space or situation in which learners and teachers interact with each other and benefit from various tools and sources of information to follow their learning activities (Nijhuis, 2008).**

A large number of researches have been conducted on the genders of students and their roles in different variables, some of which indicating no connection (Rin et al., 2008; Keramati and Shahraray, 2004; Pahlevan Sadegh, 2005) and some revealing a connection between gender and the studied variables. (Seif Hashemi, 2003; Walsh et al., 2005; Noori, 2002; Melpas et al., 2000).

Bandura's socio-**cognitive theory contends that human behavior is defined by the interaction between human and atmosphere, named bilateral causality, through refuting approaches that maintain human is stimulated by intrinsic forces or those considering humans under the absolute influence of the environment (Pervin, 2001).**

This chapter will discuss the relationship between self-concept, self-efficacy, and the classroom atmosphere and their effect on achievement in mathematics. Thus self-concept, self-efficacy and the classroom atmosphere are independent variables and achievement in mathematics is dependent one. Therefore, the present research aims to investigate the connection between corresponding variables and the issue in order to place the value of these connections in a considerable causative model.

1.2 Background of the problem

Mathematics is one of the effective subjects in educational performance and prospective occupation.The International Association for the Evaluation of Educational Achievement (IEA) assesses the mathematical performance of students in a number of countries through an exam called the *Trends in International Mathematics and Science Study* **(TIMSS). This research emphasizes Iranian students with low proficiency in mathematics with respect to the findings of TIMSS. This weakness can be noticed in three stages of education. Researchers conducted by Pahlevan Sadegh (2005), Nasr-e-Isfahani (2003), Sadegh Nasri (1999), Anjum (2007), Martin et al (2004) and Peterson et al (2000) can be taken into consideration. These researches study variables affecting mathematical performance.**

Numerous studies demonstrate that self-efficacy, especially as to math is a noticeable indicator of mathematical progress. The conducted meta-analysis titled "The Connection between Self-**efficacy Beliefs and Educational Outputs on 1981-1988 researches (Multon & Brown**& Lent 1991)" with 36 sample researches reveal **that self-efficacy beliefs have a direct connection with educational progress whose total effect adds up to 0.38 with 99% certainty. (Zimmerman 2000). According to Anjum (2006) , mathematical self-efficacy has a positive and significant effect on the mathematical progress by studying it among 805 students of the 3rd, 4th and 5th grade of school in Lahore in Pakistan.**

Some studies showed the role of mathematical self-efficacy in mathematical performance with respect to the variables of mathematical self-concept, anxiety, perceived usefulness, past experiences and gender in a sample of 350 people based on Bandura's socio-**cognitive theory. The direct effect of mathematical self-efficacy on the variable of mathematical self-concept was reportedly high and significant. Mathematical self-efficacy has an indirect effect on mathematical performance through affecting mathematical self-concept (Pajares and Miller, 2003). Mathematical self-efficacy could be defined as eval**uation of individuals' confidence **in their abilities to successful performance or completion of duty or solving a certain mathematical problem (Hackett, 1985; Pajares and Graham, 1999). Mathematics self-concept (MSC) was constitutively defined as their evaluation of self-perceived personal possession of mathematical skills, abilities, mathematical reasoning ability, enjoyment and interest in the subject matter (Marsh, 1990, 1996).**

Regarding the direct significant role of self-efficacy in mathematical progress, this variable must have a particular place in educational researches. Therefore, self-efficacy beliefs have always been included in causative patterns at least as a balancing variable and as one of the factors this research to examine the direct relationship between the variable of mathematical self-efficacy and the variable of mathematical achievement.

Some studies have reported the absence of a connection between mathematical self-efficacy and mathematical achievment (Benson, 2001) .

Several researches (March, 2002; Wilkins et al., 2004) reported the connection between mathematical self-concept and mathematical progress to be positive and significant. Iran ranked seventh as to the variable of mathematical self-concept and ranked first with respect to the variable of self-concept. It was proved that Iranian students participating in TIMSS achieved very low ranks in mathematical performance and very high ranks in mathematical self-concept need further consideration (Wilkins, 2004). In addition, this research is going to check again it, that how self-concept of Iranian students have been high but ranks of mathematical was low and find relationship between self-concept and mathematical progress.

Although a number of researches have been conducted in the field of the relationship between mathematical progress and self-concept by Iranian researchers, conflicting results obtained in this investigation are inadequate because it requires many researches. For example, Pahlavan Sadegh's (2004) investigation report**ed high mathematical self-concept among Iranian Students. Nevertheless, the performance of Iranian students in Associations International TIMSS was considerably low. Furthermore, Poorasghr (2003) reported the low mathematic self-concept of Iranian Students. According to researches and the relationships between mathematical self-**concept and mathematical achievement, and the Iranian students' low mathematical **performance, more researches on Iranian students mathematics performance and mathematical self-concept and self-efficacy are required to identify the factors that causes the low self-concept and self-efficacy of Iranian students.**

The result of a research by Nasri (2007) that analyses the connection between mathematical performance and some psychological variables among the students of Tehran with a sample of 87 examinees shows that the variable of self-efficacy and mathematical self-concept affect and explain mathematical performance. He also maintains that this study is consistent with the researchers conducted by Barati 2004, Shekarkan and Nisi 2006, Rillich 1998 and March et al 2001.

Findings resulting from the goodness of fit of this model demonstrate that the variable of mathematical self-concept among Iranian students has a direct and

significant connection with their mathematical progress. He also mentions that this study is consistent with and similar to studies by Peters et al (2003) Kiamanesh (2003), Murray Harry et al (2000) which analyzed the connection between mathematical self-concept and progress. In the model presented by Pahlevan Sadegh, the relation between mathematical self-concept and progress is reported negative which is due to lack of proper coding.

Another research by Poorasghar (2004) studies the role of mathematical self-concept and math-learning motivation in the mathematical progress among first-grade high school students in the 6th district of Tehran by means of path analysis. The results of this model demonstrate that the variable of mathematical self-concept is the most effective one compared with other variables. Another finding of this study shows that the effect of gender is positive and significant while the effect of this variable on mathematical progress is not significant.

The differences between both genders in relation with studied variables will be discussed in this section. Researches benefiting from the latest statistical methods could provide us with a better perspective of these variables. The average of different tests shows there are gender differences among mathematical performance, self-concept and self-efficacy. The results of some methods, such as path analysis show these differences are balanced by some variables such as self-efficacy in that only the path of gender on self-efficacy is significant. Surveys also indicate that differences of performance between two genders appear when there are variables similar to certainty in the research. (Pajares and Miller, 2003).

Gender differences in mathematics have been the major subject for research during the past two decades. In general, surveys show that achievement in mathematics among boys is higher than girls. One reason for this difference is the higher self-efficacy among boys (Walsh et al., 2005). This research aims to demonstrate to examine gender differences in mathematical progress whether boys are higher than girls in mathematical progress considering the relationship between self-efficacy and self-concept or vice versa.

Pahlevan Sadegh (2005) studied the relation between variables of socioeconomic conditions of a family and personal variables with mathematical progress among 1510787 Iranian students with the aid of path analysis resulting in no direct relation between gender and mathematical self-concept and progress. He also announced that this finding is in accord with the results of researches conducted by researches, such as Swatec (2005), Wilkins (2004), Dai and David (2001) and Campbell (2001). However, this research is contradictory to the results achieved by researches, such as Pyrite and Rich (2000) and Lee and Aramson (2002) indicating a decreases in gender differences and gaps between boys and girls in Iran in terms of mathematical self-concept. Findings of Pahlevan Sadegh showed that there is no significant difference in the variables of achievement in mathematics between boys and girls.

In the past decades, academic success has been strongly linked to the positive outcomes that our society value for children. For example, once the result of government examination was announced, only the students who got excellent result in the test were given the opportunity to be interviewed by journalists for their success in academic area. They were praised by their parents, family, teachers, and even the others who did not recognize them. Schools and teachers plan a number of activities or programs at the beginning of high school in order to increase and enhance students' academic achievement. Other than that, parents also arrange **tuition and many activities for their children as to increase their academic achievement. However, there are some other factors, including self-concept, self-**efficacy, and the atmosphere of class that may influence students' or children's **academic achievement.**

The relation between students' self-**concept, self-efficacy, the atmosphere of class and their mathematical progress were important questions whether there are any** relationships between students' self-**concept, self-efficacy, atmosphere of class and their mathematical progress or mathematical progress has a major causal influence on the self-concept, self-efficacy and the atmosphere of class. In addition, what the** relationship between them is and if these three factors influence students' academic **achievement in high school are other crucial questions.**

Iranian students ranking thirty eight out of forty one, thirty one out of thirty three, thirty one out of the forty six and twenty nine out of the forty nine countries in the years 1995,1999, 2003, 2007 respectively, in TIMSS and PIRLS International Associations encourage Iranian researchers to find out the reasons for the failure of Iranian students in mathematics and to offer strategies for improving mathematics. Inappropriate classroom atmosphere and the type of education, training equipment in Iran (Kiamanesh & Noori, 2008; Kadivar, 2006), the low self-efficacy beliefs among Iranian students (Kabiri, 2003; Keramati, 2003), the low mathematical self-concept (Pahlavan Sadegh, 2004; Poor Asghar, 2005; Nasr Esfahani, 2003), families' **unfavorable socioeconomic status (Pahlavan Sadegh, 2006), the level of creativity and philosophical mind (Saif Hashmi, 2003), the high mathematical anxiety and performance expectation (Pir Hosseinloo,2003) and the low perceived usefulness of the course of problem-solving (Nasr Esfahani, 2003) vividly exemplify the efforts made in this area. However, since the mathematical and scientific progress are important for future career and due to poor mathematics among students in Iran, a few researches have been conducted in this field, and unfortunately, some of the results of the research are also inconsistent.**

The purpose of this research is to identify more precisely the relationship between mathematical self-concept, self-efficacy and mathematical achievement in the atmosphere of math class and provide strategies for improvement.

1.3 Statement of the problem

The aim of this study is to examine the relationship between students' **mathematical self-concept, mathematical self-efficacy, and the atmosphere of class and whether they influence mathematical progress among Iranian students in high school. Finally, it will discuss whether we can find any relationship between the three factors above and academic achievement as well. Another question is whether these three factors can enhance academic achievement in high school. This research is related to another study that is in the process by the Association of Iranian Society of Psychology. In addition, the researcher will find some familial, personal and social**

factors which may relate to the achievement of Iranian students. Nevertheless, the major parameters which might influence the problem of Iranian students' **underachievement can be overviewed as social factors, parents, peers, classmates, facilities, educational style etc.**

A few studies have considered investigating the improvement of the achievement in mathematics among Iranian students. So it is necessary to find out which factors could improve the ability to have achievement in mathematics. Furthermore, the researcher could find just a few researches and studies which show the relationship between self- concept, self-efficacy and classroom atmosphere (Fan and Walker (2000); Pajares and Miller (2003). In this field, especially comparative study among different genders is very poor.

1.4 Research Objectives

The objectives of the research are as follows:

(i) To validate the achievement in mathematics, self-concept, self -efficacy and classroom atmosphere hypothesized model.

(ii) To examine the relationship between self-concept, the classroom atmosphere, self-efficacy and the achievement in mathematics of Iranian high school students.

(iii) To examine significant difference between the achievements in mathematics among male and female high school students.

(iv) To examine the good fit of the structural model.

1.5 Research questions

This study addresses the following research questions:

(i) Is the hypothesized model of achievement in mathematics, self-concept, self -efficacy and classroom atmosphere valid?

(ii) Are there any significant relationships between self-concept, the classroom atmosphere, self-efficacy and the achievement in mathematics of Iranian high school students?

(iii) Is there any significant difference between the achievements in mathematics among male and female high school students?

(iv) Is there a good fit structural model of relation between achievement in mathematics, self-concept, self -efficacy and classroom atmosphere among Iranian high school students?

1.6 Research Hypothesis

The hypotheses of this research are:

(i) The hypothesized model of variables is a valid model.

(ii) There are significant relationship between self-concept, the classroom atmosphere, self-efficacy and the achievement in mathematics of high school students.

(iii) There is a significant difference between the achievements in mathematics among male and female high school students.

(iv) There is a good fit structural model of the relation between achievement in mathematics, self-concept, self-efficacy and classroom atmosphere of Iranian high school students.

1.7 Significance of the Study

This research studied the level of achievement in mathematics by concentrating on the role of self-concept, classroom atmosphere and self-efficacy among Iranian high school students. Few studies have focused on analyzing the

determinants achievement in mathematics among this population. The researcher cannot find any published studies, which have examined the relation between achievement in mathematics by concentrating on the role of self-concept, classroom atmosphere and self-efficacy. This study represents an effort to address this void in the literature. Recognition of factors in relation to achievement in mathematics could help in finding the theoretical and practical ways for improving the conditions of students of this group. Furthermore, it was useful for having a general view about the relation between variables of this research. By this finding the researcher prepared a fitting model that showed all scattered previous research on a summarized model. This study provides an insight for a better understanding of factors, which have an influence on achievement in mathematics.

This survey could provide some information for government in order to have successful students, academic achievements and in the productivity of scientific and technological fields. Since mathematics is the foundation of science and technology, solutions to mathematical progress are very important. Also this survey could illustrate the blind spots and provide appropriate solutions for government. One of the ways to achieve success in life, occupation and activities in society is educational success.

This study could be useful to schools for development in mathematics and effective guidance of students to mathematics -related sciences and vocational branches. High School plays an important role in the growth of personality and skills of students by considering some issues, such as educational conditions, the content of textbooks and their conformity with students' needs, the physical conditions, the **geography of school, entertainment and sport facilities, the connections between** parents and schools, students' mental and familial problems, teachers' knowledge, their living conditions, teachers' method of teaching, educational management and **planning, the quality of training and other issues which could play a significant role** in students' educational success and failure. Teachers with poor knowledge, the **absence of planning for teaching, shortcomings in educational methods and** unfamiliarity with students' morale are also other important **factors that lead to educational failure.**

This research could be useful to students, regarding mathematics in curriculum. It could make them aware of mathematics and in addition, the perception of mathematics as a result of human interests and needs. If students use the result of this research and if the aspects of mathematics program are combined in learning mathematics, learning can be simplified. When self-efficacy and self-concept are linked with mathematics, learners are able to see a humane manner that increases their motivation and achievement. There are several advantages in self-concept, the atmosphere of class and self-efficacy in this research with attitudes in mathematical educational programs. Students also understand and become more conscious of the role of mathematics in their lives and experience and also use different methods to learn. Furthermore, they consider mathematics as a subject that solves their problems. The inclusion of mathematics in curriculum makes students aware of the mathematical efficiency, and in addition, the perception of mathematics is a result of human interests and needs.

This research can be important to parents to develop appropriate ways for children to raise self-efficacy and self-concept. With respect to the significance of mathematics, parents attempt to develop students' mental abilities and the skill of **reasoning and prepare them to pace up with scientific changes and technological advances in their future life by including mathematics in their syllabi. Proper education and educational progress in mathematics obviously necessitate the recognition of problems students face in the way of learning.**

Regarding the explained studies in the initial sections of the research, it can be noticed that they all emphasize the role of mathematical self-concept and mathematical self-efficacy in mathematical progress. Therefore, with reference to these studies, these two parameters can be considered the effective ones in the present research. However, we aim at including the parameter of academic achievement by Iranian students as a neglected parameter in our research to discuss its effect on mathematical progress, mathematical self-concept and mathematical self-efficacy.

1.8 Scope of the study

According to objectives of this research, the main purpose is achievement in mathematics by considering some factors among Iranian students. So the scope is confined to the 11th grade of high school in Tehran as the capital of Iran. The researcher screen the respondents, who are between 16 and 17 years old. The data collected through four questionnaires being distributed from the first of January to the end of March of 2014.

1.9 Theoretical Framework

The present study has been conducted based on Bandura's socio-**cognitive theory. This study contends that human behavior is explained through the interaction between human and environment which is named mutual causality by Bandura, refuting the approaches that maintain an individual is stimulated by internal forces or those that consider human devoid of choice in nature. Humans affect others as much** as they are affected by both internal and external factors influence one's behavior **formation. In this approach, behavior, personal factors and environmental parameters act as interdependent factors.**

Self-efficacy is one of the concepts of Bandura's fundamental socio-**cognitive** theory. Studies on the interaction between the" individual" and "behavior" in self-**efficacy demonstrate that self-efficacy beliefs influence the behaviors of educational progress, such as the choice of assignments, continuity of learning and the amount of effort and acquisition of skills (Shunk, 1991-2002).**

It has also been indicated that various particular experiences, such as previous performance, replacement experiences, verbal persuasion and emotional-physiological arousal influence one's personal beliefs. For instance, students who **have been successful at school reveal higher levels of sufficiency related to educational performance in comparison with those devoid of successful experiences.**

Bandura (Shuck 2002) realized that students with high levels of self-efficacy participate more in educational assignments, work harder and endure longer against problems compared with those doubting their capabilities.

Borkwin (2000) concluded in a study that self-efficacy is the best predictor of mathematical progress. Fun and Walker (2000) came to the conclusion that students' **self-efficacy beliefs have a crucial role in predicting the performance of math problem-solving in two disparate researches. Various studies Pajares and Zimmerman (Anjum, 2006) also cite that self-efficacy particularly in the area of math is a remarkable predictor of mathematical progress.**

Carl Rogers, believed human can affect his/ her destiny or even control it. Since human is free, s/he can determine his/her own happiness or misery with free will. With respect to his belief, the main incentive is the individual's attitude towards him/herself and his/her surrounding world. Rogers's places emphasis on human's **features, in particular his/ her liberty and talent for personal growth and has an** optimistic attitude towards human's nature. He assumes A) Humans can go beyond **their primitive animal heritage and control their basic orientations and B) Humans are conscious and logical creatures who are not dominated by their unconscious and illogical demands and contradictions.**

He maintained that there is a basic human need for positive regard both from others and from oneself. He also believed that in every person, there is a tendency towards self-actualization and development so long as this is permitted and encouraged by an inviting environment (Purkey & Schmidt, 1987).

It seems educational self-concept and educational performances have a bilateral connection. Self-concept has been categorized in 3 levels: general self-concept, educational self-concept and non-educational self-concept and specific areas of self-concept directly related to the learning subject or the type of activity (Bloom, 1982. March et al., 2003). General self-concept that is a set of fixed beliefs about one's self is placed on the first level. Both general educational and non-**educational areas are placed in the second level. In the third level, there are peculiar areas of self-**

concept relating directly to school lessons or the type of activity. This level depends on our daily experiences and is most likely to change. Next study showed that there are relations between three levels of self-concept. Verbal performance and verbal self-concept as well as mathematical progress and mathematical self-concept are also correlated (Bentham, 2002).

Another variable affecting mathematical progress that has been studied in this research is the class atmosphere. The environment of class has a vital role in students' educational, behavioral and psychological performance (Kuperminc et al., 2003). The psychological atmosphere of the learning environment and its contextual and social characteristics as well as teachers' support have a significant role in students' learning behaviors, involvement with assignments, educational values and educational progress (Ames, 1992; Davis, 2002; Pintrich, 2002). The application of students' conception in order to assess the class atmosphere stems from Lewin's theory (1936) and Murray's theory of demand-pressure (1938). Lewin (1935) and Murray (1938) have emphasized the influence of environmental characteristics on human behaviors. The theories of these researchers suggest that the interaction between environmental characteristics, such as class experiences and personal characteristics predicts the development of one's behaviors (Fraser, 2004; Dorman and Aldridge, 2004).

The theoretical framework of environmental conception in this research is based on Moos's (1979) conceptualization from the socio-psychological class atmosphere. Based on Moos's theory, the class atmosphere has measurable characteristics like humans. (reported by Choi & Baek, 2002).

Various studies have shown variables related to school, such as the class atmosphere, student-teacher relation, teacher's management of class, organizational behavior and gender correlate with students' educational progress.

Sunger and Gunggoren (2009) showed in a study that the conception of the atmophere of class has a direct connection with the cognitive and motivational components of learning.

Choi and Baek (2005) concluded in a study titled "The Correlation between Students' Conception of the Atmosphere of Class and Educational Progress in Korea" that the class atmosphere is a decent predictor of students' educational progress. Studies by Cutton (2001), Mijli (1996), Telli, Cakiroglu & Den Brok (2006) and Derman, Fischer and Waldrip (2006) have also reported the direct connection between the conception class atmosphere and educational progress.

According to Bandura's advice (1997), individuals' real performances should be assessed. The real performance can be assessed when doing assignments is important to examinees and s/he has a high level of motivation to do them. Final exams are of high importance from among other exams. Nationwide homogeneity of final exams (due to the exams of the 11rd grade) was another factor to apply the final written exam as a means of assessing mathematical progress. Students' scores are collected after checking their exam sheets and announcing their credits.

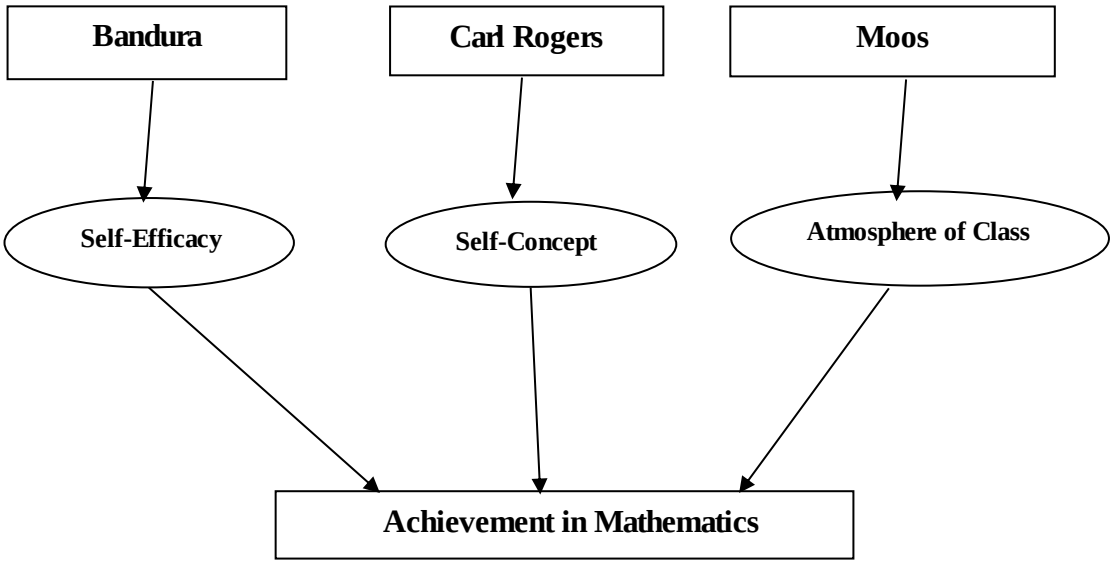

Figure 1.1 Theoretical Model of Study

1.10 Conceptual framework

Students' educational **progress is one of the indicators of the efficacy of every education system. Therefore, many studies have been conducted on the factors creating educational progress. These studies emphasize the recognition of factors capable of change and modification that can play the role of a moderator between educational progress and its corresponding variables. In the conceptual model of the present study, the conception of the atmosphere of class as an external factor affects mathematical self-concept as well as mathematical self-efficacy and indirectly explains the changes of mathematical progress.**

It is usually noticed that students have trouble solving math problems and fail to solve some problems which affects their mathematical self-efficacy. Thus, self-efficacy is studied in this research as one of the effective factors in mathematical progress.

Another significant parameter in the area of institutional learning that has required various researches is educational self-concept. Educational self-concept indicates students' conception or concept of their efficiencies with respect to **institutional learning that both affects and is affected by educational progress.**

In order to study high school students' conception of the class environment, a **particular class should be observed since high school students have variegated** subjects and classes. As a result, students' conception differs from class to class and **teacher to teacher. Regarding the mentioned reasons and the importance of math, the main objective of this study is to discover the connection between mathematical self-concept, self-efficacy and the classroom atmosphere concerning achievement in mathematics. This study is conducted on boys and girls in the 11rd grade of high school in Tehran. The offered model is presented in the figure 1.1.**

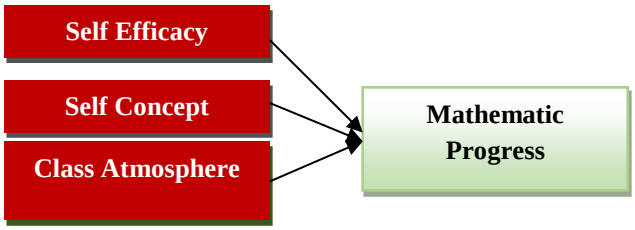

Figure 1.2 The relationship between students' self-**efficacy, self-concept, class atmosphere and achievement in mathematics (Conceptual Model of Research study).**

1.11 Definition of Terms

The following terms, which are independent variables are defined as they relate to this study; self-efficacy, class atmosphere and self-concept. Mathematical progress, however, is a dependent variable. High school is a control variable. Genders and the comparison between them are moderator variables.

1.11.1 Self- Efficacy

Bandura (1977) offered a formal theoretical definition of self-efficacy:

"Perceived self-efficacy refers to beliefs in one's capabilities to organize a**nd execute the courses of action required to produce given attainments. . . . Such beliefs influence the course of action people choose to pursue, how much effort they put forth in given endeavors, how long they will persevere in the face of obstacles and failures, their resilience to adversity, whether their thought patterns are self-hindering or Self-aiding, how much stress and depression they experience in coping with taxing** environmental demands, and the level of accomplishments they realize. (p. 3)" (B**ong and Skaalvik, 2003).**

Sam et al., (2005) claim self-efficacy is a motivational belief with a determining role in learning various sciences. Expectations about self-efficacy are one of the most significant factors in building one's behavior. The definiti**on of self-efficacy in this research is the belief of a person about his/ her confidence in their abilities. Studying self-efficacy beliefs of individuals benefits from various forms of** the verb "can", such as, "Can I solve this problem?" and mathematical **self-efficacy in this research is an individual perception and takes on learning and doing mathematics assignments and abilities in solving mathematics problems.**

Pajares and Miller (1994) regard mathematical self-efficacy as one's **assessment of his/ her abilities in solving mathematics problems. Hackett and Bettes (1989) define mathematical self-efficacy as individual perceptions and takes on learning and doing mathematics assignments. Pajares and Kransler (2000).**

In carrying out this study, the researcher used Mathematics Self-Efficacy Scale (MSES). The MSES was constructed according to three criteria. First, the items were written with specific reference to the curriculum level of students studying at middle high school level in the Victorian school system. This criterion relates to students in Years 9 and 10 who are approximately 14 to 16 years of age. Second, the items were designed to measure perceived, rather than demonstrated, competence. Third, the MSES items were worded so that the context in which respondents make their assessments of their mathematics competence could be varied.

1.11.2 Self-concept:

Self-concept is colloquially defined as a composite view of oneself. Rosenberg (1979) defined self-concept as ". . . the totality of the individual's **thoughts** and feelings having reference to himself as an object" (p. 7) (Bong and **Skaalvik, 2003).**

Self-concept is an important construct in education because of its linkage to academic achievement (Byrne, 1984; Valentine, Dubois, & Cooper, 2004). Nonetheless, a general self-concept might not be solely confined in the academic orientation (Skaalvik and Skaalvik, 2006).The definition of self-concept in this research is the explanation of self-perception. One's self-**concept is rooted in what one may consider** his/herself to have been. For example, "who I am" or "how you feel about yourself?"

The definition of mathematical self-concept in this research is perceived as usefulness in mathematical achievement. One's interest in mathematics originates **from his/her learning from individual interest and mathematical ability.**

Mathematical self-concept is assessed through self-description questionnaires (SDQ) in this research. This scale evaluates students' self-**concept with the aid of 12 questions in two mini-scales.**

1.11.3 Class Atmosphere

Learning environment which is also named "learning situation" or "learning context" is a general phrase indicating various aspects of a teaching space. The **learning environment of a class targets some space or situation in which learners and teachers interact with each other and benefit from varied tools and sources of information to pursue their learning activities (Nijhuis, 2006).**

This research is based on Moos's (1979) conceptualization from the socio-**psychological class atmosphere. Bas**ed on Moos's theory, the class atmosphere has **measurable characteristics similar to those of humans (reported by Choi & Baek, 2002).**

The class atmosphere in this research is defined as a learning place where teachers and students' main goals are teaching **and learning. Therefore, a decent atmosphere is required to be established in the classroom for teaching and learning.**

Optimal and suitable atmospheres are positive and goal-oriented relationships that are available between teachers and students, the way and the method of teaching and students' communication in class.

1.11.4 Achievement in Mathematics

Achievement in mathematics is defined as learners' success in educational **affairs which can be evaluated based on examinations. The evaluation of mathematical progre**ss means the assessment of the learners' performance and the **comparison of the results with predetermined goals in order to decide whether** teachers' educational activities and students' learning activities have yielded **favorable results and the desirable success rate (Tourani, 2008).**

The definition of achievement in mathematics in this research is success in educational affairs which can be evaluated through examinations, especially for those who score "A" in mathematics examinations.

1.11.5 High schools

In Iran, high school consists of four years of education, referred to as year 10 to year 13. In Iran, high school begins at the age of 15 and finishes at the age of 18. Students are allowed to the next year regardless of their academic achievement during the 3 degrees. The first degree in Iran is primary school between the ages 7 and 11. The second degree is junior high school when students are 11-13 years old. During the third degree i.e. high school, students are 14-18 years old. This study focuses only on male and female high school students in Tehran ranging between 14 and 18 years of age.

In this research, high school is defined for students aged between 15 and 18 years of age. This study focuses on only male and female high school students who are between 17 and 18 age group in Tehran the capital of Iran.

1.12 Summary

This chapter discusses the introduction of the study, the background of the problem, the statement of the problem, research objectives, research questions, research hypotheses, the significance of the study, the scope/ limitation of the study, conceptual framework, theoretical framework and the definition of the terms that are used in this research. Since academic achievement in mathematics has become extremely important for students in Iran, teachers and students had better know which factors influence their academic achievement. Although there are numerous factors that affect students' Academic Achievement in Mathematics, this study focuses only on students' Self**-concept, Self-efficacy and Perception of classroom.**

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