Haigazian University

The Effect Of Teacher Ability, Motivation and Work Situation On Student Performance

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A Thesis

Submitted in Partial Fulfillment for the Requirements

Of The Degree of Masters of Arts in the Education Department of

Haigazian University

Beirut, Lebanon

June 2000

Haigazian University

Abstract

This study examines the relationship of teachers' performance to student performance in mathematics of 6^{th}, 7^{th}, 8^{th}, and 9^{th} grade students in Beirut. A general model of teachers' performance (Rowan et al., 1997) suggests that the effects of teachers on students' achievement can be explained by three general classes of variables: teachers' ability, motivation, and work situation. This study shows and discusses how the combined effects of these classes of variables can explain students' performance in math. The analyses revealed that teachers' performance could have a direct but week effect on student performance in mathematics.

Acknowledgement

I would like to thank my advisor, Dr. Chris Moacdieh, for his helpful suggestions and valuable feedback at various stages in the development of this thesis, and the members of my committee, Dr. David Tawil and Dr. Ahlam Kleilat, for their professional guidance.

I am most grateful to Miss Najwa Nasr, an instructor of Business Administration at Haigazian University, who patiently guided me through the analysis of the data. This thesis would not have been possible without her support and assistance. Thank you.

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Chapter One

Introduction

A. The statement of the problem and its background

A shared concern in education is the issue of why some students fail. Research studying variables, which affect the performance of students, are numerous. One of the many approaches taken to study student performance is the theory adopted by so called Revisionists or Social Conflict Theorists. They claim that student progress in school is influenced by the socioeconomic status (SES) of the individual's family. The Revisionists claim that "if you know a child's class status ... you can predict what will happen to him in school and how successful he will be."(Rehberg and Rosenthal, 1978). Rosenthal (1978) stated; "the predominant influence on an individual's progress in school is the social class of his/her family." Similarly, Jenks(1971) points out that educational attainment is greatly influenced by the social-background of the family, the parents' education, the location of residence and school, and by child-rearing methods. On basis of their empirical research Zonjonc and Markus (1975) concluded that intellectual growth and educational attainment are envisaged as a function of the structure of the family. According to Zonjonc (1976) this complex structure is made up of the following factors: number of siblings, birth order, age spacing between adjacent children, and the milieu in which each child is reared. A further influence on the child's intellectual growth relates to the mother's age at the birth of the child.

(Zonjonc, 1976) The companions of older mothers frequently socialize with people of similar status. Such an atmosphere provides a richer and more stimulating environment than provided by younger mothers. Kalmun (1994) describes the influence of mother's occupational status on children's educational attainment a positive factor. Bowles (1971) showed that children whose parents were highly educated outperform the children of parents with less education by a large margin. Children whose parents occupy positions at the 'top' of the occupational hierarchy attain more years of schooling than compatible children of 'working class' parents. In addition there is a difference in the respective child-rearing methods and also differences in the child's physical surroundings, all of which influence academic performance. Rist (1976), on basis of an empirical study, showed that the milieu of a particular school; including such factors as school facilities, pupil-teacher ratios, social and cultural compositions of the faculty and students influence student performance. He added that teacher-pupil activities and interactions, community and parental involvement, faculty relationships, the role of the principal and supportive services such as library facilities might all have a direct impact on educational attainment.

Another approach is through the effect of teacher's expectation on student performance. Rosenthal and Jacobson (1968) claim that teachers' expectations of a pupil's academic performance have a strong influence on the actual performance of that pupil - thus validating a type of educational self-fulfilling prophecy. Rist in 1977 added to Rosenthal's and Jacobson's findings that the

origins of teachers' expectations are attributed to a student's social class, physical appearance, sex, race, and language patterns. A teacher's knowledge of a student's alleged performance on IQ tests and the school records of the student also shape a teacher's perception. Rist (1970) gives a wide range of factors, which are likely to shape or influence a teacher's perception of a particular student. He stated that the name of the child, age (whether above or below class level), name of parents, relative status of parents, family size, and home address mold a teacher's perception of a student. Whether the child receives public welfare funds or not, any type of interview with the parents and child before school resumes, information available to the teacher from other teachers or the teacher's own experience with older siblings of the student, and prior academic and disciplinary records cast a teacher's insight of a student. Moreover, Rist argues that the behavior, degree and type of verbalization, dress, mannerism, physical appearance, body odor, interactive behavior (students among themselves and with the teacher) and the degree of verbal interaction and the quality of language used by students on the first few days of school all influence a teacher's perception. The teacher begins to form opinions concerning the capabilities and potentials of the various children in the classroom. Rist claimed that certain criteria become indicative of expected success and others become indicative of expected failure. According to Rist, the teacher's evaluation is based on middle class criterion. Falling below such criterion would contribute to a negative assessment by the teachers. Those children who closely fit the teacher's middle-class, "ideal-type" of the

successful child, come to realize the teacher's expectations and consequently fall into the expected "fast-learner" or "slow-learner" category.

One group who has been opposed to the Revisionist's and Social Conflict Theorist's assumption that an individual's progress is influenced by the SES of the family are the Meritocrats (e.g. Rehberg and Rosenthal, 1978). The Meritocrats reject the Revisionist's insistence on the effect of external forces on students' performance. Instead, the Meritocrats claim that individual merit, academic achievement and ability, educational goals, curricular plans and support given by parents and peers remain the best predictors of educational success. According to the Meritocrats, all play a negligible role as predictors of student performance.

A research project conducted by the Educational Research and Development Center in Lebanon (CRDP) in 1995. Based on the data obtained by the center there seems to be an increasing rate of failure among intermediate (grades 6-9) and secondary (grades 10-12) level students. Whether professional pedagogues, or concerned laymen, teachers have always been blamed for students' failure. Ali Husseini (1999) conclude on basis of a survey that Lebanese students' academic results in many subjects, mainly math and science were 'disastrous'. "In education," Husseini says, "there are four parties responsible for the learning process: the parents, the school administration, the student, and the teacher. Any party which does not play its proper role can cause its failure." The extent to which students' achievement is attributed to teachers' 'effectiveness' or lack of it is a highly relative issue to

the present research. Holt (1964) has closely examined the problems of teacher's efficiency and student's performance in his book Why Students Fail, (1967). According to Holt, it is the teacher who should be held responsible for either the success or failure of those who are under his/her guidance and academic influence. Student's past, present, and future performance can easily be interpreted and predicted based on data given about their teachers. Teachers are described as demagogues who teach children docility and meaningless routines.

In recent years much effort has been directed toward understanding the quality of teacher performance or how 'effective' a teacher is in terms of student academic performance. Thus teachers' success has become attributed to students' increase in knowledge, skills, and grades. There has also been extensive research directed at analyzing the relationship between teachers' knowledge, education, motivational level, or personality, on the one hand and student performance on the other.

Administrators usually use students' scores to measure teachers' competence within the classroom. Eisner (1994) and Gordon (1983) indicated in their studies that there does not seem to be a reliable "statistical relationship between a competent teacher and student learning." Eisner believes that many factors, other than teachers' performance combine together to yield a student's score: factors such as student's background, learning abilities, or motivation. He also argued that the difference in performance amongst teachers is not simply a difference in knowledge of a subject matter. Rather, it is a

combination of variables. Eisner (1983) went further and stated that a teacher must understand the individuals he/she is teaching, the abilities of the students, and the stages of development through which they pass. A teacher must also be aware of the different ways in which the environment molds the students' personalities and interests. An 'effective' classroom teacher must understand the principles underlying the behavior of her students - then act accordingly.

This leads us to the study conducted by Rowan et al. (1997) which is at the core of the current research. Rowan et al. (1997) suggest that teachers' effect on students' achievement can be attributed to three general classes of variables; a) teaching ability, defined in terms of teachers' knowledge of subject matter plus teaching strategies; b) teachers' motivation, defined in terms of the teachers' efficacy, locus of control, and outcome expectancies; and c) the classroom situations in which teachers work, including such factors as class size, instructional grouping arrangements, time allocations, and the extent to which schools have been 'restructured' to provide teachers with appropriate control over working conditions and support from colleagues. Rowan et al. suggest that ability, motivation, and work situation have direct and additive effect on students' performance.

Rowan et al. studied the effects of these variables on 10^{th} grade students' mathematics achievement. Their sample consisted of 5381 students and 2077 teachers from 410 private and public schools. The data collected was based on teachers' self-rating on a set of variables.

Obtained results from Rowan et al. indicate that variables that measure teachers' content knowledge affect students' achievement. Students whose teachers answered the math quiz item correctly had higher levels of achievement than did those whose teachers answered the question incorrectly. There was no relationship between teachers' emphasis on Higher Order Teaching (HOT) based instruction and students' mathematics achievement. The findings provide a mixed support for hypotheses about the effects of teachers' motivation on students' achievement. Further data show that teachers' general force of motivation had no effect on students' achievement in mathematics whereas teachers' expectations for specific students did have a statistically significant effect on students' achievement. In the analysis of studying the effects of school-restructuring variables on students' achievement the results found by Rowan et al. were again mixed. Their data show students who attend schools where teachers reported more control over decision making and have support from school leadership had higher levels of mathematics achievement. On the other hand, receiving cooperation from staff members showed no significance with student performance. Despite the mixed findings and small effects, the researchers still believe that the data provide some support for the idea that students achieve more in schools where their teachers are actively involved in school life. Rowan et al. (1997) concluded that their findings provide preliminary support for the broad hypothesis that teaching performance is a function of various dimensions of teachers' ability, motivation, and work situation. The effect sizes of variables measuring these

broad constructs were exceedingly low. This is in line to Eisner's claim that there are many factors other than a teacher's performance, which influence a student's academic performance, as previously mentioned.

In general the main aim of the present research is to examine possible relationships that might accrue between teacher effectiveness and student performance. A resultant conclusion from researchers' experience with the issue of finding a relationship between 'effective' teachers and student performance is a complex task.

The present investigation follows Rowan et al.'s (1997) study of teacher's performance in terms of three general classes of variables: a) teacher's ability, b) motivation, and c) work situation. Rowan et al.'s model views that ability (A), motivation (M), and work situation (S) have direct and additive effect on teacher's performance (TP). Our study will investigate the additive effect (TP) of A, M, and WS on student performance (SP), as in Rowan et al.'s model. Moreover, the study will consider the individual effects of A, M, and WS on SP. More details are found in the Literature Review section of this paper.

Bearing in mind all of the above mentioned research and results, and considering the fact that teacher accountability is constantly on the educational agenda, the present research is based on Rowan et al.'s findings. The current research is an attempt to investigate teacher performance as it relates to teacher's ability and motivation to teach mathematics, and the teacher's working situation or environment, on the performance of intermediate (grades

6,7,8,9) students who attend private schools in Beirut and its vicinity. It brings a modest step towards shedding some light on the complex issue of the teachers' performance and student performance. It also attempts to clarify elements within teacher's ability, motivation and work situation, which have direct influence on student performance.

B. The Hypotheses

Accordingly, the following null hypotheses are formulated:

H1: Students, who have math teachers with higher levels of ability as measured in terms of knowledge in subject-matter and teaching strategies that involve Higher Order Thinking (HOT) or indirect teaching methods, will have higher achievement in math.

H2: Students whose teachers are highly motivated in their work will show higher levels of achievement in math than students whose teachers are not highly motivated to teach.

H3: Students who have teachers who are engaged in school restructuring have higher levels of mathematics achievement than students who have teachers who are not engaged in school restructuring.

H4: Higher teacher performance leads to higher student performance.

C. Definition of Terms

The following terms are defined in the context of the study. In accordance with Rowan et al.'s theory, teacher performance is a function of:

- Teacher Ability

In the text teacher's ability to teach is measured through:

- Teacher's knowledge in mathematics
- Teacher's use of 'indirect' (teacher-centered) teaching strategy vs. 'direct' (student-centered) teaching strategy in teaching students Higher Order Thinking (HOT) skills in math that demand deep conceptual knowledge of subject and the ability to solve complex multi-step problems.

- Work Situation

Work situation is defined by teachers being actively involved in restructuring their school environment by:

a) decision making,

b) staff members working collaboratively for a common aim,

c) having support from school leadership.

- Motivation

Motivation according to Hertzberg's Motivation Theory is defined as a measure of teacher's level of intrinsic motivation towards her/his job.

- Student Performance

  Student scores on the midyear examination in mathematics.

D. Purpose

Some teachers are unquestionably more successful in the classroom than others. Some seem to be able to make students understand complex thoughts with what seems to be little effort on their part. Others, even those highly successful in their own specialized field have difficulty 'getting the message across' to students.

To the best of this author's knowledge, the relationship between teacher performance and student performance has not yet been investigated in Beirut, Lebanon. Since teacher evaluation and supervision are an important means through which administrators improve resources of a school, there is an obvious need for the delineation of the possible relationship between factors (variables) in teachers' performance influencing the performance of students. Hence, one may assume that if a significant relation does exist between student performance and teacher performance, then recruiting, supervising, training, and evaluating teachers, can become clearer to educators and school administrators. It will also allow administrators in their evaluation of teachers to provide the necessary feedback or training, which in turn will increase student performance.

Based on the above rationale, this study is designed to achieve a two-fold purpose:

- To determine whether a relationship exists between teacher performance and student performance.
- To study the variables in teacher performance which have direct influence on student performance in private intermediate schools in Beirut and its vicinity.

E. Significance of the Study

Rowan et al. have developed and constructed a measure of TP and received data from 2077 teachers of mathematics from 410 private and public elementary schools in the USA. It is expected that this study, which is an inquiry into a problem that has not yet been investigated in Lebanon, will provide a general understanding of variables in teacher performance, teachers who teach mathematics in private schools at the intermediate level.

The findings of this study could have diagnostic and predictive uses:

- Give a better understanding of variables in teacher performance, which elevate student performance.
- The findings could also help to decide in which areas teacher training is needed most.
- It is also hoped that the study will stimulate further research in the field of teacher performance and its relation to student performance.

F. Limitations

The study is conducted within the following limitations:

- Time and cost limitations

One of the primary limitations was the inability to conduct a face to face survey. The researcher was not present to explain in person the nature and seriousness of the study. The present author handed the questionnaires to the respondents through the administrators of the schools. There was the possibility of respondents not feeling accountable in filling the questionnaire since there was no direct contact between the researcher and the respondent. Any questionnaire regarding information from teachers is likely to be met with suspicion on their part and cause bias in responses. This may cause the respondents to believe that information of this type may be handed to 'authorities' within the school. Another limitation is that different schools/teachers have different measuring or grading systems. Instead of using the school's measuring system, a standardized test could have been used to measure the performance of students in mathematics. Student performance in this study is tested through the class average on the midyear exam. This may not have been a sufficient measure in evaluating the students' performance in math. Midyear exams are administered after four months of schooling, which might not reflect enough time exposure to the teacher. The teachers' ability, motivation, and work situation could have influential effect on the students' performance, which may not necessarily show after four months of contact.

- Questioning limitations

Another limitation that could be taken into consideration is the language barrier. Even though the selection of schools was based on having English language as the language of instruction, we assumed that all teachers knew the English language and would have no difficulty in comprehending the language used in the questionnaire. But a number of teachers reported that they had not understood the meaning of certain words in the questionnaire. The questionnaire could have been translated into Arabic, the native language of the respondents. Since the researcher was not present, the amount of time spent by each individual respondent on teacher math quiz in measuring the teachers' knowledge in the subject matter was not controlled. Even though time was specified (7 minutes), the respondents could have spent a longer time or even sought the assistance of others to obtain the correct answer for each math problem posited in the questionnaire. Moreover, the organization of the questionnaire might have created some negative feedback; feeling 'offended' or 'insulted' which led to missing responses and bias in completing the remaining questions.

- Cultural limitations

A general limitation is a cultural limitation, which any researcher collecting data in Lebanon could face. Some Lebanese might not be accustomed or acquainted with or have been exposed to participating in research or studies. They are unfamiliar with answering questions of the sort.

- General limitation

The results of this study cannot be generalized to the whole of Lebanon. The results are limited to Beirut and its vicinity.

Chapter Two
Review of Literature

The purpose of this section is to give the reader a brief overview of related research undertaken in the field of education. Educators have often asked, "What makes a 'good' or 'effective' teacher? "How can a teacher improve his/her students' performance?" "Do 'effective' teachers have certain abilities, motivational levels, or special working situations in common?" Or "Are there certain patterns or traits that separate 'good' teachers from the 'average' or from the 'ordinary'?" Or "What variables or qualities are describable in a teacher?" These questions have been discussed and studied by educational researchers, administrators, and other experts in the field, and results show that there are almost as many opinions and conclusions as there are discussants (Medley, 1982).

Explanations given for student success or failure come from different intertwining sources. The teacher's educational background, professional experiences, teaching strategies or techniques among others are all intermingled to have their positive or negative effect on the student. Next, the student's family and social background, past success or failing experiences, the availability of educational resources such as books, magazines, computers, extracurricular activities in and out of school, as well as their personal traits are some of the variables that play an important role in determining a student's success or failure. Finally, the school itself can either enhance or hinder the

existence of a healthy educational atmosphere, for elements such as curriculum, textbooks, audio-visual materials, disciplinary measures, school policies, and physical structure and school facilities, such as labs, libraries, and clubs, all interact to make a decisive impact on the student's educational journey.

Teaching Ability

Many researchers [Campbell 1990; Hunter and Hunter 1984 (Hanushak, Hedges, Laine, and Greenwald 1994; Prediger 1989; M. Smith and George 1992) cited in Rowan et al. 1997] have used various variables such as measuring teachers' I.Q. and educational degree obtained to study the relationship of teaching ability to student performance. In this section we will focus on two specific factors to represent teachers' ability (A): (a) teachers' knowledge of subject matter and (b) teachers' use of appropriate teaching strategies (Rowan et al., 1997). These are elucidated as follows:

a._ Knowledge of subject matter:

The importance of measuring teaching performance in terms of teachers' knowledge of subject-matter is straightforward. Bryne (1990), Leinhardt and Smith (1985), and Shulman (1986) have argued that a deep knowledge of the subject being taught can support teachers in both the planning and interactive phases of teaching. In planning for instruction, knowledge of subject matter supports the development of good lesson

structures that organize and sequence instruction around important concepts and related operations. Leinhardt and Smith (1985) stated in their study the knowledge of subject emerges from two core areas of knowledge: 1) lesson structure and 2) subject matter. Lesson structure knowledge includes the skills needed to plan and run a lesson smoothly, to pass easily from one segment to another, and to explain material clearly. On the other hand, subject matter knowledge includes concepts, algorithmic operations, the connections among different algorithmic procedures, the subset of the number system being drawn upon, the understanding of classes of student errors, and curriculum presentation. Subject matter knowledge supports lesson structure and acts as a resource in the selection of examples, formulation of explanations, and demonstrations. For example, knowledge of subject matter requires lesson structure so that the content of the lesson strongly influences how it is to be taught. Therefore, in our study we will examine the effects of teachers' knowledge of mathematics on students' performance in mathematics.

b._ Teaching strategies:

In teaching, aside from knowledge of subject-matter, one of the most important skills that can affect teaching performance is the particular teaching strategy a teacher uses. Cook and Richards (1972), and Eisner (1994) maintained that good performance involves the different techniques used in teaching. The quality required for one kind of teaching is not necessarily appropriate for appraising the quality of another. For example, leading of

discussions, lecturing, or organizing small groups for specific learning activities are different methods which teachers could combine as varieties in teaching. Gorton (1983) believed that effective teachers should possess the following qualities:

- An acceptable knowledge of subject-matter and understanding of how students learn.
- Clear and measurable objectives along with the best-laid lesson plan.
- A readiness to spend more time on giving directions, clarifying objectives and modeling how to do the assigned work.
- The ability to present the lessons at the student's appropriate level of difficulty, and assign tasks that will give higher chances of success rather than failure.

Haney et al. (1983) suggests that teaching effectiveness is a combination of complex aspects of human qualifications such as professional knowledge, general knowledge, and qualities associated with aspects of attitudes, personal habits, and personality.

Darling-Hammond and Snyder (1992, as quoted by Rowan et al. 1997) discussed teaching strategies by drawing a distinction between "direct" and "indirect" approaches to instruction. They defined direct instruction as teacher-centered instructional strategy that emphasizes large group instruction; recitation and drill; and opportunities for controlled independent practice. In contrast, indirect instruction is less teacher-centered and more student–directed. It can be characterized by the use of open-ended and

divergent questions, student-initiated discussions, and attention to students' personal experience.

As reported by Rowan et al. 1997, Darling-Hammond and Snyder (1992), found that indirect instructional strategies are more effective than direct instructional strategies in teaching students Higher Order Thinking (HOT) skills that demand deep conceptual knowledge of a subject and the ability to solve complex multi-step problems. A great deal of evidence suggests that direct instructional strategies are effective in teaching basic skills such as teaching mathematics. Kupermintz et al. (1995) found that when teachers placed more emphasis on HOT through "indirect" instructions than "direct" instructions, their students had higher scores on mathematics tests. This study will follow a measure developed by Raudenbush, Rowan, and Cheong (1983) and will be called Teaching Strategies (TS). The measure assesses the extent to which teachers use "indirect" teaching strategies in teaching HOT and the extent to which teachers emphasize a deep conceptual understanding of mathematics and encourage students to think in open-ended ways about the subject.

Based on the discussion on subject-matter knowledge and teaching strategies as determining factors of ability, the following hypothesis is formulated:

H1: Students, who have math teachers with higher levels of ability as measured in terms of knowledge in subject-matter and teaching strategies that involve indirect teaching methods, will have higher achievement in math.

Teacher Motivation

In addition to studying various dimensions of teaching ability, educational researchers have also examined the effects of teachers' motivation on students' achievement. Conley and Levinson (1993) found a significant level of relation between teacher performance and student achievement. Such studies and findings put great emphasis on the administrator to promote efficiency over teacher satisfaction.

An administrator-staff relation as a means to elevate productivity is the scope of the present discussion focusing on factors and means to enhance teacher satisfaction. For the administrator to meet the tough demands, expectations and needs of the teachers, he needs to maintain and guarantee a positive and high staff relationship, and high staff satisfaction and morale for the purpose of increasing effectiveness and productivity-student learning and achievement. Administrative behavior is a highly important factor in facilitating good staff morale and establishing a healthy climate. Improving the social climate of the school and staff morale can have a positive and direct effect on pupil attitudes and learning (Miller, 1981). He conducted a survey and concluded that high staff morale and positive spirited teachers look forward to going to school in the morning and are not in a hurry to leave in the evening. Miller went on to confirm that high staff morale and positive spirited teachers exhibit concerns for the direction that school and the programs are moving. They actively participate in school functions, committees and

organizations, and willingly perform various school tasks that are above and beyond their stated duties. Such individuals derive satisfaction from being members of the school system and of the teaching profession who support the school, its goal and its philosophy.

Since real and perceived performance problems are rooted in declining levels of work motivation, administrators are interested in actions that can enhance the motivation of their staffs. There are various procedures or methods administrators may adopt. Goal-setting, what one tries to accomplish in a job, gives positive effects on motivation and performance. Management by Objectives (MBO) is another system for motivating and integrating the effort of school employees toward common objectives. An alternative work-motivation theory is the Incentive Systems-with the purpose of motivating participants to improve their work performance by making jobs attractive, interesting, and satisfying. Individuals are motivated by both extrinsic and intrinsic rewards. Extrinsic outcomes include recognition, money, promotion, and social interaction with colleagues and 'well-balanced' students. On the other hand, intrinsic rewards count for feelings of accomplishment, competence, efficacy, self-esteem, and self-actualization. (Miskel, 1982).

A different approach to the study of staff satisfaction is based on Herzberg's motivation-hygiene theory. The theory focuses on factors leading to the positive job attitude and satisfaction for the individual to reach Maslow's stage of self- actualization thus following the promotion of psychological growth. Individuals start from a neutral stance towards a job.

The presence of a certain factor (motivators) act to increase an individual's job satisfaction, while the absence of other factors (hygiene) produce negative attitudes which result in job dissatisfaction.

Table 2-1: Job Satisfaction Continuum-A Graphic Representation of the Motivation-Hygiene Theory.

Hygiene	Motivators
-Interpersonal relations (superiors, peers, subordinates)	-Achievement
	-Recognition
-Supervision	-Work itself
-Policy and administration	-Responsibility
-Working conditions	-Advancement
-Personal life	
Dissatisfaction←----------0----------→Satisfaction	
(-)	(+)

(Hoy & Miskel, 1996, 321)

A number of researches on teachers are supportive of the motivation-hygiene theory because intrinsic rewards "satisfaction of teaching" are proved to be more powerful motivators than extrinsic rewards. Sergiovanni (1967), the first to replicate Herzberg's theory of Motivation, carried out a survey of 3,382 teachers. He discovered that achievement, recognition, work and responsibility contributed predominantly to staff satisfaction. Poor relations with peers and students, unfair or incompetent administrative policies and practices, outside personal problems, and work environment proved to be

major instigators of job dissatisfaction. Similarly, Frase (1989) conducted a study to compare teachers choosing professional travel for training as a reward with teachers choosing cash as a reward. In comparison with the teachers who selected cash, the teachers who favored professional travel reported significantly greater increases in the number of opportunities to experience job enrichment in the form of conducting workshop for teachers and redesigning curricula. These opportunities represent intrinsic motivators that Herzberg labeled "responsibility" and "possibility of growth". In contrast, the teachers who chose cash reported little or no increase in intrinsic motivation, job enrichment, or involvement in professional activities.

O'Reilly's and Caldwell's (1980) findings offer general support that decision made on intrinsic job features and for internal reasons are likely to be associated with increased feelings of satisfaction and attitudinal commitment. Whereas, decisions made under external constraints, that is, decision based on a concern for family and financial considerations are inversely related or show decrease in job satisfaction and commitment. When an individual feels pressured or constrained in making decisions, such as family or financial pressures or even job location, the outcomes are likely to be valued less and, the decision makers may be less committed to the choice than when decisions are made free from extrinsic justifications.

Conley and Levinson (1993), who conducted a wide array of surveys found that job satisfaction, which further leads to participation in work redesign, to be among more experienced teachers but not among their lesser

counter-parts who are learning to adapt to the work environment. Extrinsic rewards proved to be strong predictors of job satisfaction for less experienced teachers; however, later in the teaching career extrinsic rewards appear to be of limited utility.

Hence, following the number of research cited, a questionnaire has been developed to measure teachers' motivational level using Herzberg's theory of motivation in Beirut, Lebanon

H2: Students whose teachers are highly motivated show higher levels of achievement in math than students whose teachers are not highly motivated.

Effects of Work Situations

Rowan et al.'s third variable in measuring TP is the effect of work situations. Literature (Peters and O'Connor 1980; Pfeffer 1991) supports that in addition to having motivated and skilled employees, organizations perform better when they have better organizational structure and climate. School reformers (Carnegie Task Force, 1986) who advocate participate decision making in schools, state that teacher participation would improve student achievement outcomes indirectly by increasing teacher productivity, effectiveness and job satisfaction by developing a stronger commitment or linkage to the school. Gordon (1983) defines decision making as a process of choosing among alternatives. The decision-making process according to Hoy & Miskel, 1996 is a cycle of events that includes the identification and

diagnosis of a difficulty, the reflective development of a plan to alleviate the difficulty, the initiation of the plan, and the appraisal of its success. He adds that an effective administration requires rational decision making, and decisions are rational when they are appropriate for accomplishing specific goals. According to Simon (1947) rational behavior consists of a means-ends chain. Given certain ends, appropriate means are selected but once those ends are achieved, they in turn become means for further ends and so on. Gorton (1983) suggests that during the process of reaching a decision, an administrator should involve teachers, as well as parents, students, central office supervisors and others in the process of schooling, in order to capitalize on any special insights and expertise they may be able to contribute. Therefore, teacher leadership has become a key element of recent initiatives to enhance the profession of teaching and restructuring schools by creating a new working relationship between teachers and their principals. (Smylie & Conyers, 1992)

Kanfer (1990) examined how work situations interact with ability and motivation to affect job performance. Work restructuring and decision making have been discussed by Rowan et al. (1997), as well. They cited the work of Walton (1980) who found that when organizations delegate decision making and coordination to employees, the employees' performance comes to depend more heavily on their skills and motivation than when technologies are more mechanistic and organizational designs are more centralized. The effects of ability and motivation on employee's performance tend to vary across

situations. When tasks are complex and organizations are decentralized, differences in employees' motivation and ability are thought of as having strong effects on performance. However, when tasks are simple and organizations emphasize centralized planning and control, these differences are considered to have weaker effects. Rowan (1994, cited in Rowan et al. 1997) defines work situation (WS) in terms of school restructuring where teachers are active participants in decision making. He went further to state that school restructuring makes better use of the available expertise and motivation of teachers. He emphasized a form of school restructuring that promotes teachers' control over decision-making, staff collegiality and collaboration, and supportive leadership. In recent years, consensus has begun to emerge that bureaucratic and centralized controls over teaching suppresses the effects of teachers' skill and motivation on students' achievement. On the other hand, organizational designs that feature decentralized decision making, high levels of staff cooperation and interaction, and supportive leadership allow skilled and motivated teachers to be more effective.

A number of studies (Imber, Neidt, Reyes, 1990; Johnson, 1995; Maeroff, 1988; and others) view teacher participation in school decision making as a way to improve schools. Maeroff (1988) argues that to professionalize teaching and improve its status, teachers need more authority over decisions that directly affect their classrooms and work, which denotes a high degree of autonomy, and dignity. Therefore, teachers are viewed as partners with administrators rather than subordinates. Advocates of school

restructuring (Weiss et al. 1992) claim that in order to advance professionalism, teachers must have the opportunity to participate in decision making. This way they are not passive recipients of orders from above but full-fledged professionals with latitude to shape the conditions under which they work and the kind of work they do. Teachers become committed to the decisions that emerge. They "buy-into" the decision by feeling a sense of ownership; therefore, they feel they are more likely to see that decisions are actually implemented.

A more recent study by Sue Johnson (1995) posited that the involvement of teachers in decision making at the school level allows them to bring their expertise with them and to share their knowledge of classrooms in meaningful ways, to learn from each other and reach consensus by collaborative efforts. Teachers can bring practical knowledge drawn from their own classroom experiences, a kind of contribution which administrators cannot contribute (Conway, 1984). Similarly, Weiss et al. (1992) state that strategies are being promoted as a means to improve decisions about teaching and learning. Because teachers are close to classrooms and students, they presumably have important information to contribute to the decision-making process. As a consequence, it is expected that decisions will be tuned to the needs of students.

Reformers, (Carnegie Task Force, 1986), who advocate participate decision making in schools, state that such participation would improve student achievement outcomes indirectly by increasing teacher productivity,

effectiveness and job satisfaction by developing a stronger commitment or linkage to their schools.

Regardless of student outcomes, participation in decision making in schools is a worthy goal because teachers, only if they are willing to become involved have the right to participate in decisions that effect their work, meaning that they make schools more democratic. Studies advocating teacher participation in decision making are numerous. Caldwell and Wood (1988) stress that particularly during the last decade, schools in the U.S. are implementing changes that allow for greater control over the decision process. Engaging teachers in school issues, on which they feel that they are experts, leads to higher morale and a greater sense of professionalism. When teachers take greater responsibility they see that decisions are carried out promptly. Boles and Troen (1992) believe that for teachers to remain vital, engaged and committed to teaching, they must have time for dialogue and reflection away from the daily demands of the classroom. Nevertheless, teachers (Imber, 1981) have not often derived a great deal of satisfaction from participate decision making schemes that have been implemented in their schools. As a result, principals often report that despite their best intentions, their teachers are reluctant to get involved in making decisions.

Therefore, in accordance with the numerous researches and in the formulation of our hypothesis, we will follow Rowan et al.'s (1997) line of study. It follows that teaching is a complex and professional line of work that is best managed through "organic" forms of management (Rowan 1990, cited

in Rowan et al. 1997). The design emphasizes a form of school restructuring that promotes teachers' control over decision-making, staff collaboration, and supportive leadership. Rowan et al. have argued that these above mentioned managerial processes enhance the capacity of able and motivated teachers to perform their work well. Their argument implies that the effects of teachers' ability and motivation are increased as organizations decentralize decision making and develop collegial and collaborative forms of work and supportive patterns of administrative leadership. Hence, the following hypothesis is formulated:

H3: Students who have teachers who are engaged in school restructuring have higher levels of achievement in mathematics than do students who have teachers who are not engaged in school restructuring.

Our final analysis is to measure whether teacher performance as a function of A,M,WS has a direct and additive effect on student achievement. Defining TP as a summation of ability, motivation, and work situation, we can state our last hypothesis:

H4: Higher teacher performance (TP) leads to higher student achievement.

Chapter Three

Methodology

Sample

The research conducted is pioneering since no study in the field of assessing the achievement of students related to teacher performance has been done in Lebanon before. The teacher sample for our data is taken from schools in Beirut and its suburbs. The sample is limited to co-educational private schools, which have intermediate level classes (grades 6-9) whose language of instruction is English. We found 81 schools falling into this category. According to the directory provided by the Center for Research and Education (1993-1994), the schools were listed and ordered according to the following factors:

a) the educational district,

b) the zone within the educational district,

c) the serial number of the school within the village or the locality,

d) the sector, whether the school is public, private but free, or private with pay,

e) the time in which the school building is used whether it is used for one shift or two shifts.

The present researcher numbered the schools from 1-81 and chose the schools that correspond to the numbers on the first vertical column of the Random Table K (McCal, 1990).

Simple random sampling was used for choosing the schools. 31 out of 81 schools corresponded to the numbers on the first vertical column of the random table. The researcher visited the 31 chosen schools and provided questionnaires to the principals of those schools. These principals gave the questionnaires to teachers who taught mathematics at the intermediate level. Three schools out of the 31 refused to participate in the study. The remaining 28 schools claimed to have between 1 and 6 teachers teaching mathematics at the intermediate level; consisting of 85 teachers. Out of the 85 teachers, 68 responded, having a response rate of 80%. There was a constant follow up in order to collect the questionnaires. Some respondents were indifferent or disinterested in participating in the task. There seemed to be a general reluctance to fill the questionnaire.

Procedure

A letter was delivered to each school principal explaining the nature of the study (see Appendix A) and requesting permission to conduct the research. Upon approval, the questionnaire was given to the administration to pass on to the teachers of math. An additional letter was attached to each questionnaire, providing a brief explanation to the participants of the nature of the project he/she were to take part in. The letter also assured them that the questionnaire

was not a test and that the answers would not have any bearing on their future teaching position. It was expected that the teachers would fill out the questionnaire and return it to the administration, to be picked later by the present researcher.

Instrument

The instrument is a 44-question text, which was filled out by the teachers as part of the present research (Appendix B). This questionnaire is designed in eight parts. Part I consists of 6 mathematical problems, the first being a reuse of the single problem provided by Rowan et al. (1997). The original, Rowan et al.'s measure of teacher knowledge consisted of one math problem. It was decided that it was too short, skewed and unfair to the examinee if only one question was to be used to measure mathematical ability. So, five simple representative problems were provided to investigate the basics in different aspects of math. These five problems cover five different aspects of mathematical reasoning. Parts II – VI of the questionnaire are based on Rowan et al.'s study, item by item. Part II consists of 5 questions, Part III consists of 5 questions, Part IV consists of 4 questions, Part V consists of 6 questions, and Part VI consists of 12 questions to test the different hypotheses. The researcher to make them more viable to Lebanese teachers reworded the questions. For example: "Respondent's control over texts/materials" was reworded as: "I have control over texts/materials I use in the classroom." The questions in part VII have been designed by the present researcher based on

Hertzberg's theory of motivation as cited in Hoy and Miskel (1996). It has been used as a substitute for General Force of Motivation, which measures teachers' efficacy expectations, teachers' outcome expectations, and teachers' locus of control, as used by Rowan et al. (1997). The teachers were asked to self-rate the questions in Parts II - VIII on a 6-point Likert scale, where '1' means 'least' and '6' 'most'. Finally, Part VIII of the questionnaire is a request for the class average on the math midyear exam in order to determine students' achievement.

The present author cannot be held responsible for the validity and reliability of the revised instrument. We assume that, (a) the reputation of the Rowan et al. and (b) the subsequent influence of the their study, will be enough evidence for the validity and reliability of the instrument.

The hypotheses to be tested:

H1: Students who have math teachers with higher levels of ability as measured in terms of knowledge in subject-matter and teaching strategies that involve Higher Order Thinking (HOT) or indirect teaching methods will have higher achievement in math.

Part I and II of the questionnaire measure for H1. The scores obtained as a measure of teacher's knowledge on subject matter is indicated by "K" derived from part I. "K" is the average score on the test, consisting of 6 mathematical questions (refer to Appendix B). In part II individual teachers self rated on a 6 point likert scale, the emphasis they placed on 5 items that

dealt with their teaching strategies. Part II was designed to test the effect of Teaching Strategies (TS) on the Student Performance (SP). The 5 items or variables were: (1) understanding the logical structure of math; (2) understanding nature of proof; (3) knowing mathematical facts and principles; (4) thinking about what a problem means and ways it may be solved; and (5) understanding mathematical concepts.

H1 will be tested by the use of:

1. simple regression to test the nature and the degree of the relationship between the teachers' knowledge (K) and the student performance (SP),
2. multiple regression analysis to find the relationship between the 5 variables testing for the teaching strategies (TS), and the student performance (SP).
3. stepwise regression analysis to find the better predictors of SP.

H2: Students whose teachers are intrinsically motivated will show higher levels of achievement in math than students whose teachers are not highly motivated.

The self-rating on the motivational factors consist of 5 variables. This measure was taken from Hertzberg's theory of motivation. Teachers rated questions in Part VII on a 6-point Likert scale. They self-rated the following factors which they believed motivated them and to what extent: (1) accomplishment of objectives; (2) receiving recognition by the administration;

(3) the responsibility to teach and educate youngsters; (4) the job itself; and (5) the possibility of advancement.

H2 will be tested by the use of multiple regression and stepwise regression analysis to find the relationship and show the additive effect of these 5 variables testing for motivation (M) on SP.

H3: Students who have teachers who are engaged in school restructuring have higher levels of mathematics achievement than students who have teachers who are not engaged in school restructuring.

By being engaged in school restructuring, we mean that teachers are actively involved in restructuring their school environment by decision making, staff members working collaboratively for a common aim, and having support from school leaders. For H3 teachers again self-rated the questions in Parts III, IV, V, and VI of the questionnaire on a 6-point Likert scale. These parts consisted of 27 questions on a 6-point scale. They assess 1) the extent of teachers' control over decision-making (TC) parts III & IV, 2) staff collaboration (SC) (part V), and 3) supportive leadership in teachers' working environment (SL) (part VI).

TC (part III and IV) consist of 9 questions. Teachers in part III were required to report the amount of control they had over (1) choosing text/materials to be used in the classroom; (2) content to be taught; (3) teaching techniques and methods; (4) disciplinary measures in the class; (5) amount of homework given to students. In part IV, teachers were to self-rate

the extent to which they influenced (1) disciplinary policies in school; (2) training programs/workshops; (3) promoting students at school; (4) designing school math-curriculum.

Rating staff collaboration (SC) consisted of 6 questions. Teachers were to self-rate on a 6-point Lekert scale, the extent to which they agreed or disagreed on the following items: (1) staff members count on each other to help out if problems arise in school; (2) colleagues share beliefs about educational missions, aims, and objectives; (3) school offers continual learning about new educational techniques to teachers; (4) there is a great deal of cooperative effort among staff to accomplish tasks; (5) there is broad agreement among faculty about the educational mission; (6) there is a positive and warm atmosphere in the school.

The third factor in teachers' working environment, supportive leadership (SL), consisted of 12 questions. Teachers self-rated the questions on a 6-point Likert scale, the extent to which they agreed on the following: (1) the principal is good at getting educational resources; (2) the principal deals efficiently with outside pressure; (3) the principal makes plans and carries them out efficiently; (4) goals and priorities for the school are clear; (5) staff members are recognized for a job well done; (6) the school principal decisively knows what kind of school he/she wants; (7) school administration acknowledges problems faced by staff and offers help; (8) school principal is encouraged to experiment with new teaching methods; (9) the principal lets staff know what is expected of teachers; (10) school principal is interested in

innovation; (11) school rules for student behavior are enforced; (12) school principal consults staff before making decisions.

H3 will be tested by the use of multiple regression and stepwise regression analysis on each set of questions as well as on all questions put together. We will test the nature and degree of the relationship between the involvement of the teacher in school restructuring or work situation (WS) and the student performance in mathematics.

H4: Higher teacher performance (TP) leads to higher student achievement.

In the last analysis the present researcher studied the additive effect of A, M, WS to obtain TP through regression analysis. TP was considered to be the result of the teachers' ability, motivation, and work situation. Thus all the variables falling under these categories were regressed with student performance in order to see which variable under TP affected most the SP and had an additive effect.

Chapter 4
Results

The analysis of data presented proceeded in several stages. In the first stage, the questionnaire was divided into 5 parts each measuring a different variable. The Chronbach alpha (α) for reliability was calculated for each part to check whether the parts are reliable in testing their corresponding hypotheses. The Cronbach alpha showed that the questions are related in each variable and they test the same factor. After conducting these preliminary analyses, multiple regression was applied to test the additive effect of the independent variables on the student performance, as well as the strength of the relationship between these variables and SP for our three hypotheses.

Findings:

It was worth mentioned that all of the following findings are based on random sampling of the 31 schools and the response of 68 teachers.

H1: Students who have math teachers with high ability and teaching strategies involving Higher Order Thinking (HOT) or indirect teaching methods will be positively related to higher student performance.

Under H1 the Chrobach alpha for the 5 independent variables testing teaching strategies involving Higher Order Thinking (HOT) resulted in α=0.6939 which shows that all the 5 variables testing for H1 have a common factor.

A regression analysis was performed to check the relationship between teachers' knowledge and the students' performance and to see whether the knowledge of the teacher has an effect over the students' performance.

Table 4.1
Regression table showing the findings of teachers' knowledge when regressed with SP.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.012	0.000	-0.015	1.7124

ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	2.776E-02	1	2.776E-02	0.009	0.923
Residual	187.659	64	2.932		
Total	187.686	65			

Coefficient

Model	Unstandardized Coeffiecients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	12.714	0.931		13.662	0.000
K	1.702E-02	0.175	0.012	0.097	0.923

Predictors: (Constant), K
Dependent Variable: SP

The regression equation ended up being:

Expected value of SP = 12.714225 + 0.017021K which shows that there is a positive relationship, though very small between SP and K; if K increases by 1 score or grade, SP will increase by 0.017021 grades.

The regression analysis yielded the following results: the change in K can only explain 0.00015 of the changes in the students' performance. Thus the level of the teachers' knowledge is not a good estimator of students' performance. In addition to this, k was not a significant variable i.e. it shows that teachers' knowledge does not affect the SP. F= 0.00947 with a p-value of 0.9228> $\alpha = 0.05$.

Another Multiple Regression analysis test was conducted to test the relationship between the 5 variables testing for HOT and SP. Table 4.2 entails the details of the multiple regression analysis.

Table 4.2
The results of the regression analysis between the independent variable HOT and SP.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.348	0.121	0.046	1.6715

ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	22.395	5	4.479	1.603	0.174
Residual	162.037	58	2.794		
Total	184.432	63			

Coefficients

Model	Unstandardized Coeffiecients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	10.586	1.475		7.177	0.000
Objective: logical structure	9.153E-02	0.177	0.066	0.518	0.607
Objective: mathematical proof	-1.891E-02	0.206	-0.12	-0.092	0.927
Objective: facts and principles	-0.440	0.260	-0.324	-1.692	0.096
Objectives: what a problem means and ways to solve	-4.431E-02	0.255	-0.027	-0.174	0.863
Objectives: mathematical concepts	0.835	0.306	0.496	2.728	0.008

Predictors: (Constant), Objective: mathematical concepts, Objective: logical structure, Objective: mathematical proof, Objective: what a problem means and ways to solve, Objective: facts and principles
Dependent Variable: SP

A multiple regression analysis was run to test the relationship between HOT and SP and multicollinearity was checked for and not noted.

The regression equation yielded the following: SP = 10.586209 + 0.1533 (understanding logic) – 0.018909 (understanding nature of proof) – 0.439577 (knowing facts and principles) – 0.044314 (ways to solve a problem) + 0.834770 (understanding mathematical concepts).

Showing that there is a positive relation between the teacher emphasizing on understanding logic and mathematical concepts and the

students' performance whereas there is a negative relationship between the SP and the teachers' emphasis on understanding nature of proof, knowing facts and principles, and thinking about what a problem means and ways to solve it. Among all the variables included in the regression equation, the only variable that was significant is the one that shows that there is an effect on SP was the emphasis of the teachers on the understanding of mathematical concepts (t= 2.728, p-value = 0.0084<0.05). The other variables were non-significant.

The set of questions testing HOT was able to explain 12.143% of the changes in the SP. But, this set of questions was not significant in showing that HOT affects the SP. (F= 1.60324, p-value = 0.1736> 0.05).

A stepwise regression test was also conducted on the same set of variables of HOT and SP. It showed that the only variable that remained in the equation was 'understanding the mathematical concepts'. SP=10.562548+0.429808 (understanding mathematical concepts). Table 4.3 gives the last step on the stepwise regression.

Table 4.3
A stepwise regression was run to show the relationship between HOT and SP.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.255	0.065	0.050	1.6676

ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	12.008	1	12.008	4.318	0.042

Residual	172.425	62	2.781		
Total	184.432	63			

Coefficients

Model	Unstandardized Coeffiecients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	10.563	1.080		9.777	0.000
Objective: mathematical concepts	0.430	0.207	0.255	2.078	0.042

Predictors: (Constant), Objectives: mathematical concepts
Dependent Variable: SP

Excluded Variables

Model	Beta In	T	Sig.	Partial Correlation	Collinearity Statistics
					Tolerance
1 Objective: logical structure	0.035	0.277	0.783	0.035	0.984
Objective: mathematical proof	-0.052	-0.416	0.679	-0.053	0.970
Objectives: facts and principles	-0.327	-1.896	0.063	-0.236	0.487
Objectives: what a problem means and ways to solve	-0.104	-0.703	0.485	-0.090	0.700

Predictors in the model: (Constant), Objectives: mathematical concepts
Dependent Variable: SP

H2: Students whose teachers are intrinsically motivated will show higher levels of achievement in math than students whose teachers are not highly motivated.

Cronbach's alpha for the 5 independent variables testing the intrinsic motivation of teachers resulted in α=0.6520, which shows that all the variables, were testing for a common factor, the intrinsic motivation. Collinearity test was run on these independent variables to check for multicollinearity. All the correlation coefficients were found to be between – 0.7 and 0.7 thus showing no form of multicollinearity.

A multiple regression analysis was done to test the relationship between all the variables testing the teachers' motivation and the SP. Refer to table 4.4 for the regression model.

Table 4.4
Showing the relation between teachers' motivation and SP.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.465	0.216	0.150	1.5624

ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	39.760	5	7.952	3.258	0.012
Residual	144.017	59	2.441		
Total	183.778	64			

Coefficients

Model	Unstandardized Coeffiecients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		

1 (Constant)	13.885	1.650		8.413	0.000
M:accomplishment of objectives	-0.777	0.275	-0.363	-2.827	0.006
M: recognition of a job well done	0.287	0.174	0.224	1.649	0.104
M: educating youngsters	0.407	0.253	0.207	1.607	0.113
M: the job itself	-0.246	0.185	-0.175	-1.329	0.189
M: possibility of advancement	0.132	0.194	0.090	0.680	0.499

Predictors: (Constant), M: possibility of advancement, M: educating youngsters, M: the job itself, M: accomplishment of objectives, M: recognition of a job well done
Dependent Variable: SP

The Regression equation shows that the:

Expected SP = 13.884827 – 0.777297 (accomplishment of objectives) + 0.287328 (receiving recognition by the administration) + 0.406801 (the responsibility to teach and educate youngsters) – 0.245633 (job itself) + 0.131633 (possibility of advancement).

There is a positive relationship between SP and receiving recognition by the administration, the responsibility to teach and educating youngsters, and possibility of advancement. Whereas the accomplishment of objectives and the job itself have a negative relationship with SP. The only significant variable in the regression was 'the accomplishment of objectives' (t= -2.827, p-value = 0.0064 < α = 0.05).

The regression analysis showed that the variation in the motivation variables can explain only 21.635% of the changes or variation in the SP. the

overall regression model was significant with an F=3.25774 and a p-value = 0.0115 < α = 0.05. That is the combination of motivation variables help us better predict the SP.

A stepwise regression analysis was conducted as well, the two variables that stayed in the equation in two steps were the accomplishment of objectives and the responsibility to teach and educate youngsters. See table 4.5 for the regression model.

Table 4.5
Showing the regression model between M as the independent variable and SP the dependent variable.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
2	0.406	0.165	0.138	1.5736

ANOVA

Model	S00um of Squares	Df	Mean Square	F	Sig.
2 Regression	30.248	2	15.124	6.108	0.004
Residual	153.529	62	2.476		
Total	183.778	64			

Coefficients

Model	Unstandardized Coeffiecients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
2 (Constant)	13.861	1.589		8.724	0.000

M: accomplishment of objectives	-0.785	0.257	-0.366	-3.048	0.003
M: educating youngsters	0.577	0.236	0.293	2.441	0.018

Excluded Variables

Model	Beta In	T	Sig.	Partial Correlation	Collinearity Statistics
					Tolerance
2 M: recognition of a job well done	0.175	1.407	0.164	0.177	0.862
M: the job itself	-0.068	-0.565	0.574	-0.072	0.948
M: possibility of advancement	0.090	0.706	0.483	0.090	0.843

Predictors in the Model: (Constant), M; accomplishment of objectives
Predictors in the Model: (Constant), M: accomplishment of objectives, M: educating youngsters
Dependent Variable: SP

The regression equation was SP= 13.860628 + 0.576785 (responsibility to teach and educate youngsters) – 0.784715 (accomplishment of objectives).

Showing that there is a positive relationship between SP and responsibility to teach and educate youngsters; the more teachers are motivated by this idea the better the students will perform. Whereas there is a negative relationship between the SP and the accomplishment of objectives; that is the more the teachers are motivated and concentrated on achieving objectives the less will be the SP.

The variation in the remaining two variables was able to explain 16.495% of the variation in SP. The overall regression equation was significant showing that by knowing these two variables we can predict better the student performance. ($F = 6.10757$, p-value $= 0.0038 < \alpha = 0.05$).

H3: Students who have teachers who are engaged in school restructuring have higher levels of mathematics achievement than students who do have teachers who are not engaged in school restructuring.

Whenever talking about work situation (WS), it is defined by teachers being actively involved in restructuring their school environment which include three main factors: teacher control over decision making (TC), staff members working collaboratively for a common aim (SC), and supportive leadership in teachers' working environment (SL). The Cronbach alpha was calculated for each factor separately which resulted in α=0.7846, 0.7946, and 0.9247 respectively. Regression was run on each of the three factors separately; then jointly. Collinearity test was also run. No multicollinearity effect of independent variable was noted.

First, a multiple regression analysis was conducted to test the relationship between the teacher's control over their classes and the student's performance. The regression results are shown in table 4.6.

Table 4.6
Teachers' control over their classes when regressed with SP.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.314	0.099	0.025	1.6681	1.860

ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	18.584	5	3.717	1.336	0.261
Residual	169.737	61	2.783		
Total	188.321	66			

Coefficients

Model	Unstandardized Coeffiecients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	10.005	1.503		6.655	0.000
Control: text/material	-8.581E-02	0.213	-0.065	-0.402	0.689
Control: content	-2.125E-02	0.215	-0.017	-0.099	0.921
Control: teaching techniques	0.273	0.266	0.156	1.025	0.309
Control: disciplinary measures	0.411	0.265	0.224	1.550	0.126
Control: amount of homework	-6.768E-03	0.233	-0.004	-0.029	0.977

Predictors: (Constant), Control: amount of homework, control: texts/materials, Control: disciplinary measures, Control: teaching techniques, Control: content
Dependent Variable: SP

The regression equation was: SP = 10.004679 – 0.085808 (texts) – 0.021248 (content) + 0.272796 (techniques) + 0.410896 (disciplinary measures) – 0.006768 (homework).

Showing that there is a positive relationship between the teacher's control over disciplinary measures and teaching techniques and the students' performance; that is the more the teacher has control over the teaching techniques and disciplinary measures, the better the student will perform. Whereas, there is a negative relationship between SP and the remaining items showing that the more teachers have control over choosing the text materials, the content to be taught, and the amount of homework given to students the lower will be the SP.

The variation in the variables related to teacher control over a) choosing text material, b) content to be taught, c) teaching techniques, d) disciplinary measures, e) amount of homework given, was able to explain only 9.868% of the variation in SP. The overall model was not significant. Therefore, using the combination of these 5 items was not helpful in predicting SP. ($F=1.33576$; p-value$=0.2613 > \alpha = 0.05$). All five items were not significant in predicting SP even individually. For the same set of variables a stepwise regression was conducted to see whether any of these items would help predicting better student performance.

Table 4.7

A stepwise regression between teachers' control and SP.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.287	0.082	0.068	1.6307	1.844

ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	15.484	1	15.484	5.823	0.019
Residual	172.837	65	2.659		
Total	188.321	66			

Predictors: (Constant), Control: disciplinary measures

Dependent Variable: SP

Coefficients

Model	Unstandardized Coeffiecients		Standardized Coefficient Ts	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	10.176	1.102		9.236	0.000
Control: disciplinary measures	0.526	0.218	0.287	2.413	0.019

Excluded Variables

Model	Beta In	T	Sig.	Partial Correlation	Collinearity Statistics
					Tolerance
Control:texts /materials	-0.025	-0.205	0.838	-0.026	0.997
Control:content	-0.003	-0.023	0.982	-0.003	0.964
Control:teaching techniques	0.121	0.902	0.371	0.112	0.792
Control:amount of homework	0.007	0.056	0.956	0.007	0.851

Predictors in the Model: (Constant), Control: disciplinary measures

Dependent Variable: SP

In fact only one variable remained in the regression equation; the control over disciplinary measures. Though the variation in this variable was not able to explain more than 8.222% of the variation in the SP; control over disciplinary measure was significant in predicting the SP (t=2.413; p-value=0.0186<α=0.05).

SP = 10.175590 + 0.526113 (disciplinary measures). We know from the regression equation that there is a positive relationship between the teachers' control over disciplinary measures and the SP. The more the teachers have control over disciplinary measures the better the students will perform.

Then a regression analysis was run on the set of variables testing the influence teachers had on school restructuring, see table 4.8 for regression results.

Table 4.8
Showing the regression results between the influence teachers have on school restructuring as the independent variable and SP.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of theEstimate	Durbin-Watson
1	0.206	0.042	-0.019	1.7055	2.112

ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	7.984	4	1.996	.0686	0.604
Residual	180.337	62	2.909		
Total	188.321	66			

Coefficients

Model	Unstandardized Coeffiecients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	12.191	0.645		18.901	0.000
Influence: discipline policy	0.156	0.134	0.172	1.165	0.249
Influence: training programs/workshops	-6.883E-02	0.167	-0.065	-0.412	0.682
Influence: promoting students	5.875E-02	0.175	0.062	0.336	0.738
Influence: math curriculum	3.233E-02	0.176	0.029	0.184	0.855

Predictors: (Constant), Influence: math curriculum, Influence: training programs/workshops, Influence: disciplinary policy, Influence: promoting students
Dependent Variable: SP

SP = 12.191458 + 0.156396 (disciplinary policies) + 0.058746 (promoting students) – 0.068834 (training programs) + 0.032333 (math-curriculum).

The regression equation shows that there is a positive relationship between (disciplinary policies, promoting students, and math-curriculum) and SP. Where as there is a negative relationship between training programs and workshops and SP.

We can see from these results that the variation in these four variables was able to explain only 4.24% of the variations in SP. The regression analysis results showed that none of these four variables was significant. That is, none of them can help us predict better the SP; neither individually nor additively.

F = 0.68623; p-value = 0.6042>α = 0.05).

A stepwise regression analysis was conducted on this same set of variables and none of the variables entered the equation.

Then, a multiple regression analysis was conducted to test the relationship between teacher's control over their classes and the influence teachers had on the school restructuring, and the SP. Table 4.9 shows the multiple regression results.

Table 4.9
Teachers' control over their classes and the influence teachers have over school restructuring as the independent variable regressed with SP.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.341	0.116	-0.023	1.7086	1.978

ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	21.917	9	2.435	0.834	0.588
Residual	166.404	57	2.919		
Total	188.321	66			

Coefficients

Model	Unstandardized Coeffiecients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	10.191	1.602		6.362	0.000
Control: texts/materials	-4.396E-02	0.231	-0.033	-0.191	0.850

Control: content	-0.150	0.254	-0.117	-0.591	0.557
Control: teaching techniques	0.242	0.291	0.138	0.832	0.409
Control: disciplinary measures	0.349	0.290	0.190	1.201	0.235
Control: amount of homework	3.354E-02	0.246	0.019	0.136	0.892
Influence: discipline policy	0.113	0.148	0.125	0.769	0.445
Influence: training programs/workshops	-5.779E-02	0.178	-0.054	-0.325	0.746
Influence: promoting students	6.268E-02	0.179	0.066	0.351	0.727
Influence: math curriculum	3.352E-02	0.193	0.031	0.173	0.863

Predictors: (Constant), Influence: math curriculum, Control: amount of homework, Influence: training programs/workshops, Control: texts/materials, Control: disciplinary measures, Influence: disciplinary policy, Control: teaching techniques, Influence: promoting students, Control: content
Dependent Variable: SP

SP=10.191023 + 0.33519(curriculum) + 0.348516(disciplinary measures) – 0.150015(control over content) + 0.113499(disciplinary policies) + 0.33536(control over homework) + 0.062682(promoting students) + 0.242018 (teaching techniques) – 0.043960(control over text material) – 0.057789(training programs and workshop).

The variables that had a positive relationship with SP were:

- Influence on math curriculum
- Control over disciplinary measures
- Influence on discipline policy

- Control over amount of homework given
- Influence on teaching techniques.

The variables that had a negative relationship with SP were:

- Control over content
- Control over text and materials
- Influence on training programs and workshops.

The 9 variables testing teacher's control and influence taken together were able to explain only 11.638% of the variation in SP. They were not significant ($F=0.83414$; p-value$=0.5878>\alpha=0.05$). None of the variables was significant in predicting SP, even individually. Then a stepwise regression was conducted over these 9 variables and the only variable that remained in the equation was the control over disciplinary measures. Table 4.10 shows the results for this stepwise regression.

Table 4.10
Showing the results of the stepwise regression between TC as a function of teachers' control over their classes and teachers' influence over school restructuring, and SP.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.287	0.082	0.068	1.6307	1.844

ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	15.484	1	15.484	5.823	0.019
Residual	172.837	65	2.659		
Total	188.321	66			

Coefficients

Model	Unstandardized Coeffiecients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	10.176	1.102		9.236	0.000
Control: disciplinary measures	0.526	0.218	0.287	2.413	0.019

Predictors: (Constant), Control: disciplinary measures
Dependent Variable: SP

Excluded Variables

Model	Beta In	T	Sig.	Partial Correlation	Collinearity Statistics
					Tolerance
1 Control: texts/materials	-0.025	0.205	0.838	-0.026	0.997
Control: content	-0.003	-0.023	0.982	-0.003	0.964
Control: teaching techniques	0.121	0.902	0.371	0.112	0.792
Control: amount of homework	0.007	0.056	0.956	0.007	0.851
Influence: discipline policy	0.131	1.071	0.288	0.133	0.936
Influence: training programs/workshops	0.050	0.419	0.677	0.052	0.998

Influence: promoting students	**0.086**	**0.712**	**0.479**	**0.089**	**0.985**
Influence: math curriculum	**0.054**	**0.438**	**0.663**	**0.055**	**0.931**

Predictors in the Model: (Constant), Control: disciplinary measures
Dependent Variable: SP

Second a multiple regression analysis was conducted to test the relationship between staff collaboration and SP and this is partly testing whether the work situation will affect the performance of the teachers; thus affecting the performance of the students. Kindly refer to table 4.11.

Table 4.11
Staff Collaboration regressed with SP.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	**0.354**	**0.125**	**0.037**	**1.6572**	**1.868**

ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	**23.539**	**6**	**3.923**	**1.429**	**0.219**
Residual	**164.782**	**60**	**2.746**		
Total	**188.321**	**66**			

Coefficients

Model	Unstandardized Coeffiecients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	12.021	1.048		11.474	0.000
SC: staff help	-8.426E-02	0.128	-0.087	-0.657	0.514
SC: share beliefs about educational missions	-0.301	0.234	-0.209	-1.286	0.203
SC: cooperative effort	3.058E-02	0.207	0.021	0.148	0.883
SC: cooperative effort	-4.683E-02	0.200	-0.040	-0.234	0.816
SC: agreement about educational meission	0.166	0.271	0.114	0.612	0.543
SC: positive atmosphere	0.369	0.182	0.313	2.027	0.047

Predictors: (Constant), SC: positive atmosphere, SC: share beliefs about educational missions, SC: learning about new techniques, SC: cooperative efforts, SC: agreement about educational mission
Dependent Variable: SP

SP = 12.020788 + 0.368930 (positive and warm atmosphere) – 0.300878 (share beliefs) – 0.084260 (staff members count on each other) + 0.030583 (learning new techniques) – 0.046833 (cooperative effort) + 0.165802 (broad agreement).

The regression equation yielded to the following results: there is positive relationship between the positive and warm atmosphere, the continual learning about new educational techniques, the broad agreement among faculty about educational mission and the SP. Therefore, the higher teachers

rated these variables the higher the level of SP there was. Whereas, the relationship between colleagues sharing beliefs about educational mission, staff members counting on each other to help, and cooperative effort and the SP was negative, therefore, the more a school has of these variables the lower was the SP.

The regression analysis showed that the variation in all of the variables testing staff collaboration could explain on 12.499% of the variation in SP.

This regression model was not significant; ($F=1.42850$; p-value$=0.2188>\alpha=0.05$). That is the combination of all these variables will not help us better predict the SP. Moreover, none of the variables taken individually was able to help in better predicting SP.

A stepwise regression was conducted on the same set of variables yielded to the following; the only variable that entered the regression equation was the warm and positive atmosphere with 8.063% explanatory power ($t = 2.388$; p-value $= 0.0199 < \alpha = 0.05$). The regression equation:

SP = 11.212239 + 0.334620 (positive and warm atmosphere).

Table 4.12 shows the stepwise regression results.

Table 4.12
The results of a stepwise regression between Staff Collaboration and SP.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.284	0.081	0.066	1.6321	1.935

ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	15.185	1	15.185	5.701	0.020
Residual	173.136	65	2.664		
Total	188.321	66			

Predictors: (Constant), SC: positive atmosphere
Dependent Variable: SP

Coefficients

Model	Unstandardized Coeffiecients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	11.212	0.690		16.240	0.000
WS: positive atmosphere	0.335	0.140	0.284	2.388	0.020

Predictors: (Constant), SC: positive atmosphere
Dependent Variable: SP

Excluded Variables

Model	Beta In	T	Sig.	Partial Correlation	Collinearity Statistics
					Tolerance
SC: staff help	-0.132	-1.067	0.290	-0.132	0.924
SC: shared beliefs about educational missions	-0.178	-1.461	0.149	-0.180	0.933
SC: learning about new techniques	-0.037	-0.289	0.774	-0.036	0.880
SC: cooperative effort	-0.107	-0.771	0.443	-0.096	0.743
SC: agreement about educational mission	-0.044	-0.311	0.757	-0.039	0.703

Predictors in the Model: (Constant), SC: positive atmosphere
Dependent Variable: SP

Thirteen different variables were used to check the supportive leadership at schools. A regression analysis was run to test the relationship between the supportive leadership through its 13 variables with SP. Table 4.13 shows the Regression results.

Table 4.13
The results of the regression analysis between Supportive Leadership and SP.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin_Watson
1	0.385	0.148	-0.057	1.7838	1.928

ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	27.628	12	2.302	0.724	0.722
Residual	159.100	50	3.182		
Total	186.728	62			

Coefficients

Model	Unstandardized Coeffiecients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	12.185	1.518		8.025	0.00
Getting educational resources	-0.129	0.315	-0.084	-0.410	0.683
Outside pressure	0.385	0.263	0.316	1.460	0.151
Planning	4.735E-02	0.315	0.036	0.150	0.881
Clarity of goals	3.462E-02	0.428	0.020	0.081	0.936
Recognition	0.646	0.310	0.415	2.083	0.042

Know aim	**1.668E-02**	**0.441**	**0.009**	**0.038**	**0.970**
Acknowledge problems and help	**-2.539E-02**	**0.291**	**-0.017**	**-0.087**	**0.931**
Encouragement to experiment new teaching methods	**5.871E-02**	**0.306**	**0.040**	**0.192**	**0.848**
Expected from teacher	**-0.210**	**0.369**	**-0.123**	**-0.570**	**0.572**
Interest in innovation	**-0.421**	**0.360**	**-0.265**	**-1.170**	**0.248**
Rules are enforced	**-8.234E-02**	**0.239**	**-0.059**	**-0.344**	**0.732**
Staff is consulted	**-0.194**	**0.198**	**-0.169**	**-0.980**	**0.332**

Predictors: (Constant), Staff is consulted, know their aim, rules are enforced, getting educational resources, recognition, outside pressures, encouragement to experiment new teaching methods, acknowledge problems and help, expected from teachers, interest in innovation, planning, clarity of goals
Dependent Variable: SP

The regression equation yielded to the following results: SP = 12.185401 – 0.1290 (educational resources) + 0.3845 (dealing with outside pressure) + 0.0473 (plans are made and carried out) + 0.0346 (goals are clear) + 0.6461 (recognition for a job well done) + 0.0166 (knows aim of school) – 0.0253 (acknowledgement of problems) + 0.0587 (experiment new teaching methods) – 0.2100 (knowledge of expectations) – 0.4212 (interest in innovation) – 0.0823 (rules are enforced) – 0.1938 (staff is consulted). The following variables yield to a positive relationship with SP:

- school leaders dealing efficiently with outside pressure,
- when plans are made and carried out,
- when school goals and priorities are clearly stated,
- when teachers are recognized for a job well done,

- when school leader knows the aims of the school,
- and when school leader encourages new teaching methods to be experimented.

Therefore, the higher the teacher rated these variables the higher the level of SP. Whereas, the more a school has of these variables:

- school leader being good at getting educational resources,
- acknowledgement of problems by school leaders,
- administration offering help to teacher,
- knowledge of expectations,
- interest in innovation,
- rules being enforced and staff members being consulted by the leader before plans are carried out;

the lower is the SP.

The multiple regression analysis showed that the only significant variable was staff members being recognized for a job well done ($t= 2.083$; p-value $= 0.0424 < \alpha = 0.05$) all other 12 variables ended up being non-significant. The variation in all of the variables can explain only 14.796% of the variation in SP.

This regression model was not significant; ($F = 0.7235$; p-value $= 0.7217 > \alpha = 0.05$). That is the combination of these variables will not help us predict better the SP.

A stepwise regression was conducted on the same set of the 13 variables none of the variables entered the regression equation.

A final regression analysis was run to test the relationship between the 27 variables (TC + SC + SL) forming the WS and SP. The regression model was not significant; ($F=0.9$; p-value$=0.588>\alpha=0.05$). That means that the combination of these variables measuring WS will not help us predict better the SP. Table 4.14 shows the results of this regression. The only individual variable that was significant in helping better predict SP when all 27 variables were taken together was shared beliefs about educational missions ($t=-2.116$, p-value $= 0.042< \alpha=0.05$).

Table 4.14
The results of the stepwise regression analysis between WS and SP.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.644	0.414	-0.038	1.7679

ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	77.339	27	2.864	0.916	0.588
Residual	109.389	35	3.125		
Total	186.728	62			

Coefficients

Model	Unstandardized Coeffiecients		Standardized Coefficient Ts	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	10.884	2.188		4.975	0.000
Control: texts/materials	0.304	0.307	0.229	0.989	0.329
Control: content	-0.358	0.330	-0.278	-1.084	0.286
Control: teaching techniques	4.650E-02	0.385	0.026	0.121	0.904
Control: disciplinary measures	0.677	0.366	0.354	1.851	0.073
Control: amount of homework	-7.841E-02	0.345	-0.045	-0.227	0.822
Influence: disciplinary policy	0.313	0.213	0.343	1.472	0.150
Influence: training programs/workshops	-0.279	0.241	-0.258	-1.160	0.254
Influence: promoting students	0.127	0.238	0.133	0.534	0.597
Influence: math curriculum	2.805E-02	0.238	0.025	0.118	0.907
SC: staff help	3.429E-02	0.192	0.034	0.179	0.859
SC: share beliefs about educational missions	-0.643	0.304	-0.424	-2.116	0.042
SC: learning about new techniques	0.230	0386	0.157	0.595	0.555
SC: cooperative effort	-0.318	0.314	-0.256	-1.013	0.318
SC: agreement about educational	0.111	0.447	0.073	0.247	0.806

mission					
SC: positive atmosphere	0.383	0.296	0.316	1.295	0.204
SL: getting educational resources	6.392E-02	0.368	0.042	0.174	0.863
SL: dealing with outside pressures	0.192	0.311	0.158	0.619	0.540
SL: plans are made and carried out	-5.935E-02	0.376	-0.045	-0.158	0.875
SL: clarity of goals	-0.307	0.509	-0.178	-0.603	0.550
SL: recognition of a job well done	0.560	0.390	0.360	1.437	0.159
SL: know their aim	0.128	0.517	0.072	0.247	0.806
SL: acknowledge problems and help	-0.268	0.330	-0.179	-0.813	0.422
SL: encouragement to experiment new teaching methods	0.552	0.403	0.379	1.370	0.179
SL: knowledge of expectations	-0.189	0.452	-0.110	-0.417	0.679
SL: interest and innovation	-0.363	0.437	-0.228	-0.831	0.411
SL: rules are enforced	-0.285	0.305	-0.203	-0.938	0.355
SL: staff is consulted	-0.256	0.269	-0.223	-0.950	0.348

Predictors: (Constant), SL: staff is consulted, Control: disciplinary measures, Influence: training programs/workshop, SC: staff help, SC: learning about new techniques, Control: amount of homework, Influence: disciplinary policy, Control: texts/materials, SC: share beliefs about educational mission, SL: dealing with outside pressures, SL: rules are enforced, SL: recognition of a job well done, Control: teaching techniques, Influence: math curriculum, SL: acknowledge problems and help, SC: positive atmosphere, Influence: promoting students, SC: cooperative effort, SL: getting educational resources, Control: content, SL: interest and innovation, SL: knowledge of expectations, SL: know their aim, SL: encouragement to experiment new teaching methods, SL: plans are made and carried out, SL: clarity of goals, SC: agreement about educational mission

Dependent Variable: SP

A stepwise regression was also done on the set of 27 variables forming the WS and the only variable that entered the regression equation was teacher's control of disciplinary measures with a explanatory power of 10.776% (t=2.714; p-value of 0.0086<α=0.05). The regression equation of SP= 9.648369 + 0.628225(disciplinary measures).

We can conclude that there is a positive relationship between SP and teachers having control over disciplinary measures in the teacher's working situation.

Table 4.15
Showing the regression analysis between WS (TC, SC, SL) and SP.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.328	0.108	0.093	1.6526

ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	20.122	1	20.122	7.367	0.009
Residual	166.606	61	2.731		
Total	186.728	62			

Predictors: (Constant), Control: disciplinary measures
Dependent Variable: SP

Coefficients

Model	Unstandardized Coeffiecients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Consant)	9.648	1.172		8.231	0.000
Control: disciplinary measures	0.628	0.231	0.328	2.714	0.009

Predictors: (Constant), Control: disciplinary measures
Dependent Variable: SP

Excluded Variables

Model	Beta In	T	Sig.	Partial Correlation	Collinearity Statistics
					Tolerance
Control: texts/materials	-0.021	-0.174	0.863	-0.022	0.998
Control: content	0.011	0.086	0.932	0.011	0.975
Control: teaching techniques	0.124	0.925	0.359	0.119	0.812
Control: amount of homework	0.016	0.126	0.900	0.016	0.872
Influence: disciplinary policy	0.111	0.878	0.384	0.113	0.920
Influence: training programs/workshops	0.044	0.361	0.719	0.047	0.999
Influence: promoting students	0.088	0.718	0.475	0.092	0.985
Influence: math curriculum	0.031	0.243	0.809	0.031	0.915
SC: staff help	-0.032	-0.263	0.794	-0.034	0.996
SC: share beliefs about educational missions	-0.219	-1.755	0.084	-0.221	0.907
SC: learning	0.043	0.350	0.728	0.045	0.987

about new techniques					
SC: cooperative effort	-0.013	-0.107	0.915	-0.014	0.956
SC: agreement about educational mission	-0.006	-0.047	0.962	-0.006	0.856
SC: positive atmosphere	0.235	1.957	0.055	0.245	0.966
SL: getting educational resources	0.010	0.086	0.932	0.011	0.996
SL: dealing with outside pressures	0.084	0.664	0.509	0.085	0.914
SL: plans are made and carried out	0.060	0.485	0.629	0.063	0.960
SL: clarity of goals	-0.04	-0.032	0.974	-0.004	0.835
SL: recognition of a job well done	0.177	1.442	0.154	0.183	0.958
SL: know their aim	0.050	0.386	0.701	0.050	0.889
SL: acknowledge problems and help	-0.013	-0.102	0.919	-0.013	0.968
SL: encouragement to experiment new teaching methods	0.005	0.037	0.971	0.005	0.978
SL: knowledge of expectations	-0.108	-0.841	0.404	-0.108	0.890
SL: interest and innovation	-0.010	-0.078	0.938	-0.10	0.949
SL: rules are enforced	-0.023	-0.187	0.853	-0.024	0.996
SL: staff is consulted	-0.071	-0.581	0.564	-0.075	0.991

Predictors in the model: (Constant), Control: disciplinary measures
Dependent Variable: SP

H4: Higher teacher performance (TP) leads to higher student performance (SP).

The 38 variables taken together formed the TP. Collinearity test was run and multicollinearity effect of the independent effect was not found. A multiple regression analysis was conducted to see the relationship between the 38 variables that make up TP and the SP. The only significant variables in teachers' performance that influence SP were: recognition received by the administration, shared beliefs by staff members for a common mission, when school principal is good at getting educational resources, and the motivating factor of having a job. ($F=1.35800$, p-value$=0.2405>\alpha=0.05$). The combination of the 38 variables measuring TP does not help in predicting the performance of students in mathematics in intermediate classes. See table 4.16 for the regression model.

Table 4.16
Showing the final results the TP(A, M, WS) with SP.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.855	0.731	0.193	1.5859

ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	129.785	38	3.415	1.358	0.240
Residual	47.785	19	2.515		
Total	177.571	57			

Coefficients

Model	Unstandardized Coeffiecients		Standardized Coefficient Ts	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	9.649	5.391		1.790	0.089
K	6.058E-02	0.409	0.037	0.148	0.884
Objective: logical structure	0.118	0.305	0.084	0.386	0.704
Objective: math proof	-0.269	0.366	-0.169	-0.735	0.472
Objective: facts & principles	-0.200	0.428	-0.136	-0.468	0.645
Objective: what a problem means and ways to solve	-0.376	0.355	-0.221	-1.060	0.303
Objective: math concepts	1.109	0.771	0.609	1.438	0.167
Control: texts/materials	0.226	0.395	0.171	0.573	0.573
Control: content	-0.596	0.424	-0.464	-1.407	0.176
Control: teaching techniques	0.550	0.521	0.302	1.055	0.304
Control: disciplinary measures	0.499	0.444	0.248	1.124	0.275
Control: amount of homework	-0.552	0.558	-0.304	-0.988	0.335
Influence: discipline policy	0.144	0.302	0.161	0.476	0.639
Influence: training programs/workshops	-0.223	0.349	-0.201	-0.638	0.531
Influence: promoting students	-9.734E-02	0.316	-0.104	-0.308	0.761

Influence: math curriculum	4.909E-02	0.333	0.045	0.147	0.884
SC: staff help	-0.171	0.269	-0.172	-0.636	0.532
SC: share beliefs about educational missions	-0.702	0.306	-0.464	-2.291	0.034
SC: learning about new techniques	-0.115	0.479	-0.080	-0.241	0.812
SC: cooperative effort	0.186	0.361	0.152	0.517	0.611
SC: agreement about educational mission	-0.434	0.535	-0.289	-0.812	0.427
SC: positive atmosphere	0.275	0.403	0.230	0.683	0.503
SL: getting educational resources	1.149	0.520	0.752	2.211	0.040
SL: dealing with outside pressure	0.198	0.421	0.164	0.471	0.643
SL: plans are made and carried out	-0.119	0.400	-0.092	-0.298	0.769
SL: clarity of goals	-0.309	0.579	-0.181	-0.534	0.599
SL: recognition of a job well done	1.028	0.480	0.666	2.143	0.045
SL: know their aim	-0.679	0.580	-0.384	-1.172	0.256
SL: acknowledge problems and help	-0.372	0.402	-0.248	-0.925	0.367
SL: encouragement to experiment new teaching methods	0.158	0.563	0.110	0.281	0.782
SL: knowledge of expectations	0.349	0.547	0.204	0.639	0.531

SL: interest and innovation	-0.257	0.461	-0.163	-0.558	0.583
SL: rules are enforced	0.235	0.346	0.168	0.678	0.506
SL: staff is consulted	-0.242	0.372	-0.199	-0.650	0.523
M: accomplishment of objectives	-0.660	0.619	-0.295	-1.066	0.300
M: recognition of a job well done	0.108	0.302	0.082	0.356	0.726
M: educating youngsters	0.770	0.537	0.354	1.435	0.168
M: the job itself	-0.924	0.347	-0.656	-2.661	0.015
M: possibility of advancement	0.603	0.344	0.404	1.754	0.096

Predictors: (Constant), M: possibility of advancement, Objective: mathematical concepts, SC: staff help, Influence: promoting students, M: recognition of a job well done, Objective: mathematical proof, SL: dealing with outside pressures, K, SC: learning about new techniques, M: accomplishment of objectives, Control: texts/materials, Influence: discipline policy, M: educating youngsters, SC: share beliefs about educational missions, Objective: what a problem means and ways to solve, SL: rules are enforced, SL: recognition of a job well done, Objective: logical structure, Control: disciplinary measures, M: the job itself, Control: teaching techniques, Control: amount of homework, SL: acknowledge problems and help, Objective: facts and principles, Influence: training programs/workshops, SL: interest and innovation, SL: plans are made are carried out, SC: cooperative effort, SC: positive atmosphere, Influence: math curriculum, SL: staff is consulted, SL: know their aim, Control: content, SL: knowledge of expectations, SL: getting educational resources, SL: clarity of goals, SC: agreement about educational mission, SL: encouragement to experiment new teaching methods

Dependent Variable: SP

A stepwise regression was also done on the set of the 38 variables forming TP. The only variables that entered the regression equation and have a positive relationship between SP were:

- accomplishment of objectives
- recognition of a job well done
- share beliefs about educational missions

- control over disciplinary measures

with an explanatory power of 35% SP=12.613 + 0.530 (recognition for a job well done) – 0.878 (accomplishment of objectives) – 0.424 (shared beliefs about educational missions) + 0.837 (disciplinary measures).

Table 4.17
A stepwise regression between TP and SP.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.599	0.358	0.310	1.4661

ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	63.651	4	15.913	7.403	0.000
Residual	113.920	53	2.149		
Total	177.571	57			

Coefficients

Model	Unstandardized Coeffiecients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	12.613	1.653		7.628	0.000
M: accomplishment of objectives	-0.878	0.255	-0.393	-3.446	0.001
SL: recognition of a job well done	0.530	0.185	0.344	2.869	0.006
SC: share beliefs about educational missions	-0.424	0.187	-0.280	-2.270	0.027

Control: disciplinary measures	0.837	0.237	0.417	3.533	0.001

Excluded Variables

Model	Beta In	T	Sig.	Partial Correlation	Collinearity Statistics
					Tolerance
K	0.025	0.218	0.828	0.030	0.956
Objective: logical structure	0.030	0.255	0.800	0.035	0.922
Objective: math proof	0.009	0.081	0.936	0.011	0.948
Objective: facts & principles	-0.016	-0.129	0.898	-0.018	0.800
Objective: what a problem means and ways to solve	0.052	0.442	0.661	0.061	0.877
Control: texts/materials	0.002	0.015	0.988	0.002	0.949
Control: content	-0.017	-0.140	0.889	-0.019	0.850
Control: teaching techniques	0.103	0.771	0.444	0.106	0.690
Control: amount of homework	0.005	0.037	0.970	0.005	0.848
Influence: discipline policy	0.081	0.696	0.490	0.096	0.904
Influence: training programs/workshops	-0.073	-0.625	0.535	-0.086	0.898
Influence: promoting students	-0.028	-0.235	0.815	-0.033	0.872
Influence: math curriculum	0.053	0.412	0.682	0.057	0.752
SC: staff help	0.040	0.345	0.732	0.048	0.922

SC: learning about new techniques	0.030	0.227	0.821	0.032	0.710
SC: cooperative efforts	0.055	0.440	0.662	0.061	0.772
SC: agreement about educational mission	0.119	0.732	0.468	0.101	0.464
SC: positive atmosphere	0.235	1.869	0.067	0.251	0.731
SL: getting educational resources	0.044	0.353	0.725	0.049	0.791
SL: dealing with outside pressure	0.169	1.312	0.195	0.179	0.716
SL: plans are made and carried out	0.002	0.014	0.989	0.002	0.769
SL: clarity of goals	-0.083	-0.539	0.598	-0.073	0.496
SL: know their aim	-0.031	-0.207	0.837	-0.029	0.544
SL: acknowledge problems and help	0.030	0.236	0.815	0.033	0.766
SL: encouragement to experiment new teaching methods	0.150	1.040	0.303	0.143	0.580
SL: knowledge of expectations	-0.099	-0.679	0.500	-0.094	0.574
SL: interest and innovation	0.023	0.147	0.884	0.020	0.483
SL: rules are enforced	0.017	0.148	0.883	0.020	0.928
SL: staff is consulted	0.042	0.313	0.755	0.043	0.694
M: recognition of a job well done	0.116	1.012	0.316	0.139	0.917
M: educating youngsters	0.183	1.537	0.130	0.208	0.837

M: the job itself	**-0.123**	**-1.059**	**0.294**	**-0.145**	**0.889**
M: possibility of advancement	**0.150**	**1.246**	**0.218**	**0.170**	**0.828**
Objective: math concept	**0.186**	**1.322**	**0.192**	**0.180**	**0.602**

Predictors: (Constant), M: accomplishment of objectives, SL: recognition of a job well done, SC: share beliefs about educational missions, Control: disciplinary measures
Dependent Variable: SP

Chapter 5

Summary, Conclusion and Implications

Our broad hypothesis was to test whether the teacher performance (TP) affects student performance (SP). Teacher performance was assumed to be an additive function of ability of teachers (A), motivation (M), and work situation (WS).

Results showing the inadequacy of predicting SP from the teachers' knowledge in math could lead one to speculate about the true nature of TP. Insignificant results obtained in the regression analysis between teaching methods, indirect teaching technique or higher order thinking (HOT) in our case, reinforce the above mentioned speculation. The variables under motivation, on the other hand, showed to have a significant predictive validity on SP, i.e. the higher the motivation of the teacher, the higher the SP. The individual factors making up WS showed highly insignificant results on SP. Further calculations showed that out of the 27 items measuring WS, it was teachers' control over disciplinary measures which was the core of influence on the overall measure of WS and SP. Going back to our initial hypothesis, results show that in the Lebanese educational system, a student's performance in math at the intermediate level cannot be predicted from the TP. Nevertheless, as mentioned above, certain individual items proved to be significant predictors of SP. However, the small effects found in this study could easily have favorable implications for our schools, administrators and

teachers. With such studies administrators could evaluate the weaknesses and strengths of the teachers and the school as a whole. Therefore, they could provide measures to elevate and enhance the performance of the teachers.

Our first hypothesis H1: "Students, who have math teachers with higher level of ability as measured in terms of knowledge in subject-matter and teaching strategies that involve Higher Order Thinking (HOT) or indirect teaching methods, will have higher achievement in math." Therefore to test whether the ability of the teachers can affect SP, we studied the knowledge (K) of the teacher in the subject matter and his/her teaching techniques or strategies (TS). In our study, teachers' knowledge in subject matter did not show a significant effect on SP (p-value of 0.9228). Teachers claim that their schools do offer adequate opportunities to participate in training programs or workshops to allow them to continually learn about new educational techniques and their principals seem, to show interest in introducing new teaching strategies or experimenting with new methods; nevertheless, our results indicated that teacher ability is not a good predictor of SP. According to our results, we also found that stressing mathematical facts and principles does not improve predicting the students' performance, and when it does, it has a decremental influence on the students' achievement. Instead teachers should concentrate more on understanding mathematical concepts, which in our study has shown to have a significant influence on students' performance with a p-value of 0.0084. Additionally, teaching logical structure of math, the

nature of mathematical proof, what a problem means, and ways it might be solved should be part of a teacher's teaching objectives.

Our study of the second hypothesis H2: "Students whose teachers are highly motivated in their work will show higher levels of achievement in math than students whose teachers are not highly motivated," reveals that there is a significant level of relationship between teacher motivation and SP (p-value of 0.0015) which suggests that administrators should never retire from finding new ways in continuing to motivate their teachers. Interestingly enough, however, the findings provided a mixed support for the broad hypothesis. Among the items measuring the motivation variable, only when a teacher achieves or accomplishes the objectives of the lesson, and the responsibility to teach and educate youngsters, the teacher becomes motivated to teach, and thus has a positive effect on SP.

As for our third hypothesis H3: "Students who have teachers who are engaged in school restructuring have higher levels of mathematics achievement than students who have teachers who are not engaged in school restructuring."

The reality has its roots that stem from the mid-1900's with the coming of the Lebanese independence in 1943, the French system of education was carried over with only slight modifications in 1947, 1971, 1980, which the Ministry of Education (MOE) adopted.

The educational system in Lebanon is quite rigid. Teachers do not use textbooks or materials they see suitable for their students or even the content

they ought to teach. The curriculum provided by the Ministry of Education sets the norms. Instruction largely consists of lectures by teachers; students play a passive role. Teaching methods follow this pattern: explanation of the lesson, application of the rule and oral recitation, which is used for grading students. Students sit listening quietly to the teacher, who speaks in a formal and impersonal way. Pupils rarely question what is presented, and they copy material dictated by the teacher, who uses textbooks as the major source of instruction. Very simply, memorization dominates Lebanese schools. No doubt this program has its shortcomings. The system, modeled after French and English/American systems, in general does not prepare students to face the intellectual, psychological and societal challenges of the Lebanese community. No attention is also given to individual differences among students in a classroom setting. The classroom is, with few exceptions, teacher-centered, and little opportunity is available for individual students to learn at their own speed or accordance to their needs. There is also a high rate of failure and dropouts. The reasons include the rigid curriculum that does not meet the needs of students and the lack of adequate facilities and equipment. Nevertheless, with the onset of the new curriculum, such practices are slowly changing. The MOE explained on several occasions in 1996 that the objectives of the reform of school programs is aimed at developing human potentials and social capital with a view to reducing poverty, injustice, and violence, and to promote openness among people through participation in the building of society (Sader, 1997). True action has been taken, but a complete implication

of a reform takes several years and a constant follow-up in order for it to serve its purpose.

Because of the rigid Lebanese educational system mentioned above, the results of our H3 showed that none of the variables related to the teacher being involved in school restructuring has an affect on the SP. This shows that even though teachers believe or claim to be involved in school restructuring but actually they are not. The curriculum is set for them, particularly in mathematics. Nevertheless the results of H3 showed that there is a significant relationship between teachers being involved in school restructuring and performance of their students (p-value = 0.0086). It is only when teachers have controlled over discipline in their classrooms that there is a direct and positive influence on SP. Moreover, a positive relationship was shown between teachers having influence over disciplinary policies, promoting students, and math-curriculum; and SP.

A further variable in school restructuring is staff collaboration. A positive relationship was shown between teachers working in a positive and warm atmosphere, teachers continually being involved in learning about new educational techniques, and the existence of a broad agreement among faculty and educational mission; and SP. Teachers reported that when their leaders in their work situation; a) deal efficiently with outside pressure such as pressure exerted by the government, b) when school plans, goals, and priorities are made and clearly stated, and carried out efficiently, c) when school leaders know the aims of the school, d) when school leaders encourage new teaching

methods to be experimented, the SP will increase. The outcome of our data indicates that only when teachers are recognized for the "good" job they have done this will effect SP.

Coming to our broad and comprehensive hypothesis H4: "Higher teacher performance TP leads to higher student performance SP", which is the additive effect of all the variables measured in H1, H2, and H3 does not help in predicting the performance of students in mathematics in intermediate classes in Beirut. The only significant variables in teachers' performance (p-value = 0.2405) that influence SP were:

- recognition received by the administrator,
- shared beliefs by staff members for a common mission,
- control over disciplinary measures
- accomplishment of objectives.

Whereas the excluded variables were:

- Teachers stressing on teaching the logical structure of math, mathematical proofs, facts and principles, understanding mathematical concepts, and what a problem means and ways to solve it.
- Teachers having no control over the texts and materials they use, over the content they teach, teaching techniques, and control over the amount to homework they give.

- Teachers having no influence over disciplinary policy, training programs or workshops, promoting students, and math curriculum in their schools.
- Teachers do not receive help from the staff, are not given opportunities to learn about new teaching techniques, there is no cooperative effort to accomplish tasks, no agreement with the staff about educational mission, and teachers do not work in positive and warm atmosphere.
- Teachers believe that their school leaders are not good at: getting educational resources, dealing with outside pressure, carrying out plans, clarifying school goals, acknowledging problems faced by teachers and offering help, encouraging teachers to experiment new teaching techniques, letting know what is expected of teachers, interest in innovation, enforcing rules, and consulting staff before decision making that concern teachers.
- Teachers are not motivated to teach because they do not receive recognition for a job well done from the school leader. They feel there is no possibility of advancement in their teaching profession. Neither having a job nor educating youngsters motivates them to teach.

Why were these variables excluded, one might wonder? But if we look a bit deeper into the Lebanese educational system, we may find that the reason for the exclusion of the these variables from improving or predicting SP are:

- Teachers have no freedom to choose textbooks or teaching materials, they simply follow the curriculum and the textbooks assigned by the

Ministry of Education. They also have no control over the content they teach. Teachers have to follow the curriculum set by the Ministry and prepare students for the official examinations.

- There is always lack of equipment, as in audio/visual material, short of time, and congested classrooms which do not allow teachers to practice their creativity.
- Teachers are often not given to take part in making decisions that influence them or their students. Teachers could be indirectly asked about their opinions but the final decision always lies in the hands of the school leader. Teachers simply receive a set of rules to follow.
- Many schools do not have inner school training programs and are never informed about outside ones. Most schools do not inform their teachers about workshops or training programs because of financial difficulties, or because they don't want teachers to be away from school.
- Teachers become stagnated in their jobs because they are not given opportunities for advancement. They do not learn new teaching techniques. They are not given educational resources such as magazines or journals to learn and be kept up to date about new teaching techniques and about the teaching profession.
- Teachers feel that they carry all the load of educating and disciplining their students since they do not receive any help from the their administrators.

These excluded variables do not indicate that they do not effect SP. They simply show that we either didn't find any evidence of their effect on SP or they do not exist in our schools. The lack of evidence of the effect of these variables on SP could be due to the huge difference between the Lebanese educational system and the educational system of the U.S. from which the variables of the questionnaire used in this study were taken from, or it could be that other variables could better predict the SP. Therefore administrators could either check out for the availability of these variables or factors on the chosen sample.

All these implications of the study point to a number of improvement measures which should and could be taken to change existing conditions to the better in the Lebanese schools.

In view of the findings of our study, certain recommendations, which may be of help to educators in Beirut, Lebanon, are offered below.

Since continuous education is not widespread in Lebanon, special attention should be placed on developing a systematic in-service education program, which could include the following:

- In-service training :
  - Either to train at higher institutions
  - Or to invite a small team of specialists in various fields to give training in school.
  - Demonstration of new teaching techniques should be available to teachers. It is believed

that most teachers in Lebanon enter the teaching profession without any previous preparation in teaching, apart from their special subject preparation.

- Classrooms should be more student-centered rather than teacher centered.

- Establishment of professional libraries in which references may be obtained and where the interests, needs, and requirements of educators may find possible answers.
- Not only should teachers be motivated (e.g. recognition for a job well done) but also students (e.g. providing a positive feedback).

Alternatively, school principals and heads of departments in every school need provide teachers help, guidance, and feedback.

Recommendations for Further Research

Given the TP model presented in this study for the Lebanese teachers, accounts for a weak significance in the dependent variable, student performance, it is possible that what accounts for the U.S. teachers is different for the Lebanese. Nevertheless, several specific areas exist where further investigations may yield more powerful results. First, alternative measures of teachers' performance would probably enhance the Rowan et al. model.

Second, using students' mid-year exam scores as a dependent variable could have also conveyed to bias results in determining students' performance level. Other objective measures could be implemented where all students are evaluated in a similar way. Instead of using students' scores provided by teachers the researcher could have administered a comprehensive measure to evaluate student competence in math.

Third, a major area of study needs to be investigated in determining student performance other than the influence of the teachers' performance. Physical facilities, curriculum, among many other variables within a school may, all affect students' level of achievement. Since the TP model is less efficient in accounting for the performance of Lebanese students, it must be taken into consideration that there are various other or additional influences on students' educational attainment that need to be considered in future research. For example, the student's socio-economic status, or student's psychological and emotional state.

Inevitably, we are tempted to ask the same question again; "What improves or influences student performance?" The research findings in our literature review as well as our study of Lebanese teachers - students are mixed. In other words, it does not necessarily follow that positive teacher performance leads to better student performance. Then how much of student improvement in academic performance is attributed to the teacher's performance, as defined in our study, and how much is due to different

variables which are the most influential factors in the "schooling" and "socializing" process.

Administrators aim at maintaining a favorable milieu, which can help to elevate TP; and in turn increase the productivity level of students. Administrators are interested in actions that can intensify the performance of their teachers. Today, teachers need to go beyond the "old" transmission model of instruction. They need to be encouraged to participate more actively in school management and develop their own visions. Administrators need to promote professional teacher growth by maintaining a collaborative school culture, where staff members often talk, observe, criticize and plan together.

In light of the evidence provided, the results could have many implications for administrators.

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Appendix A

Letters presented to school administrators and teachers who teach mathematics to 6,7,8, and 9 grade students.

Dear Sir/Madame:

Thank you for agreeing to allow me to conduct my research in your institution. The questionnaire presented is a requirement for the completion of a Master's thesis in the field of Educational Administration. Teachers of Math of grades 6, 7, 8, and 9 will be required to fill out the accompanied questionnaire. The results could be helpful to administrators and educators in developing new teaching techniques.

The process of conducting the research comprises two steps:

Step 1: Kindly request from the above mentioned teachers to prepare the total average of math midyear exam for each class/section they teach.

Step 2: Hand out the questionnaire to each of the above mentioned teachers.

The questionnaire is to be filled out completely. Just a few minutes of their time will be required.

Your utmost cooperation is greatly appreciated.

Thank you,
Hourig Tchennozian
(Graduate Student at
Haigazian University)

Dear Participants,

The following questionnaire measures various teaching techniques. The results could be helpful to teachers and administrators in developing new and effective teaching methods. Kindly fill out the questionnaire, which should require 10-15 minutes of your time. We greatly appreciate your help and participation in conducting this research, which is part of a requirement in the completion of my Master's thesis in Educational Administration. Thank you for you cooperation.

Hourig Tchennozian
(Graduate Student at Haigazian University)

Appendix B

Questionnaire presented to teachers who teach mathematics to 6,7,8, and 9 grade students as part of our data.

I._ For questions 1-6, according to you, supply the appropriate answers to the following mathematical problems. Circle the correct answer. Time given 7 minutes.

1.Your students have been learning how to write math statements expressing proportions. Supposedly last night you assigned the following:

A one- kilogram bag contains 50% more red colored candies than green candies. Write a mathematical statement that represents the relationship between the red (r) and green (g) candies using r and g to stand for the number of red and green candies.

Here are some responses you get from students:

Kelly: 1.5r=g

Lee: .50r=g

Pat: .50g=r

Sandy: g+1/2g=r

Which of the students has represented the relationship best? (Circle the best answer):

All of them

Kelly

Lee

Pat

Sandy

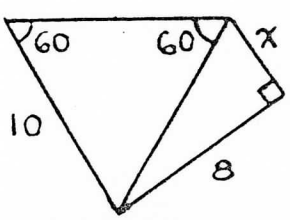
None of them. It should be _____.

2. The ratio of A to B is x : 8, and the ratio of B to C is 12 : y. If the ratio of A to C is 2 : 1, what is the ratio of x to y?

a) 2:3 b) 3:2 c) 4:3 d) 3:4 e) 1:3

3. In the figure, x= ?

a) 4 b) 6 c) $4\sqrt{2}$ d) $4\sqrt{3}$ e) $8\sqrt{3}$



4. What is the area of a parallelogram whose vertices are (-4, -2), (-2, 6), (10, 6), (8, -2)?

a) 32 b) 48 c) 72 d) 96 e) 104

5. If $(x-1)^2 - (x-1) = 0$ then

a) $x = 0$ or $x = 2$

b) $x = 0$ or $x = 1$

c) $x = -1$ or $x = 2$

d) $x = 1$ or $x = 2$

e) $x = 0$ or $x = -1$

6. A bag contains 3 green marbles, 4 blue marbles and 2 orange marbles. If a marble is picked at random, what is the probability that an orange marble is not picked?

a) ¼ b) 1/3 c) 4/11 d) ½ e) 7/9

II._ The questions in set II involve objectives. Kindly read each question, then decide on how much emphasis you give to each objective in your teaching. Circle the appropriate number on a 6-point scale from 0(none) to 6(heavy).

7. Understanding the logical structure of mathematics.

(None) 0____1____2____3____4____5____6 (Heavy)

8. Understanding the nature of mathematical proof.

(None) 0____1 ____2____3____4____5____6 (Heavy)

9. Knowing mathematical facts and principles.

(None)0____1____2____3____4____5____6(Heavy)

10. Thinking about what a problem means and ways it might be solved.

(None)0____1____2____3____4____5____(Heavy)

11. Understanding mathematical concepts.

(None)0____1____2____3____4____5____6(Heavy)

III._ For the questions in set III, kindly rate the following from 0(no control) to

6(complete control).

12. I have control over texts/materials I use in my classroom.

(No control) 0___1___2___3___4___5___6(Complete control)

13. I have control over content taught.

(No control) 0_____1____2____3____4____5____6(Complete control)

14. I have control over teaching techniques.

(No control) 0 ____1____2____3____4____5____6(Complete control)

15. I have control over disciplinary measure in my class.

(No control)0____1____2____3____4____5____6(Complete control)

16. I have control over amount of homework I give to my students.

(No control)0___1___2___3___4___5___6(Complete control)

IV. In this set kindly rate the following items from 0(no influence) to 6(a great deal of influence).

17. I have influence over discipline policy in my school.

(No influence)0___1___2___3___4___5___6(Great influence)

18. I participate and show influence over training programs/workshops.

(No influence)0___1___2___3___4___5___6(Great influence)

19. I have influence over promoting students at school.

(No influence)0___1___2___3___4___5___6(Great influence)

20. I have influence over designing school math-curriculum.

(No influence)0___1___2___3___4___5___6(Great influence)

V. In set V, rate the following from 0(strongly disagree) to 6(strongly agree).

21. I can count on staff members to help out if I have any problems in school.

(Strongly disagree)0___1___2___3___4___5___6(Strongly agree)

22. Colleagues and I share beliefs about educational missions, aims and objectives.

(Strongly disagree)0 ___1___2___3___4___5___6(Strongly agree)

23. Teachers at this school are continually learning about new educational techniques.

(Strongly disagree)0___1___2___3___4___5___6(Strongly agree)

24. There is a great deal of cooperative effort among staff to accomplish tasks.

(Strongly disagree)0___1___2___3___4___5___6(Strongly agree)

25. There is broad agreement among faculty about educational mission.

(Strongly disagree)0___1___2___3___4___5___6(Strongly agree)

26. There is a positive and warm atmosphere in the school. School seems to be like a big family.

(Strongly disagree)0___1___2___3___4___5___6(Strongly agree)

VI. Similarly, in set VI, rate the following from 0(strongly disagree) to 6(strongly agree).

27. Our principal is good at getting educational resources.

(Strongly disagree)0___1___2___3___4___5___6(Strongly agree)

28. Our school principal deals efficiently with outside pressures.

(Strongly disagree)0___1___2___3___4___5___6(Strongly agree)

29. Our school principal makes plans and carries them out efficiently.

(Strongly disagree)0___1___2___3___4___5___6(Strongly agree)

30. Goals and priorities for the school are clear.

(Strongly disagree)0___1___2___3___4___5___6(Strongly agree)

31. Staff members are recognized for a job well done.

(Strongly disagree)0___1___2___3___4___5___6(Strongly agree)

32. Our school principal decisively knows what kind of school he/she wants.

(Strongly disagree)0___1___2___3___4___5___6(Strongly agree)

33. Our school administration acknowledges problems faced by staff and offers help.

(Strongly disagree)0___1___2___3___4___5___6(Strongly agree)

34. Our school principal is encouraged to experiment with new teaching methods.

(Strongly disagree)0___1___2___3___4___5___6(Strongly agree)

35. Principal lets staff know what's expected of teachers.

(Strongly disagree)0___1___2___3___4___5___6(Strongly agree)

36. Our school principal is interested in innovation.

(Strongly disagree)0___1___2___3___4___5___6(Strongly agree)

37. In our school, rules for student behavior are enforced.

(Strongly disagree)0___1___2___3___4___5___6(Strongly agree)

38. Our school principal consults staff before making decisions.

(Strongly agree)0___1___2___3___4___5___6(Strongly agree)

VII. In this set, rate again the following from 0(strongly disagree) to 6(strongly agree).

39. When I achieve or accomplish the objectives of my lesson I become motivated to teach.

(Strongly agree)0___1___2___3___4___5___6(Strongly agree)

40. When my work receives recognition by the administrator I become motivated to teach.

(Strongly disagree)0___1___2___3___4___5___6(Strongly agree)

41. The responsibility to teach and educate youngsters motivates me to teach.

(Strongly disagree)0___1___2___3___4___5___6(Strongly agree)

42. My job makes me motivated to teach.

(Strongly disagree)0___1___2___3___4___5___6(Strongly agree)

43. The possibility of advancement at my school makes me motivated.

(Strongly agree)0___1___2___3___4___5___6(Strongly agree)

VIII. Kindly provide the total average of the mathematics midyear Exam of the class(es) you teach.

	Section A	Section B	Section C
Grade 6			
Grade 7			
Grade 8			
Grade 9			