

**A comparative study between Kuwait's Government and Private Sector Primary
Schools in methods of teaching and pupils' achievement in mathematics**

By

Abdulrahman Al-Duwaila

Submitted to the Graduate faculty of the School of Sport and Education

In Partial Fullfilment of the Requirements for the Degree of Doctor of Philosophy

Supervisor of Dissertation

Professor Mike Watts

Doctor Dawn Leslie

Brunel University

2012

Abstract

The study aimed at identify the aspects associated with teaching mathematics and students' learning through The framework for the scientific and theoretical features and properties related to: a) teaching mathematics in primary school, b) mathematics students' achievement and educational environment attributes, schools and teachers, c) nature of primary education in private and governmental schools, d) The differences between them in Kuwait in light of fifth primary class teaching methods and skills, and student learning and factors that affect it. Study sample included (20) mathematics teachers, all of whom taught fifth grade pupils from three primary schools in Kuwait (one private and two public; one for boys and the other for girls). Of these twenty, (10) were mathematics teachers in public primary schools and the other (10) were in the private primary school. Also, a sample of (80) pupils were chosen from fifth grade primary consisting of (50) pupils from the public schools (25 boys and 25 girls) and the remaining (30) pupils from the private schools (15 boys and 15 girls). Many tools were administered: a) a pilot study to define the problem and confirm the validity of the research questions ;b) questionnaire for teachers to elicit information concerning the teaching methods employed; c) Collation of pupils' achievement data to define and discover the differences between pupils' achievement. A number of statistical tools from the SPSS package for analysing social research data were used, the most important of which were: Cronbach's Alpha; Frequencies and percentages; and T test. Result showed that there are statistical differences between the government and private schools concerning: the attributes and characteristics of the methods of teaching mathematics; the mathematics curriculum; the components of the educational and scholastic environment; and the students' achievement. there are no statistical differences between the government and private schools concerning: the teacher's perception of student's achievement; and the teacher's skills.

Acknowledgements

Thanks and gratitude should go first and foremost to Allah, the Almighty God who endowed me with the energy to complete this work.

I would like to extend the most profound and heartfelt gratitude and thanks to Professor Mike Watts, my advisor for this dissertation for all his critical views, assistance and guidance, which permeate all my work.

Thanks and gratitude is also due to Doctor Dawn Leslie, whose efforts and time reading drafts for this work.

Many thanks also go to the jurors in Kuwait University and the supervisors of the ministry of Education who participated in revising and editing the instruments used in this study.

I would also like to thank the students and teachers who participated in this study.

Last, but never least, all gratitude and acknowledgments should go to my parents who helped me pursue my studies in secure environment.

My love and gratitude go also to my wife and children who showed patience while I was working on this dissertation.

The whole work is dedicated to my parents and my wife and children.

TABLE OF CONTENTS

	Page
CHAPTER ONE	1
THE STUDY PROBLEM	1
Introduction and Background of the Study	1
Research problems	3
The survey and its procedures	3
Research problem formula	6
Research hypotheses	7
Research objectives	8
Research importance	9
Study sample	10
Research limitations	12
Study terminology	13
CHAPTER TWO	19
Part A	19
Theoretical and intellectual framework for the research	19
Education in Kuwait	24
Public and private education in primary school	31
Nature of mathematics as a subject	49
Student achievement (factors and variables)	55
Educational achievement motives and importance	59

Main factors affecting the teaching of mathematics in general	62
Teaching methods and processes in general and factors that affect them	70
Planning for teaching mathematics at primary level	74
Methods of teaching mathematics	87
Teaching aids and mathematics at primary level	92
Components of school climate and its relationship to methods of teaching and student achievement	99
Part B	103
reviews of the literature	
CHAPTER THREE	117
METHODOLOGY	117
Preface	117
Research method	120
The research limits	121
Research community	121
The research sample	122
Data collection	124
Instrument of the study	125
The methods of statistical processing used in the research	135

CHAPTER FOUR	137
ANALYTICAL RESULTS	137
CHAPTER FIVE	184
DISCUSSION OF THE RESULTS	184
CHAPTER SIX	196
SUMMARY OF THE STUDY	196
Bibliography	215
Appendix (A)	234
Questionnaire	234
Appendix (B)	243
Mark lists for student achievements, mathematics grade five, at government and private schools	244
Appendix (C)	247
Study survey questions	248
Appendix (D)	252
Jury Members who judged the Tools of the Study	253
Appendix (E)	254
Copies of approvals received from	255
The authority of public and private sectors	256
Appendix (F)	257

LIST OF TABLES

TABLE	Page
Table (1) the research assumptions the data collected, collection methods, and techniques used to analyse the data	16
Table (2-1) Comparison between public and private schools	34
Table (2-2) Comparison between public and private schools in the State of Kuwait	35
Table (2-3) Primary schools - features and characteristics	40
Table (2-4) Elements and components of the axis (areas) of interests associated with mathematics in primary level education	50
Table(2-5) Teaching mathematics in primary school- classification of objectives	68
Table (2-6) Scientific procedures	77
Table (2-7): Teachers' practice of traditional and creative skills	82
Table (2-8) Areas and aspects of teachers' skills in teaching	84
Table (2-9) The relationship between areas of educational management, teaching methods, and student learning	97
Table (2-10) The relationship between areas of educational management, teaching methods, and student learning	98
Table (3-1) the study hypotheses.	118
Table (3-2) defines the tools used.	120
Table (3-3) details of the sample volume.	123
Table (3-4) Research themes and measurement statement	127

Table (3-5) Measures taken to modify the survey in view of jury members' assessment of its validity	132
Table (4-1) Distribution of total research sample at government and private schools according to the 'Gender' variable	138
Table (4-2) Comparison between private and government schools according to the 'Gender' variable	138
Table (4-3) Distribution of the total research sample at government and private schools according to the 'Age' variable	139
Table (4-4) Comparison between private and government schools according to the 'Age' variable	139
Table (4-5) Distribution of the total research sample at government and private schools according to the 'Years of Experience' variable	140
Table (4-6) Comparison between private and government schools according to the 'Years of Experience' variable	140
Table (4-7) Distribution of the total research sample at government and private schools according to the 'Educational Level' variable	141
Table (4-8) Comparison between private and government schools according to the 'Educational Level' variable	141
Table (4-9) Distribution of the research sample at government schools according to the 'Gender' variable	142
Table (4-10) Distribution of the research sample at government schools according to the 'Age' variable	142
Table (4-11) Distribution of the research sample at government schools according to the 'Years of Experience' variable	143

Table (4-12) Distribution of the research sample at government schools according to the 'Educational Level' variable	143
Table (4-13) Distribution of the research sample at the private schools according to the 'Gender' variable	144
Table (4-14) Distribution of the research sample at the private schools according to the 'Age' variable	144
Table (4-15) Distribution of the research sample at the private schools according to the 'Years of Experience' variable	145
Table (4-16) Distribution of the research sample at private schools according to the 'Educational Level' variable	145
Table (4-17) The frequencies and percentages of the attributes and characteristics of the methods of mathematics teaching on the level of the total research sample	146
Table (4-18) Frequencies and percentages for the teachers' perception of achievement of students on the level of the total research sample	149
Table (4-19) The frequencies and percentages for teachers' skills on the level of the total research sample	150
Table (4-20) Frequencies and percentages for the mathematics curriculum on the level of the total research sample	152
Table (4-21) Frequencies and percentages of the components of the educational and scholastic environment on the level of the total research sample	153
Table (4-22) Frequencies and percentages for the attributes and characteristics of the methods of mathematics teaching	156

Table (4-23) Frequencies and percentages for the teachers' perception of the students' achievement comparing government and private primary schools	160
Table (4-24) Frequencies and percentages for teachers' skills comparing government and private primary schools	163
Table (4-25) Frequencies and percentages for the mathematics curriculum comparing government and private primary schools	166
Table (4-26) Frequencies and percentages for the components of the educational and scholastic environment comparing government and private primary schools	169
Table (4-27) T-test for the differences between government and private schools in terms of the properties and attributes of the methods of teaching mathematics	173
Table (4-28) T-test for the differences between government and private schools in terms of the teachers' perception of the students' achievement in mathematics	174
Table (4-29) T-test for the differences between government and private schools in terms of teachers' skills	175
Table (4-30) T-test for the differences between government and private schools in terms of the mathematics curriculum	176
Table (4-31) T-test for the differences between government and private schools in terms of the components of the educational and scholastic environment	177
Table (4-32) Distribution of the categories of the students' achievement marks in the fifth primary grade in mathematics comparing government and private schools	179

Table (4-33) Distribution of the categories of the students' achievement marks in the fifth primary grade in mathematics comparing government and private schools	180
--	------------

Table (4-34) T-test for the differences between government and private schools in terms of the students' achievement marks in the fifth primary grade in mathematics	181
---	------------

LIST OF FIGURE

FIGURE	Page
Figure (2-1) Outline of theoretical and intellectual framework of topics	23
Figure (2-2) Educational ladder in Kuwait during the period 1956-1957	27
Figure (2-3) Educational ladder in Kuwait 2004-2005	28
Figure (2-4) the main cornerstones of setting educational objectives	67
Figure (2-5) Teaching mathematics in primary school using the direct presentation method	90
Figure (2-6) Educational Management	96

CHAPTER ONE

THE STUDY PROBLEM

Introduction and background of the study

In this chapter, I explain the general framework of the study. It includes an introduction which provides an overview of the field, and a comparison between public and private primary schools in the State of Kuwait in terms of the mathematics teaching methods used and student achievement. This part of the study also presents the dimensions and background to the study problems, and those problems related to differences between teaching mathematics in public and private primary schools in the State of Kuwait. Also provided are an overview of the surveyed schools and the assumptions on which the study is based.

Furthermore, the chapter highlights the objectives that are relevant to the study of 'public and private primary schools in the State of Kuwait' in terms of the mathematics teaching methods and fifth grade students' achievement. Moreover, I will stress the significance of the investigation which tackles an issue of major importance to education in the State of Kuwait.

This chapter refers to the scope and field of the study as well as the terminology related to the issue of mathematics teaching in public and private primary schools in the State of Kuwait.

The ability of any society to work and develop is the result of many factors, the most significant of which are education, food, and health. Education is one of the most important tools that contribute directly to the achievement of prosperity and progress for a nation, to the success of new generations, and to the abilities and skills of a country's human resources. It also assists the individual with social needs at different stages in their lifetime.

Almost three centuries ago, Adam Smith, the economist, said: "the prosperity of any nation is defined by the skill and the ability to make use of the labors it has".

These human resource elements, people's skills and their abilities related to education and learning, are particularly relevant to developing countries especially with regard to their direction towards economic and social development.

Moreover, teaching is a means by which people can achieve prosperity and progress in all fields of life. The function of teaching is to build generations and add knowledge, to foster values, and to pass on concepts and moral and scientific principles to individuals. This is true of every stage of education, from pre-primary to advanced and post-graduate studies (Thompson & Klenier, 2005).

At some point in their history, most countries of the world focus on the outputs of education. These play a significant role in meeting the needs and achieving the aims of a country, whether they are economic, social, research, or in other fields in the labour market.

The most important phase of education in any country is the primary stage. Alongside other things related to this stage, it focuses not just on formal education, but on bringing up a new generation, and on building knowledge in children and the ability to think for themselves. In addition, this stage involves building knowledge through scientific and educational curricula that is the basis for moving forward and will direct and develop the thoughts, the skills, and the abilities of pupils. It also qualifies them to reach subsequent educational levels based on curricula related to the primary stage (Tee & Chan, 2008).

For these reasons, countries pay careful attention to this stage of education and provide all the pre-requisites, from institutional and administrative aspects, to educational management, curricula, and teachers. They do so because this is a crucial time in a child's schooling (Eason et al., 2009).

It is observed that many countries have an educational management system that consists of two sectors that contribute to the provision of education. Most countries depend on contributions from the private sector to provide some educational services, especially in terms of the primary level (ibid). This is the case, for example, in Kuwait, Egypt, Bahrain, and Saudi Arabia. Public and private

primary schools play a significant role in providing pupils with different skills and knowledge, especially in the field of mathematics. It is an important subject in primary education because it contributes to the building of logical thinking and deduction in pupils, and to their learning achievements later in life. Thus, teachers have to take into consideration the many objectives of mathematics teaching at this level. They also have to provide teaching methods suited to the nature of the subject and the pupils' achievements to build their knowledge and skills and to further their development (Kirkgoz, 2008).

The State of Kuwait has paid attention to educational issues for different aged pupils, and especially for the primary stage. The Kuwaiti Ministry of Education has established a system for this educational level based on public and private schools, which now fall under the supervision of the Ministry of Education, and has established a regulated approach to private school work. This approach includes everything related to the teaching process and its management and is applied in a way which is suitable to the aims of the country.

Research problems

The survey and its procedures

Eral (2003) indicated that a survey helps the researcher to build background on the survey problem. This type of research is required when the research problem is new or when the information available about the problem is limited. This was the situation I faced, as this issue is new to Arabic studies and Kuwaiti studies in particular. Studies that deal with the issue of comparison between public and private sector with regard to mathematics teaching methods and students' achievement in the fifth primary grade are, to my knowledge, very limited. Therefore, I conducted a survey to allow me to deal with the fluidity of the study area, and also asked a series of open questions. Black and Champion (2002) indicated that the survey approach is aimed at exploring the conditions surrounding a phenomenon and revealing its aspects and dimensions. This helps to accurately formulate the problem so that more in-depth research can be conducted at a later stage. The aim of the survey reported

here was to identify the conditions surrounding mathematics teaching methods and students' achievement in the fifth primary grade, alongside related aspects and dimensions concerning teachers' skills, the mathematics curriculum, the teachers' perception of students' achievement and the educational and scholastic environment at primary stage in public and private education.

I conducted a survey and analysed the minor data published and related to mathematics teaching methods and the achievement of the fifth grade primary pupils at public and private schools. This was to define the research problem dimensions and questions.

I used a number of surveys with different audiences. I conducted a text-based survey developed from reference, books and previous research related to this subject. I also conducted a survey on a sample of teachers and educational and administrative staff at public and private schools. This was to obtain feedback on the problem.

I took the following actions before conducting each survey:

- Revision of the studies related to mathematics teaching methods, students' achievement and public and private education.
- Consultation with those who have educational and scientific experience in the field of study and those related to public and private education.
- Selection of a study sample from those involved with mathematics teaching methods and students' achievement in public and private education.

A number of open questions related to the changes were asked (see appendix C, p.247).

The results of the survey, in public and private primary schools in Kuwait, showed a difference between opinions with regard to mathematics teaching methods for fifth grade primary. There was also a difference in terms of pupils' achievement and the factors that facilitate increased achievement according to teachers' skills, the

components of the educational and scholastic environment, environmental elements, school atmosphere, preparations, and the available buildings.

The survey results for primary stage public and private schools in the State of Kuwait showed a variation in the opinions of teachers and academic staff towards methods of mathematics teaching and fifth primary grade students' achievement. In addition, my recent observations in the State of Kuwait (based on my expertise in the academic and educational fields and interviews I had with parents), show that some prefer their children to go to public primary school while others prefer private primary education, and a third group do not know whether public or private schools are better. This shows that parents are confused or undecided when comparing public and private education and this raises a key question related to the study: Which are better for teaching mathematics and for fifth primary grade students' achievement - public or private schools?

As shown by the survey I conducted with a number of teachers, there is a lack of clarity and also ambiguity, not just among parents, but also among teachers when adopting certain methods (for example, dialogue, discussion, question, lecture-based and project methods) of teaching mathematics to the fifth primary grade. Are there any actual differences between public and private schools in terms of the methods of teaching mathematics to the fifth primary grade? Are such differences in favour of the public or the private schools? What are the elements of such differences?

Are there any actual differences between public and private schools in terms of the students' achievement? Are such differences in favour of the public or the private schools? What are the elements of such differences?

Are there any actual differences between public and private schools in terms of the teachers' skills and their perception of students' achievement, the nature of the mathematics curriculum and the educational and scholastic environmental components? Are such differences in favour of the public or the private schools? What are the elements of such differences?

Research problem formula

This research problem relates to the extent of the difference between public and private schools in terms of methods of mathematics teaching and fifth primary grade students' achievement in the State of Kuwait. Of particular importance are: parents' confusion and indecision about whether their children should go to public or private schools; the lack of clear criteria for comparison between both types of education; and the absence of any clear reasons why some parents prefer public schools while others prefer private schools based on mathematics teaching and students' achievement. The research problem can be described through the following question:

What are the key differences between public and private schools in terms of methods of mathematics teaching and fifth primary grade students' achievement in the State of Kuwait?

In addition to the results of the survey, I observed a difference in opinion about methods for teaching mathematics to fifth grade primary pupils and their achievement. It was also apparent to me, from my experience of working in the educational field and my interviews with the pupils' parents, that there were marked preferences for either public or private school. Some people preferred to send their children to private schools rather than public ones. This is because private schools have some privileges, especially with regard to the curriculum and, sometimes, foreign languages. Other people believe that their children will receive better education at public schools than at private ones; but is that right?

The problem can be defined as follows

The research problem can be described through the following questions:

What are the actual differences between public and private schools in terms of the methods of teaching mathematics to the fifth primary grade?

Do such differences favour pupils of the public or the private schools?

What are the elements of such differences?

What are the actual differences between public and private schools in terms of the teachers' skills and their perception of students' achievement, the nature of the mathematics curriculum and the educational and scholastic environmental components?

Are such differences in favour of pupils of the public or the private schools? What are the elements of such differences?

Are there any actual differences between public and private schools in terms of the students' achievement? Are such differences in favour of the public or the private schools? What are the elements of such differences?

Research hypotheses

Since teaching methods are an integrated process and the result of a number of variables and other related factors (Xin et al., 2008; Mevarech & Kramarski, 1997; Stecher et al., 2006), such variables associated with the teaching process are concentrated in the teachers' skills, the nature of the mathematics curriculum, the teachers' perception of students' achievement and the educational and teaching environment. All these factors are related to teaching methods as an integrated process (Philipp et al., 2002; Nilsson & Driel, 2010). Henceforth, the variables which this study recognises as relating to mathematics teaching methods are as follows: the features and characteristics of mathematics teaching methods at the primary stage, the teachers' skills, the teachers' perception of students' achievement, the components and characteristics of the academic and teaching environment and the students' achievement in mathematics. These will be highlighted through a comparison between the primary schools in public and private education in the State of Kuwait.

The following hypotheses were derived in relation to methods and student learning in the fifth grade of private and government schools:

- There are statistically significant differences in the properties and attributes of the methods for teaching mathematics in the fifth primary grade of government and private schools.
- There are statistically significant differences in the teachers' perception of students' achievement and factors affecting it concerning mathematics in the fifth primary grade of government and private schools.
- There are statistically significant differences in the teachers' mathematics skills in the fifth primary grade of government and private schools.
- There are statistically significant differences in the nature of the mathematics curriculum in the fifth primary grade of government and private schools.
- There are statistically significant differences in the educational and scholastic environment components and features, which are influential in the teaching methods and the students' achievement in mathematics in the fifth primary grade of government and private schools in Kuwait.
- There are statistically significant differences in the degree of students' mathematics achievement in the fifth primary grade of government and private schools in Kuwait.

Research objectives

This study aims to identify the following aspects that are associated with teaching mathematics and students' learning:

- 1- The framework for the scientific and theoretical features and properties related to teaching mathematics in primary school.
- 2- The scientific and theoretical framework regarding mathematics students' achievement and educational environment attributes, with regard to schools, teachers and related subjects in primary school.
- 3- The scientific and theoretical framework related to the nature of primary education in private and governmental schools.

- 4- The differences between governmental and private schools in Kuwait with regard to teaching methods for mathematics in the fifth class of the primary school.
- 5- The differences between governmental and private schools in Kuwait in terms of student learning and factors that affect it.
- 6- The differences between governmental and private schools regarding educational environment in terms of teaching skills, syllabus and the components of the educational environment.
- 7- Recommendations that could improve the teaching of maths in Kuwait and help to improve student learning in governmental and private schools.

Research importance

The importance of the study can be explained in terms of the following:

1- Research academic importance

The study area considers development, enhancement and academic contributions related to educational theory.

The relevance of the study from an academic perspective involves the following:

1-1- The importance of the topic of teaching mathematics at primary level, as it has an impact on building students' skills and capabilities.

1-2- The academic importance of teaching mathematics methods and students' learning. This requires more study and is a matter that reinforces theory-building around this topic.

1-3- The scientific importance of the study lies in the fact that it enriches theories and studies related to the comparison of public and private education and the assessment of the characteristics of both of these with regard to mathematics teaching methods and students' achievement.

2- Research application importance

The application side of the study is related to several dimensions that contribute to primary education in Kuwait and to education in general, the most important of which are:

2-1- This is the first study of its kind in the State of Kuwait which compares the methods of mathematics teaching in public and private schools.

2-2- The importance of application lies in its contribution to recommendations and suggestions for public and private schools. These concern factors that affect student learning of mathematics at primary stage both in general and, more specifically, in the fifth grade.

2-3- This study benefits both public and private schools of the primary stage through the recommendations it provides concerning educational and school systems, the syllabus, teachers' skills and environmental components, matters which enable them to enhance teaching methods and improve students' learning of mathematics.

2-4- This study also benefits the Ministry of Education in Kuwait as it highlights the main differences between public and private education concerning mathematics teaching methods and students' learning progress. It also highlights the possibility of developing these methods and enhancing students' learning.

Study sample

I chose three schools using the cluster random sampling method. One of these was private and the others were public primary schools in Kuwait, I selected one private school because of its known adherence to internal systems. In general, it is difficult to gain access to private schools, whilst public schools are more readily available because of their affiliation to the public interest. Also with regard to the sample, there are no coeducational (mixed) schools in Kuwait, so those sampled were all single sex. The private primary school is segregated, with one building for boys and the other for girls, as is the situation for all private schools in Kuwait. The public primary schools were chosen, one for boys and the other for girls. The chosen

sample included (20) maths teachers, all of whom teach fifth grade pupils. Of these twenty, (10) are maths teachers in the public primary schools. Of these ten, (5) teach in the primary school for males (boys) and the other (5) work in the primary school for females (girls). The other (10) maths teachers, in the private primary school, are divided into (6) teachers who teach fifth grade pupils in boys' classes, and (4) who teach fifth grade pupils in girls' classes.

I chose fifth primary school students because this is their final year in the primary stage and the children reach a good level of educational experience and ability to learn, while the teachers of pupils at this level manage to deal effectively with the fifth grade curriculum. The fifth grade curriculum is more advanced than the previous primary levels and this allows the teachers to demonstrate their skills. I selected a sample of (80) pupils from the fifth grade primary consisting of (50) pupils from the public schools, with (25) pupils from each class, one class from the primary girls school and the other class from the primary boys school. The remaining (30) pupils attended the private school and consisted of (15) pupils from each of two classes, one class for boys and the other for girls. I chose this sample to compare their maths achievement by referring back to fifth grade pupils' marks sheets in both public and private schools.

Primary schools in the public sector

1. AL-Ummah primary school for girls. This school is located in Salwa Area.

The total number of pupils is (602).

The total number of teachers is (86) (females).

The number of pupils in grade 5 is (149).

The number of classes in fifth grade is (6).

The total number of school classes is (25).

2. AL-Muthanna primary school for boys. This school is located in the Farwania area.

The total number of pupils is (910).

The total number of teachers is (126) (males).

The number of pupils in grade 5 is (206).

The number of classes in fifth grade is (8).

The total number of school classes is (35).

Primary schools in the private sector

3. AL-Ruya bilingual primary school is located in the Hawally area.

This school is divided for boys and girls. The two divisions are separated, one building for boys and the other building for girls.

The total number of pupils is (777).

The total number of teachers is (98).

The total number of girl pupils is (338).

The number of girl pupils in the fifth grade is (63).

The total number of girl classes is (19).

The number of girl classes in fifth grade is (4).

The total number of boy pupils is (439).

The number of boy pupils in the fifth grade is (95).

The total number of boy's classes is (26).

The number of boy's classes in the fifth grade is (6).

Research limitations

There are several factors that determine the scope of this study as follows:

1- The sample consisted of teachers and fifth primary grade students from schools in Kuwait. The selected private schools were bilingual.

2- This study is restricted to measuring features and characteristics of methods of teaching mathematics, and factors influencing students' learning of mathematics.

It was possible to measure students' learning progress by referring back to fifth grade students' grade sheets in both public and private schools. These sheets of results are for the unified tests of both public and private schools which are supervised by the Ministry of Education.

- 3- Also, the study is restricted to measuring school and educational systems, features and characteristics of teachers' teaching skills, the fifth grade mathematics syllabus, and the organisational aspects of educational and academic systems, as these factors are the ones with most influence on teaching methods and students' learning.

Study terminology

I highlight the following:

1- Teaching mathematics methods

The method teachers use when teaching educational activities in mathematics. This method is aimed at relaying mathematics knowledge and skills in an easy and cost effective way (Birgin & Baki, 2009).

Also, it defines different methods and ways used by teachers to alter students' attitudes and to convey knowledge and the required skills for the subject being taught (Prakay & Stanford, 2005).

- Teaching is considered to be a number of steps the teacher uses to accomplish desired goals from the academic syllabus.
- These steps are correlated with some psychological, educational and personal aspects which are related to the teachers and teaching methods (Wei et al., 2010).

2- Students' achievement

Academic learning is described as: all knowledge, understanding and skills acquired by the learner as a result of certain teaching experience. Also learning is defined as identification of names, symbols, expressions, generalisations, as well as the ability to express knowledge (Hughes & Kwok, 2007).

- Also learning is determined by: to what extent students have learned and comprehended what has been taught to them during a certain period. This could be tested by exams, in which case results will be the measure of what the learner has been taught (Peterson et al., 2010).

- Also, learning can be determined by what students have acquired from academic experience after passing through several educational stages (Qarqza, 2006).

3- Educational environment and school atmosphere

It is the scholastic climate, the behaviours, policies and characteristics of the school and the teaching/working environment in terms of the official organisational structure, administrative communication, management supervision and behaviour of groups within the academic matrix which affects the performance of the educational and teaching process (Murphy, 2008).

- Also school environment and school atmosphere express mutual interaction between inputs and outputs in a school, a relationship which determines whether a school is an open or closed social system and the extent to which educational and academic goals are accomplished.

A school atmosphere is the one in which the educational process is achieved (Eason et al., 2009).

4- Teachers' skills

This refers to a teacher's personal traits, skills, and capabilities (existing and acquired); those that help them accomplish their teaching role in an efficient and effective way, as well as enhancing students' learning (Ciani et al., 2008).

Teaching skills are the tools to affect changes in students from both academic and educational points of view, to help them acquire skills, capabilities and different knowledge, a process which enriches students' knowledge and facilitates their self-development.

5- Mathematics curriculum

A group of required syllabuses that includes all subjects that must be studied by the student in school in order to obtain his/her degree (Harris & Sass, 2010).

Also, a syllabus is defined as a group of subjects prepared by specialists. The teacher executes it through teaching and the students' aim is to learn it – this is with regard to mathematics (Kasule & Mapolelo, 2005).

- Mathematics is a syllabus expressed as a group of concepts, and facts; knowledge that the school wants to embed in its students of mathematics. This is to prepare them for life and develop their skills as they acquire and benefit from the experience of others (Erdogan, 2010).

6- Teachers' perception of students' achievement

The teacher's ability to discover and understand the students' achievement levels and to know their strengths and weaknesses in relation to such achievement; the reasons for low achievement levels; the ability to deal with such low levels; and awareness of the students' behaviours as related to their academic achievement (Bergh et al., 2010).

7- Components of the educational and scholastic environment

Material components include educational resources, classrooms, scholastic management and leadership method, the teaching situation in the classrooms, the teacher's role in communication with the students in the classrooms and his/her role in solving problems with the educational process (Vanhoof et al., 2009).

8- Public schools

Every governmental entity responsible for education. Technical and educational preparation for the pre-university stage. Public schools differ from private ones (Honingh & Oart, 2009).

9- Private schools

Every non-governmental entity responsible of education. Technical and educational preparation for the pre-university stage. Also tuition fees are paid in order to accomplish its goals (Asadullah, 2009).

The table below lists the research assumptions, the data collected, collection methods, and techniques used to analyse the data:

Table (1)

Hypotheses of the study	Data collected	Form of analysis used
(1) There are statistically significant differences in the properties and attributes of the methods of teaching mathematics in the fifth primary grade of government and private schools.	Questionnaire that is administered to teachers to elicit information about the methods of teaching mathematics in the fifth primary grade; a comparison between government and private schools in Kuwait.	The questionnaire results were statistically analysed in terms of percentage. In addition, T test analysis was used to measure the differences between methods of teaching mathematics in the fifth primary grade, as a comparison between government and private schools in Kuwait.
(2) There are statistically significant differences in the teachers' perception of students' achievement and factors affecting it with regard to mathematics in the fifth primary grade of government and private schools.	Questionnaire that is administered to teachers to elicit information about the teachers' perception of students' achievement in the fifth primary grade; a comparison between government and private schools in Kuwait.	The questionnaire results were statistically analysed in terms of percentage. In addition, T test analysis was used to measure the differences between teachers' perception of students' achievement in the fifth primary grade, as a comparison between government and private schools in Kuwait.
(3) There are statistically significant differences in the teachers' mathematics skills in the fifth primary grade of government and private schools.	Questionnaire that is administered to teachers to elicit information about the teachers' mathematics skills in the fifth primary grade; a comparison between government and private schools.	The questionnaire results were statistically analysed in terms of percentage. In addition, T test analysis was used to measure the differences between teachers' mathematics skills in the fifth primary grade of government and private schools.
(4) There are statistically significant differences in the	Questionnaire that is administered to	The questionnaire results were statistically

nature of the mathematics curriculum in the fifth primary grade of government and private schools.	teachers to elicit information about the mathematics curriculum in the fifth primary grade; a comparison between government and private schools.	analysed in terms of percentage. In addition, T test analysis was used to measure the differences between mathematics curricula in the fifth primary grade of government and private schools.
(5) There are statistically significant differences in the educational and scholastic environment components and features that are influential in the teaching methods and the students' achievement in mathematics in the fifth primary grade of government and private schools in Kuwait.	Questionnaire that is administered to teachers to elicit information about educational and scholastic environmental components and features which are influential in the teaching methods and the students' achievement in mathematics in the fifth primary grade; a comparison between them.	The questionnaire results were statistically analysed in terms of percentage. In addition, T test analysis was used to measure the differences between educational and scholastic environment components and features in the fifth primary grade; a comparative between government and private schools in Kuwait.
(6) There are statistically significant differences in the degree of students' mathematics achievement in the fifth primary grade of government and private schools in Kuwait.	From the pupils' marks in fifth grade elementary, which were retrieved from the results of the unified test, supervised by the Kuwaiti Ministry of Education. I obtained the files of 25 pupils from a public school for boys and of 25 pupils from a public school for girls and files of 15 pupils from a class of boys, and of 15 pupils from a class of girls from a private.	The marks were analysed in terms of percentage, and ranges of students' mathematics achievement marks. In addition, T test analysis was used to measure the differences between students' marks in fifth grade, as a comparison between government and private schools in Kuwait.

Summary

In this chapter, I have referred to the general framework of the study that comprises a comparison between public and private schools in the State of Kuwait with regard to methods of teaching mathematics to the fifth primary grade and the students' achievement. I discussed the backgrounds of the study problem and its final form and questions then highlighted the opportunities, objectives and importance of the study as well as its limitations and terminology relevant to the study subject. At the end of the chapter is a table that presents the study hypotheses, data required, measurement tools adopted and analysis methods employed.

CHAPTER TWO

Part A

Theoretical and intellectual framework for the research

Many studies have discussed the issue of public and private education. Scientific argument has arisen concerning the nature of various aspects of education, especially since each, whether public or private, has its own characteristics (Saha & Saha, 2009; Tooley et al, 2008).

However, it is notable that there are few researches, studies and scientific arguments that deal with the comparison between mathematics teaching in public and private education schools in general. I also noted that Arabic research is rare and foreign studies relatively few, and that they focus only on comparison between policies, school management style, education processes, educational leadership or financing issues. One of these studies, by Nor Shirin (2004), compared the costs of private and government schools, and also provided the cost information to inform issues regarding the relative cost-effectiveness of private and government secondary schooling, and the inequity implications of education privatisation. Some others concentrate on students' academic achievement in public and private schools without focusing on the comparison between mathematics teaching methods and students' achievement in these establishments. For example Ayoob's 2007 study focused on differences in student achievement between government and private schools.

To my knowledge, foreign studies are also few, and this gives the present study scientific prestige because it tackles an issue that needs more in-depth research to assess the points of difference between public and private schools in terms of mathematics teaching and students' achievement in the fifth primary grade.

The study community consists of public and private primary schools in the State of Kuwait which work within the Kuwaiti education system.

Both types of school are subject to the supervision of the Ministry of Education of Kuwait, which provides an approved system, setting out the paths of public and private education, although there are certain regulations that apply solely to private institutions. The Ministry provides general supervision for both sectors with the exception of some schools that fall under the control of other countries; these are private schools representing certain communities. There are certain differences between public and private education in the State of Kuwait, which will be highlighted in the course of this chapter. In particular, they relate to scholastic management types, education processes, educational leadership, classroom density and school types. Due to the importance of the primary stage in which students' skills and behaviours are built, the teaching method is one of the key variables that contribute to a student's achievement. Here I look at the mathematics teaching method as an integrated process in terms of the related teaching curriculum, teachers' skills, educational environment, the educational resources used, scholastic leadership style, teachers' perception of the students' achievement and the factors affecting these. This explains the importance of these elements when approaching the mathematics teaching method as a multidimensional integrated process in view of the nature and importance of this subject and its teaching curriculum.

Education is considered to be a significant tool, used by nations the world over to achieve progress and growth in all areas. Through formal education, generations progress and individuals are able to develop their self-worth and to learn concepts and ethical scientific values at the various educational stages. This takes place from the beginning of the pre-primary stage through primary school and ends with university (Obied et al., 1998).

The primary stage is one of the most prominent because it contributes significantly to the founding and construction of prosperity; this is so because it involves certain scientific and arts curricula in domains that are considered to be the launch pad and the foundation, guiding and forming the ideas of students and setting them on the path which qualifies them for subsequent educational and pedagogical levels.

Therefore, many countries have paid attention to primary stage education as one of the most crucial. Aspects of the educational process which have been examined include; the organisational and administrative elements and components of the school environment (ibid); academic and school management; administrative communication (Ali, 2001); school leadership; management of the educational process in primary schools (Mooij, 2008); as well as the prevailing methods of teaching with regard to introducing educational materials and the way to convey information and basic concepts to pupils (Alhwaiddi, 2006).

Monitoring and developing the skills and capabilities of the teaching staff are among the subjects that other countries have cared about in the educational and pedagogical process in primary schools (Alharbi, 2000). Teachers are the basis of the delivery of information to pupils. They are responsible also for the increase in pupils' efficiency and achievements (Alhouli, 2007).

There are generally two types of organisation in Kuwait that have responsibility for managing the primary stage: schools that belong to the public education sector and those that belong to the private sector. Each sector is characterised by specific managerial and organisational frameworks that are used to control primary stage teaching methods and pupils' achievement rates, as well as the style and quality of leadership in the school environment.

Mathematics is considered to be one of the important subjects of the primary stage. The subject is used in the building and establishment of skills related to logical thinking and the ability to reach conclusions. Other benefits are the promotion of self-study and mathematical thinking. Such skills require teachers to consider several goals that mathematics teaching tries to achieve. Teachers should pursue provision and adoption of teaching methods that are compatible with the nature of this subject and its goals, and strive for high grades and advanced levels of pupil achievement (Alharbi, 2000).

Accordingly, this chapter focuses on the handling of several important issues and topics in the field of mathematics teaching and pupil achievement at the primary stage.

Kuwait is like other countries regarding its approach to education in that it adopts both governmental and private systems. The Ministry of Education supervises both. The State of Kuwait has focused strongly on the primary years, as it is an important stage in the development of its youth and future generations.

Although Kuwait is highly concerned about education, especially mathematics, its level in the Trends in International Mathematics and Science Study (TIMSS) was low. In 1995, it achieved position 39 out of 41 countries in a mathematics test. In 2007, it was placed 34th out of 36 countries worldwide. In 2011, it achieved its lowest position, at 48th out of 50 countries (TIMSS, 2011). Due to these results, research into the problem is a necessity, especially since mathematics is considered one of the main cornerstones of education in the State of Kuwait.

I refer in the following figure to the subjects that will be discussed in this chapter and the sequence in which they will be presented. The figure also explains, the presentation of chapter topics which relate to methods of teaching primary school mathematics, and academic achievement in Kuwaiti government and private schools:

Outline of theoretical and intellectual framework of topics

Education in Kuwait

Public & private education in primary schools and the factors and elements influencing the teaching methods and student achievement

Public &
private
Education

Nature of mathematics as a subject

Trends and factors affecting the nature of teaching mathematics as a subject

Goals of teaching mathematics as a subject

The process of teaching and teaching methods in general

Planning for teaching mathematics at the primary stage

Teaching position and its components

Related principles and factors in teaching mathematics

Teachers skills and abilities and their role in activating teaching methods

Principles associated with the ways and methods of teaching mathematics

Samples of teaching mathematics in primary stage

Teaching methods of some applications related to mathematics in primary school

Methods of teaching mathematics that depend on educational activities

Teaching mathematics in primary stage using interaction method between teacher and student

Teaching mathematics in primary stage using open questions method

Educational tools & Teaching mathematics in primary stage

The concept of student achievement and the factors and variables associated with this concept

Educational administration, teachers, scholastic atmosphere, and their role in teaching mathematics

Mathematics

Teaching
mathematics

Students
achievement

Figure (2 -1)

Education in Kuwait

The academic and educational process in Kuwait (as determined by the Ministry of Education) aims to offer suitable opportunities to develop individuals spiritually, intellectually, socially and physically, in accordance with their readiness and capabilities, in line with the nature of Kuwaiti society, philosophy and expectations, and in a way that suits prominent and contemporary cultural values and norms (Ministry of Education, 2009).

This should ensure a balance between individual self-actualisation and constructive participation in the building of Kuwaiti society.

Kuwait places emphasis on this objective and appreciates the importance of education in developing its society, especially with regard to economic and population growth and social values.

Education features and development (Ministry of Education, 1991).

- Formal education began in Kuwait in about 1883. At that time few could write, but then a small group began to teach the principles of religion in mosques. Education was limited to religion and sermons.
- The period 1887-1967 witnessed several stages in the development of education in Kuwait:
 1. 1887: panel studying appeared in Kuwait to teach people reading, writing and mathematics. This was in addition to the Qur'an;
 2. 1912: AL Mobarakia school was the first formal school in Kuwait;
 3. 1921: opening of AL Ahmadia school to deal with the increasing number of students who wanted to enrol at school;
 4. 1922: opening of the Happiness school which was the first civil formal school in Kuwait;

5. 1936: the Kuwaiti government became responsible for education and supervision. Then the knowledge council was established by Sheikh AbdAllah Gaber and became responsible for education in Kuwait;
6. 1937: the council established two primary schools, one for boys and the other for girls, in addition to some secondary school classes for boys at Al Mobarakia school;
7. 1953: a secondary school for boys and another for girls (Al Morkab School) were established;
8. 1954: those responsible for education in Kuwait realised that the academic syllabus and plan should be reconsidered. Education stages were re-designed to include primary, preparatory and secondary stages, each consisting of 4 years. This was in addition to 2 years kinder garden education. Previously education comprised 3 years kinder garden, 4 years primary school and 5 years secondary school;
9. 1955: this was one of the most crucial years for education in Kuwait, as the first kinder garden was established (Al Mathna school). In the same year technical education was introduced, in addition to the opening of the first religious institution. Also this year witnessed special care for those with disabilities, the opening of the first school for the blind (Al Noor School), and one for older people;
10. 1957: establishment of first institution to eliminate illiteracy;
11. 1963: a teachers' institution was opened (4 year diploma); which is equivalent to secondary level education then in 1965, law no. (1) came into force, making education compulsory and free-of charge for all Kuwaiti children.
12. 1967: the private education law – in both Arabic and English versions - was issued. In 1978 a law was passed to formalise the Ministry of Education and a syllabus for secondary school education was introduced. In 1984, the two

semester education system was implemented in secondary schools (Ministry of Education, 1991).

In the text above, I have illustrated the historical evolution of education in Kuwait using a descriptive approach that focuses on the evolution of education type and content from a quantitative perspective. The focus is on the increasing number of educational institutions and the number of students who graduate.

Educational system in Kuwait - features and characteristics (Ministry of Education, 2009)

Education in Kuwait spans a number of stages, each of which deals with a person's needs at a different age range. The educational ladder starts with kindergarten that has two levels (this is optional), then comes compulsory education at primary school (grades one to five), preparatory education (grades six to nine) and finally optional secondary education (grades ten to twelve).

This educational ladder is in place for both public and private schools together and some of the syllabus is common to both. Private international schools, however, follow their mother country's academic syllabus.

There are other forms of educational programme that are available through religious education, private schools, elder education and eliminating illiteracy programmes.

Post-secondary school education, a student can proceed to a 2 year diploma, proceed to a 4 year bachelor's course, or join a Kuwaiti, or other Arabic or foreign, university or institution.

Education in Kuwait is free of charge for Kuwaiti people and some non-Kuwaitis, like those born to Kuwaiti/gulf area mothers or those whose parents work at the Ministry of Education.

Educational ladder evolution in Kuwait (Ministry of Education, 2009)

1- Educational ladder in Kuwait during the period 1956-1957

True educational evolution in Kuwait began in 1954, as new concepts began to emerge which made the knowledge council reconsider its academic philosophy in terms of objectives and governing rules. A report was presented to propose changes to the existing educational system in a way that suited community needs to calibres.

In accordance with this report, a new educational ladder was adopted (using the 4-4-4 rule). Education became obligatory for both girls and boys between the ages of 6 and 14, which included the primary (age 6-10) and preparatory (10-14) stages. The teachers' institution was also established.

The education system at this time accepted students at primary school starting at age 6, preparatory students were accepted from age 10, and secondary stage students from age 14.

The table below illustrates the educational ladder during this period:

Academic stage	Kinder garden stage		Primary stage				Preparatory stage				Secondary stage			
Study years	2 years		4 years				4 years				4 years			
	4	5	6	7	8	9	10	11	12	13	14	15	16	17

Figure (2-2) Educational ladder in Kuwait during the period 1956-1957

2- Educational ladder in Kuwait 2004-2005

The knowledge council in Kuwait changed the previous education ladder (primary, preparatory, secondary) (4-4-4) that had been in place since 1956-1957 to a new one of three stages (5-4-3). This newly developed system was implemented starting in the year 2004-2005 to suit and improve all levels and all ages.

The table below highlights the educational ladder during this period.

Academic stage	Kinder garden stage		Primary stage					Preparatory stage				Secondary stage			
Study years	2 years		5 years					4 years				3 years			
	4	5	6	7	8	9	10	11	12	13	14	15	16	17	

Figure (2-3) Educational ladder in Kuwait 2004-2005

Private education in Kuwait (Aljabr, 2007)

Private education in Kuwait as well as other gulf areas is considered to be a phenomenon related to society and culture. This type of education has special features.

Private education is gaining increasing importance in Kuwait, especially with the deterioration in public school education quality and effectiveness. This private education is also aligned with the state direction toward development and evolution and coping with new cultural challenges.

Private education in Kuwait is represented in all private and civil institutions and is characterised by their financial, managerial and academic policy and programme's independence. These schools are either managed by individuals, or by civil, local or foreign charity institutions.

The schools are either self-funded, or paid for by subsidies or tuition fees paid by the students.

Kuwaiti law has defined private schools as all non-governmental institutions that offer general, high, religious, technical education either as general or supplementary activities.

These private schools also include those that teach languages, evening schools, all institutions that offer activities directly related to education and non-governmental kinder garden schools.

The presence of private education in Kuwait can be attributed to several causes: limited opportunity; most private schools in Kuwait set application deadlines for pupils' acceptance or rejection that are conditional upon financial support. So, most pupils can join private schools, higher levels of education, language teaching from the early years, and the existence of modern teaching facilities.

Alghanim (1990) conducted a study which noted that private education in Kuwait enjoys the best educational benefits in terms of transportation, educational achievement, well trained teachers, flexibility of relationships with parents, and academic activities and services.

Ministry of Education in Kuwait - regulations, objectives and directions, educational system evolution (Ministry of Education, 2009)

Education in Kuwait is characterised by the existence of a general system through which educational and academic directions are aligned with the Kuwaiti Ministry of Education directions.

In this regard, the Ministry of Education defines the educational system prior to university degree level as including the following:

Public Governmental Education: classified into four stages; kindergarten, primary, preparatory and secondary. Total years of study in all stages - 14. According to education law no. (11/65), issued by Kuwait Ministry of Education, in 1965, both primary and preparatory stages are obligatory (Aljabr, 2007).

Included in this type of education are both elder education and eliminating illiteracy.

- *National Governmental Education:* includes religious education in religious institutions, the Arabic language, general education, and teaching those with physical disabilities.
- *Private Education:* includes all private schools with all their educational stages.

Ministry of Education in Kuwait - organisational chart (see appendix F, p. 257)

The organisational chart of the Kuwaiti Ministry of Education includes a number of units:

- **Ministry Office:** includes the High council of Education, and the Kuwaiti national committee for knowledge and science, in addition to the Kuwaiti permanent office at UNESCO (in Paris) and the public relations department.
- **Supplementary units:** represented in the Legal Department.
- **Sectors:** which consist of the information and planning sector, educational development sector, general education sector, private education sector, diversified education sector, academic syllabus and researches sector, admin affairs sector, academic building sector, financial sector and student activity sector.

Ministry of Education in Kuwait - main objectives

- *Educational and academic process*

The Ministry of Education in Kuwait was keen to develop the educational process by emphasising the following points:

1. Develop the level of enthusiasm in Kuwaiti people, to improve their outlook and society, and to develop directions toward more effective educational methods in various fields.
2. Make radical changes in the student's syllabus and activities, while taking into consideration religious and Islamic values, ethics and citizenship.

3. Emphasis on the functional role of school. Develop activities in a way that serves academic goals and executes educational policies.
4. Enhance educational self-sufficiency. Improve students' enrolment rate in all educational stages in a way that reduces educational waste.
5. Develop educational direction in both public and private education.
6. Reinforce social status of teachers and continuously improve their professional and financial situations.
7. Develop educational performance. Ensure its administrative independence and ability to solve internal problems (Ministry of Education, 2009).

Public and private education in primary school

Factors and elements affecting teaching method and the student's learning

The text that follows introduces some previous studies that have tackled education in both private and public schools.

To summarise: the components and elements in schools - either public or private - are similar, as education and teaching processes cannot take place without their existence.

The difference between private and public schools can be defined in the nature of the educational environment; that is, teaching style and methods, management style, motivational factors, educational institution skills, teachers' skills and capabilities, school environment, communication methods, relationships and the overall educational and academic process (Cherchye et al., 2010).

Primary school, role and features

Primary school is the type of formal education that is considered to be the first step in the educational ladder, as the student enrolls in order to gain basic knowledge and skills.

The primary school concept focuses on the following issues:

- Existence of rules and educational framework
- Beginning of the educational ladder
- The basics of reading, writing and mathematics
- A system of school management that is in line with the nature of the educational process and management (Lingard et al., 2002).

Therefore, primary school management should be well supervised and follow a pattern that ensures that primary level values and principles are reinforced (Nir & Eyal, 2003).

1. Public school concepts

Public school is every public organisation that provides education or technical and professional training prior to the university degree.

Public school management differs from private school management in terms of hiring, promotions, leadership style, bonuses and firing (Ayoob, 2007).

Private school management in Kuwait has its own strategy whilst public school management depends mainly on Ministry of Education strategy.

This study finds that public schools and education have certain characteristics that distinguish them from their private counterparts, as they are supervised by the government and organised by law and legislation (Gary & Rastogi, 2006; Honingh & Oart, 2009).

I believe that both sectors have important characteristics.

Also, public education differs from private in terms of management and the control of teachers as it follows and is organised by a set of rules and procedures. For instance, in public schools teachers and school managers are under the supervision of school inspectors from the local district education authority.

2. Private school concepts

Private school is every non-governmental organisation which is concerned with education or technical and professional training, prior to the university degree.

Private schools are supervised by the Ministry of Education and educational entities in governorates. Also they are subject to labour and insurance laws - if not dealt with by a separate clause in general law (Ayoob, 2007).

Here, the school owner should be a legal entity that is able to fulfil all school financial liabilities according to conditions enforced by ministry decree; each school should have a headmaster and teaching staff with the same level of efficiency and management style as those in similar public schools. Also it is possible for private schools to hire teachers from public schools (Betts & Fairlie, 2003). In my view, teachers hired from public schools should be experienced so that they can benefit the teachers and pupils in private schools when they visit one another's classes.

There are special rules that regulate private school work. It is monitored and supervised by government, and where private schools are financed either by individuals or private institutions, those funding sources must provide adequate finance for the education process and to meet the requirements imposed on private schools by government (Asadullah, 2009).

Private schools receive private tuition fees, and it is clear that they have the following in common:

1. They contribute to primary and secondary education, both general and technical. This is in line with governing rules and approved syllabuses in similar public schools.
2. They undertake extensive study of language alongside other subjects.
3. They teach other curricula, where approved by the state, in addition to the state curricula.
4. The school may be owned by a single person or by an organisation.

5. Private schools use selection criteria when enrolling pupils, which allows them to maintain a competitive edge by selecting only the best. There is a further level of selection because private school education is not free of charge. Only those who can afford it can access it. I am against this notion of selecting only the best pupils. The school administration should be interested in the individual differences of all the pupils not only the best. Low-achievers should receive greater attention and concern in order to raise their level.

The following table highlights the major differences between public and private education:

Table (2-1)
Comparison between public and private schools

Points of comparison	Public schools	Private schools
Legal entity	Legal entity	Persons or legal entities
Ownership	Government - Ministry of Education	Private civil organisation Individuals Group of individuals
Governing rules	Ministry of Education and country rules	Ministry of Education and country rules, in addition to some special rules
Finance	Governmental finance	Individual funds
Admission rules	Determined by Ministry of Education	Determined by Ministry of Education, in addition to the special conditions of each school that meet its educational objectives
Supplementary branches	No supplementary branches; each public school is a separate entity	It can have several branches located in different places
Monitoring authority and supervision	Supervised by Ministry of Education	Supervised by Ministry of Education
School costs	Low- as it is subsidised by the government	High, as it is a private school that is self-funded

The following table compares public and private education establishments in the State of Kuwait:

Table (2-2)

Comparison between public and private schools in the State of Kuwait

Points of comparison	Public education schools	Private education schools
Supervision of the Ministry of Education	Direct supervision by the Ministry of Education	Direct supervision by the Ministry of Education
Geographic expansion of the schools	Available in every governorate of the State of Kuwait	Available in every governorate of the State of Kuwait
Nature of the educational system and educational stages	Subject to the system and stages of the Ministry of Education of the State of Kuwait	The same as for public schools
Supervision and educational management	Have supervisors and administrative personnel from Kuwait only	Have supervisors and administrative personnel from Kuwait only
Budget and financial resources	Subject to the budget of the Ministry of Education	Fully financed by the private sector
Types of schools	Subject to the system of study of subjects in both Arabic and English languages	Subject to the system of study of subjects in both Arabic and English languages
Commencement and end of the academic	Commences and ends at scheduled times and	Commences and ends at scheduled times. The

Points of comparison	Public education schools	Private education schools
year	depending on each academic stage in all public schools	dates may vary from the dates of the public schools and as per the nature of the community schools and their academic year
Capacity of classrooms	Public school classrooms are characterised by a relatively high number of students	Private school classrooms are of lower density than those of public schools
Nature of the relation between teachers and schools	Permanent appointment of Kuwaiti nationals and fixed term contracts for other nationalities	Takes the form of fixed term employment contracts between the teacher and the school
Teachers' salaries	Subject to the system and policies of the Ministry of Education of the State of Kuwait	Subject to the administrative rules of the private school and not subject to the Ministry of Education of the State of Kuwait
Description of the school in terms of the students' genders	Public schools are divided into boys' schools and girls' schools; there are separate schools for each gender	Private schools have one building with separate classrooms for boys and girls unlike public schools which have separate schools for boys and girls

Points of comparison	Public education schools	Private education schools
Teachers	Public schools have male and female teachers from Kuwait and from other countries	Private schools have male and female teachers from Kuwait and from other countries. Schools belonging to the communities of certain countries may only have teachers from that same community
Assessment and examination system	Subject to the system of the Ministry of Education of the State of Kuwait	Subject to the system of the Ministry of Education of the State of Kuwait. Community schools may apply the examination system of the country to which the community belongs
Academic curricula	Subject to the supervision of the Ministry of Education of the State of Kuwait and according to the Ministry policies	Subject to the supervision of the Ministry of Education, except for community schools which adopt academic curricula according to the country to which the community belongs
Students' nationalities	Enrol students from Kuwait and of other	Enrol students from Kuwait and of other

Points of comparison	Public education schools	Private education schools
	nationalities	nationalities
Class duration	45 minutes	45 minutes
Average teaching classes per subject per day	One class per day	One class per day
Type of classroom	Traditional classroom	Special classroom, for example, Mathematics laboratory
Students' sitting arrangements in the classroom	Groups	Groups
Enhancement class	N/A	Y
Duration of the academic day	From 7:30am to 1:30pm	From 7:30am to 2:00pm
Education costs	Free	Fee paying

The above table of comparison shows that there are some similarities and some differences between public and private schools in the State of Kuwait.

Role of primary education in both private and public schools

Primary education in both private and public schools plays the following roles (Papanastasiou & Zembylas, 2006; Tolba, 2008, Aloraini, 2002).

Primary schools and logical thinking

Primary schools allow students to think, criticise, and practice different activities. It is the role of the school to direct students toward activities that stimulate logical thinking.

Primary schools and knowledge

School should help students to gain a varied knowledge base, establish values and ensure that the knowledge learned is put into practice.

Primary schools and health

School should help students to form habits that improve their health, both mental and physical.

Primary school and embedded ethical and cultural values

The school's role is to teach children about society, culture and ethics, as ethics build human beings. This is especially important because the primary stage is the long lasting foundation which contributes to the development of we humans.

Primary school and educational system in society

Primary school is the foundation of the educational system. It is the first step in the educational ladder. For this reason it is vitally important and worthy of special attention.

Primary schools and student development

Primary schools feed students with information which helps them to develop mentally, physically, spiritually, socially and physiologically.

Also they teach students values that can help them to solve problems in their daily lives.

Primary school and coping with the external environment

Primary schools provide students with basic information, concepts, directions, trends and skills that match with their maturity level, participate in building their personalities, help them cope successfully with the external environment and ensure effective participation in society. In general, primary education sets the foundation for learning more difficult academic material.

I think that the school has a role to play in the development of the student's physical, social, religious, emotional, mental and ethical personality, and that it also plays a role in discovering their skills and creative capabilities.

Features and characteristics of primary schools

There are a number of features that are common to public and private schools which are shaped by the nature of primary education itself, as shown below:

Table (2-3) Primary schools - features and characteristics

Features and characteristics	Details
Education strategy and objectives in primary schools	<ul style="list-style-type: none"> - Increase enrolment and complete education - Increase percentage of students enrolled in education - Realise problems in society and increase students' awareness of them - Increase students' awareness of society resources (human and financial)
Primary school and citizenship	Primary school represents the minimum level of citizenship. It accepts students as long as they have reached enrolment age, so is the first step on the education ladder. It teaches students how to cope with society and embeds a sense of belonging.
Primary school – obligatory education	The law forces parents to enrol students in primary school when they reach 6 years of age.
Educational principles in primary schools	<ul style="list-style-type: none"> - Ensure that the students achieve self-actualization and belong to their society - Connect with the external environment and become flexible - Complement theory with practice - Prepare students to positively participate in building their society

Source: Aloraini (2002); Saitis & Saiti (2004); Motaawei & Metwali (2000); Jimenez & Paqueo (1996); Berlinski & Galiani (2007).

Comparison between public and private education

A number of studies that tackled both public and private education were considered to develop a strong academic background for the research. They highlighted the following:

The provision of private education can take several forms (Fitz & Beers, 2002).

- ***Contracting:*** public schools can take out contracts with several private entities, so that the latter can provide services like transportation, meals, provision of books, teacher training, building maintenance and so on.
- ***Vouchers:*** the government offers vouchers worth a certain amount to students who have reached the school enrolment age. These are valid until they finish their education and in this way parents can select the school of their choice.
- ***Substitution:*** here the government enters into contracts with some private entities to manage school affairs against certain fees.
- ***Charter and treaty schools:*** the main purpose of establishing such schools is to provide an alternative to public education. They have a free hand but in return they are fully responsible for their results. Also they have separate systems and budgets; the contract defines the system in these schools.
- ***Schools owned by the private sector:*** schools that are owned and managed by civil organisations; this is the most common type of private school.

Rouse (1998) looked at a privatisation programme applied in schools with the aid of vouchers in Milwaukee, USA. This system was established to tackle deficiencies in education quality in public schools. Some of these deficiencies in Kuwaiti public schools remain; they relate to inadequate teacher training, understaffing, and the high cost of extracurricular materials which are needed in large quantities for educational facilities.

It was highlighted that most of the enrolled students are from wealthy families, although the programme is also offered to poor and middle-class students. The scheme did not restrict the participating schools.

Schools were not committed to publishing exam marks to the students, and the study results showed no impact from using these vouchers on social coherence.

A study by (McEwan, 2001) on the Chilean experience in private education explains that the country implemented the coupon model to assign responsibility for education to city councils.

The programme allowed all students to enrol in either public or private schools, which then received monthly instalments that were mainly dependent upon the number of enrolled students. The coupon/voucher scheme included all poor students and it was noted that, post implementation, school enrolments had increased. This idea is good because it allows parents the opportunity to choose their preferred quality of school and ensure the right of all students in education, whether rich or poor.

In Holland, Patrinos (2002) has shown that 70% of students are enrolled in schools that are managed by special education committees. This study emphasises the quality and effectiveness of these schools. The freedom of parents to choose between schools for their children has eliminated all sense of inequality among students.

This study pointed out that all private schools in Holland are supervised by the public sector in terms of syllabus law, credit hours, evaluation methods, and knowledge enrichment.

As for the comparison between third secondary grade students' achievement of sciences and mathematics in Saudi Arabian public and private schools, Ayoob (2007) conducted a study to identify such differences in student achievement. The study covered a sample of 52 schools, comprised of (26) public schools and (26)

private schools with (2,428) students, (1,471) of which belonged to public schools while the other (957) belonged to private schools.

The study results showed an essential difference in statistical meaning for students' achievement in the sciences and mathematics in favour of private school students.

Ritter et al. (2009) studied the effect of traditional personnel practices and incentives for public servants with a focus on teachers. The study claims that private schools implement a complex understanding of privatisation, adopting motivational policies which encourage teachers to develop their educational performance level. The study discusses various means of privatisation in public education, including vouchers, public charter schools, subcontracting public school management to private providers, and merit pay for teachers. Privatisation supporters see it as a magic bullet to improve failing public schools. The authors argue for a more complex understanding of privatisation in public education. They concluded that privatisation, broadly defined, can align the private interests of employees with public values.

I stress the importance of teachers' motivation policies which, as this point, are thought to be an essential element in the differences between government and private education. This is due to the financial capabilities provided by the private sector and private schools exceeding the facilities of the government schools which in turn are correlated with certain government budget, rules, regulations and laws regulating the education process in government schools.

It is assumed that Free Primary Education (FPE) is required to ensure the poor gain enrolment. In a study of government and private schools in Kibera, Nairobi, Kenya, Tooley et al. (2008) surveyed a sample of 76 private primary schools with 12,132 students on roll. After introducing FPE in Kenyan schools, huge increases in enrolment were reported. The research suggests that this needs to be balanced against a much larger reported drop in enrolment in private schools. Moreover, focus groups with parents reported dissatisfaction with government schools, and

satisfaction with private schools, since FPE. The findings point to an alternative route to ensuring 'education for all', by embracing, rather than ignoring, the role currently played by the private sector.

In my opinion, the difference between government and private education at primary level is the private schools' increasing interest in this stage, given that it needs to acquire parents' confidence from the beginning of the educational process and the early stages of students' enrolment in schools. The government schools, however, are subject to the control and policies of the State and they do not need to acquire parents' confidence, being reliable government entities.

Other studies have examined the adoption and implementation of private sector methods in government education to improve failing public schools.

Renzo (2010) conducted a study on public and private education in the Dominican Republic that aimed to explore and understand the differences between the curriculum implemented in public and private schools in 3rd, 4th, 5th, 6th and 7th grades, specifically with respect to the instructional time allocated by teachers to Mathematics Activities and Mathematics Content.

One classroom for each grade was sampled randomly from each of public urban schools, public rural schools and private schools. In all schools with 3 or more classrooms for the same grade, 2 classrooms were selected at random. A sample of conducted mathematics tests included 21,938, 20,510, and 20,598 students across three layers - public rural, urban public, and private - in the 3rd, 4th, 5th, 6th and 7th grades. This study used Hierarchical Linear Modelling (HLM) procedures on 3 years of evaluation data from a nationally representative sample of 597 primary schools. The findings suggest that differences in educational opportunities help to explain differences in Mathematics Achievement in 4th, 5th, and 6th grades. The differences in mean frequency, relevant to the ways in which Dominican teachers covered Mathematics Content and engaged in Mathematics Activities in public and private schools, suggest that the national curriculum is implemented in different ways from one school type to the next.

The conditional model 2 shows that predictors, such as Public-Private and classroom Socioeconomic Status (SES), are statistically significant across the different grades: Students in private classrooms perform better than their peers in public classrooms, and classrooms with higher SES perform better than classrooms with lower SES. This is a continuous variable derived from the indicators of poverty created by the Planning Office, and developed based on the Household Questionnaire.

With regard to the control variables referred to as Educational Resources, this model indicates that there are statistically significant differences in these grades. Educational Resources for students, such as magazines, newspapers, and a classroom library, have an effect on students' mathematics achievement in 4th grade; while in 5th grade a similar effect is seen with the classroom mathematics materials. Students in private classrooms are afforded these educational resources, while their peers in public schools unfortunately are not.

The evidence found in this study supports the hypothesis that the curriculum implementation in Dominican classrooms is not the same in public and private schools; that is to say, there are differences in the opportunity to learn afforded to children in public schools in comparison to those afforded to their peers in private schools.

The evidence shows that educational resources have an effect on students' academic achievement and that this effect is present in public and private classrooms.

Also, the study results showed that Dominican teachers in private classrooms allocated more time for mathematics activities and mathematics lessons than did their peers in public classrooms. Moreover, the evidence found demonstrates that teachers in Dominican private classrooms use more educational resources.

The results indicated that teachers in Dominican public schools ask their students to carry out mathematics content related tasks (addition, subtraction, multiplication, and division) more often than do their peers in private schools. However, with regard to the mathematics content of fractions and decimals, teachers

in Dominican private schools employ these mathematics activities more often than do their peers in public schools.

I concur with the results shown by the research in relation to the differences between government and private education, as the previously concluded variables affect the students' achievement. The differences between government and private education can be summarised in three main elements including the curriculum and teaching process, the educational resources and the school climate and activity practices.

In Dronkers and Robert's (2008) work, the gross differences in scholastic achievement among public, private government-dependent, and private independent schools in 22 countries were analysed using Programme for International Student Assessment 2000 data. In a multilevel approach, the authors estimated these sector effects, controlling for sociological characteristics of students and parents, school composition, teaching and learning conditions of schools, and students' and principals' perception of the climate of their schools. The main explanation of their gross differences in scholastic achievement is the better social composition of private schools, both government dependent and independent. But pupils at private government-dependent schools have a higher net educational achievement than do comparable pupils at public schools with the same social composition. The explanation of these remaining net differences in scholastic achievement seems to be their better school climate. These net differences in scholastic achievement between public and private school sectors are equal across nations, despite historical differences in educational systems.

Cardon (1991) made a study of private school managers in Ohio state, which focused on examining levels of training and qualification requirements for private school managers.

Data from 165 private schools with full time managers was gathered and it was found that in this state the academic achievement required of private school managers was less restricted than that in its public schools. Also, those managers had achieved greater leadership milestones in line with their proposed educational objectives in literature research. I agree with this study because in Kuwait there is a

degree of freedom for the managers of private schools over that available in public schools as these tend to observe Ministry policies directly.

Tolba (2008) made a comparative study between public and private school atmosphere, and its impact on the education process in primary schools in Monofeyia governorate in Egypt. The main objective of this study was to define a regulatory framework in both public and private schools in order to identify deficiencies and weaknesses in these establishments, in addition to highlighting how school atmosphere can contribute to the achievement of academic goals along with other major positive and negative factors that affect academic atmosphere.

The study concluded that major factors affecting the academic atmosphere in both public and private schools are teachers' satisfaction, meeting students' needs, managing personal relationships in the education process, and the role of academic leadership in ensuring a healthy environment for education.

Obaidat and Mohammed (2009) conducted a study on the reasons for education privatisation in Jordan and the expected outcomes. It focused on assessment of the positive and negative aspects of such privatisation. The surveyed sample included (57) Jordanian school principals as well as male and female teachers.

The results showed that the main reason for privatising education was the awareness programme that the private sector used to promote itself. Private education creates a safe environment for students, and in contrast people are dissatisfied with the public sector. One of the positive outcomes of private education is improved educational efficiency that increases the academic system's ability to accomplish its role. In my view, most of the private schools host creative environments because of the keenness of the school administration to develop the school into an attractive environment for students.

Mostafa (2006) examined work pressure in public schools, gathering feedback from teachers and managers about work commitment, work pressure, and the degree of work commitment in public schools.

The research conclusion was that work commitment and pressure are correlated more with employee age and educational degree, and that educational and regulatory environment strongly affect work load and commitment in public education. In my opinion, this is not the case in private schools because private school teachers are assigned only to the educational process whereas public school teachers are assigned to many supervisory functions.

Algamidi and Osairi's 1992 study, in Saudi Arabia, showed the role of private schools in education when compared to that of public schools. The study was conducted on two schools in the public sector and a survey of four questions was used (an objective topic about sixth grade subjects was selected).

The study focused on making comparisons between different educational programmes offered in both types of school in order to identify the effectiveness and efficiency of each, and to validate what is commonly said; that private education is better by far to the extent that parents are keen to enrol their children. All of the results showed that the academic performance of private school students is better than that of public school pupils, as public schools lack the financial capability to execute modern educational programmes. They are also poorly equipped in terms of labs, libraries, and playgrounds, and the teachers in public schools are less skilled than those in private ones. I agree with this study that private schools are better served in terms of equipment, libraries and facilities although public schools have financial resources available to them.

The present study's conclusions on public and private education, based on the above research are as follows:

The previous studies on education indicate that there are two types of school; public and private, that are managed either by individuals or civil society institutions.

Private education makes a positive contribution to the academic process in light of the laws and rules through which it is organised.

Public education has special features that differentiate it from the private alternative in terms of education management, regulatory framework, work process, finance and budget, employee nature and grades obtained by students.

There are also differences in students' achievement and academic role between these two types of school.

Private education can take different forms depending mainly on the nature of finance, the contribution from the private sector or civil society, and the degree of independence.

Private and public school differ in terms of their demographic features, teachers' skills, and parents' willingness to enrol their children as students.

This study illustrates the importance of identifying the main dimensions which differentiate between public and private schools in terms of students' achievement and educational environment, teachers' characteristics, and finally, ways of teaching mathematics and student learning.

Nature of mathematics as a subject

Before discussing the nature of mathematics as a subject, it is necessary to clarify that, in general, guidelines with regard to mathematics focus on a number of things. Some of the most important are the nature of the educational material, the learning process, the educational process, and related expectations. These areas of interest concentrate on the diversity of material, the mathematics curriculum, and discussing questions which are not traditionally related to the student and the environment (Kasule & Mapolelo, 2005).

The following table refers to the axis (areas) of interests associated with mathematics as a subject in primary schools or the primary education stage in general. The term axis is a close translation from the Arabic expression used in curriculum discussions.

Table (2-4) Elements and components of the axis (areas) of interests associated with mathematics in primary level education

Axes components and details	Axes
The first axis focuses on subjects presented in the curriculum, the way of putting innovative (non-traditional) mathematical theories which are further related to students' factual environment and the way such theories provide solutions to real life problems.	Content of mathematics curriculum
The second axis focuses on achieving certain self-efficacy levels for students, developing research on proper solutions that are far from didactic, repetitive or the memorisation for mathematical cases. Rather, depending on inquiry, listening and understanding.	Learning associated with mathematics
The third axis is correlated with educating students with routine type questions (this type of question mainly depends on using pre-solved examples); also introducing non-routine questions (questions that require a creative way of finding solutions that have not previously existed, i.e. open questions, real life questions and questions that stimulate creativity).	Education
The fourth axis requires the combination of theory with application in order to solve mathematical problems to make sure that theory is always applied in a practical example. In practice, both types of knowledge are correlated and harmonious.	Expectations
The fifth axis, the nature of mathematics, covers the concept of simplicity to complexity. It begins with natural numbers then deals with integers, relative numbers and real numbers and finally the system of complex numbers.	Nature of mathematics

Source: Khasawna et al., 2000; Abo zainah, 2010

These are useful axes to link between, I hereby that these authors mention to Arabica environmental which my study focus on it in Kuwait. Referring back to the nature of mathematics as a subject: it can be explained as a science curriculum which focuses upon amounts and numbers, as well as shape, relationship, numerical codes, and symbols associated with operations.

Abo zainah recommends that this interpretation of the nature of mathematics be used as a description and explanation of the elements and symbols used in mathematics. He also found that the nature of mathematics can be determined in terms of progress from simplicity to complexity, beginning with natural numbers then moving through integers, relative numbers and real numbers to the system of complex numbers (Abo zainah, 2010).

In the context of this research, mathematics appertains to cumulative knowledge and close relations between rules and theories, and is a continuous and sustained science. The nature of mathematics is an abstract science that depends on innovations of the human mind. This science refers to the growth of humanistic thinking towards estimating quantities using different methods in counting and writing figures. Mathematics is also a thinking method that relies on inductive, deductive and logical thinking to solve cases (Morizeek & Darweesh, 2009). Mathematics is considered as one of the basic sciences in building curricula for all stages and grades; some even call it the Queen of Sciences. This science concentrates on methods, ideas, and thinking styles (Nozadze & Romberg, 1997), as it deals with numbers, figures, calculations, algebra and mathematical relations.

This entry-level definition of mathematics focuses on abstraction, but it is still possible to explain the science of mathematics as a 'cumulative structure that means that the subsequent acquisition of knowledge is based on an already-acquired prior knowledge' (Morizeek & Darweesh, 2009: 49). As a science, it deals with the human mind, and includes foundations, concepts and rules, theories and processes, resolving issues (problem-solving), and proofs, and deals with figures and symbols

(Papanastasiou, 2008). This applies, for example, to the mathematical operations; operations begin with addition and subtraction, then differentiation and integration, with some complications.

In terms of language, mathematics uses expressions and specific codes that are clearly defined to facilitate intellectual communication between individuals. As Erdogan (2010) says, mathematics mainly depends on well-known numbers, symbols and signs. It is also a universal language that is known for expressions and symbols that are known to everybody (Abo zainah, 2010).

Considering mathematics as a subject that mainly depends on understanding and interaction on the part of the teacher is a very limited definition, because it should be treated as a well-organised body of knowledge that starts from undefined concepts, until it is integrated, becomes theory and reaches a conclusion (Alajmi & Aldokhi, 2010). Therefore mathematics depends on studying sequences, order in numbers, and shapes, provides a model for life and financial examples, and also touches social aspects and deals with real examples from society (Tektaş et al., 2010). In this regard, the present study considers mathematics as a subject that focuses on knowledge, order and sequences until it produces results stimulated by society and real life.

Others believe that mathematics is a science that includes four main fields; arithmetic, geometry, algebra and mathematical analysis (Abo zainah, 2010). These four subjects have been totally integrated into the mathematics curriculum. This definition justifies the use of mathematics as an important tool for obtaining and analysing results (Cleary & Chen, 2009).

For the purposes of this study, mathematics is defined as a fundamental core science that is interrelated with all fields and specialisations. It depends on a number of figures, symbols and signs, through the use of integrated theories, and leads to definite conclusions and results that depend on organised knowledge and integrated theories.

Mathematics curriculum

The academic curricula are the basis through which knowledge is provided to students in different topics. The mathematics curriculum is one of the important curricula which give students different skills and abilities (Stein & Kaufman, 2010). Mathematics curriculum planners are always making efforts to include different types of methods and strategies for teaching and learning of the subject.

Marzano's (2003:22) research on school effectiveness showed that the 'development of a guaranteed and viable curriculum provides the greatest impact on student achievement'.

The mathematics curriculum consists of academic content and activities related to mathematics. The curriculum in Kuwaiti public schools is the same as in private schools in terms of academic content such as mathematical problems, fractions, algebra, and geometry. However, they vary in the way the topics are distributed and presented in terms of quantity and quality. In public schools, the information presented to children is dense and the teacher explains the material verbally (Altammar, 1991). The private sector, on the other hand, focuses on quality rather than quantity. Moreover, the private sector pays greater attention to providing integrated elements in lessons, making use of educational resources that suit the topic, and varying resource use to fit the lesson's objectives (Alghanim, 1990).

In a study on government education in Kuwait, Altammar's 1991 study explores the key standards set by the National Council of Teachers of Mathematics (NCTM) in public primary schools in Kuwait as perceived by mathematics teachers, including class teachers, supervisors and curriculum specialists. It identifies the extent of the integration of such standards in the current mathematics curricula in primary schools and suggests improvement methods.

This study involved 413 primary stage mathematics teachers, 20 mathematics supervisors and 14 specialists in the State of Kuwait. In the preparation of this survey, the researcher adopted the standards of the National Council of Teachers of

Mathematics for the year 1989 while extending, reformulating or dividing certain questions into sub questions.

The researcher used descriptive analysis including averages and standard deviations to summarise the answers resulting from the survey. ANOVA and dimensional comparison methods were used to compare the answers of the three groups of teachers. He also used the tests to compare teachers' perceptions of the need for mathematics teaching standards and the evidence of these standards in their work.

The results from the whole sample indicate that they answered as follows:

- 1- All standards are important.
- 2- The current mathematics curriculum does not pay enough attention to the standards, particularly those related to problem solving.
- 3- Data analysis and probability are not well represented in the current curriculum.
- 4- Decimal fractions and the use of computers in primary schools are not given enough attention in the current curriculum.

The surveyed teachers stated that:

- 1- The time assigned for teaching mathematics is very limited.
- 2- The textbooks and classroom environment are not suitable.
- 3- Special programmes are not available for weak students.
- 4- There are insufficient educational resources and applied methods.

In a study on private education, Alghanim (1990) showed the parents' point of view with regard to the advantages of private education in the State of Kuwait. The survey covered an extensive sample of parents in 29 private schools of different stages (primary, preparatory and secondary). The study showed that private schools have the best educational advantages in terms of the educational level, teachers' qualifications, and flexibility of the relationship with parents, as well as the educational and scientific services, activities and events.

I agree with Altammar that the public sector in the State of Kuwait focuses on the quantity of information and lacks quality. It also focuses on the transfer of information, concepts and thoughts from the teacher to the learner in a traditional way. As such, it does not consider the individual variations among students. I agree with Alghanim that private education focuses on the transfer of information, concepts and thoughts in various ways making use of educational activities, events and scientific services.

Student achievement (factors and variables)

Student achievement is one of the most important topics in the education cycle, especially since different practices in education are aimed at effecting a radical change for the better in a student's behaviour (McEwan & Trowbridge, 2007).

It contributes to the development of personal differences and to the comprehensive growth of the student, but is also an indicator of the teacher's success in delivering knowledge, and developing students' skills (Celik & Keskin, 2009).

Academic achievement and learning depend in the first place on students' capabilities, talents, skills, training level and the surrounding environment.

The achievement process cannot produce its desired results and outcome if not associated with strong motivation (Alhashimi & Alibrahim, 2010).

Strong motivation will urge students toward a high level of achievement and accelerate their learning curves, as $\text{productivity} = \text{ability} + \text{motivation}$ (Bakish, 2008).

Therefore, creating situations that increase students' motivational level will have a positive impact on their academic achievements.

Physiologists have discovered that individual needs are main drivers of physiological activity, as by nature the individual learns to differentiate between good and bad, success and failure (from environmental stimulus). Accordingly we can direct individual motivation toward social motives which include wealth, power, status, co-operation and prestige (Mohammed, 2004).

There are a number of views on, and approaches to, the subject of student achievement, as outlined in the text below.

Student achievement definition from a psychological perspective

According to Fletchers et al. (2009), one definition of educational achievement, taken from a psychological dictionary, is the acquired knowledge or skill rather than the actual achievement or possibility of actual achievement from the psychological point of view.

This approach is based on the following important elements:

- Existence of students' previous knowledge.
- Existence of gained skills.
- Learning has to be completed in a certain time frame.

Student achievement definition from an academic efficiency perspective

Within this context, learning is defined as reaching a certain level of learning efficiency, either in school or college. This efficiency can be measured by tests/exams, teachers' evaluation or both. Therefore it focuses on evaluating students' acquired knowledge (Armagan & Koksall, 2010).

This approach is based on the following important elements:

- Efficiency level.
- Conducting tests/exams.
- Teacher's evaluation.
- Student's knowledge evaluation.

Student achievement definition from the perspective of outstanding academic performance

Within this context, learning is defined as what the individual has accomplished in terms of his/her outstanding performance with regard to learning, training, exams and tests (Alhazimi, 1995).

This approach is based on the following important elements:

- Individual acquired achievement through learning.
- Exams and exams undertaken.
- Outstanding performance and distinction.

Student achievement definition from a knowledge, understanding and skills perspective

Here, learning is defined as students' acquired knowledge, understanding and skills in the context of defined educational experience (Hughes & Kwok, 2007).

Knowledge is defined as the amount of acquired information needed to be able to identify different dates, names, symbols, expressions, designs... and so on. Understanding is reflected in the ability and skills employed to express this knowledge using various methods (for example, find a correlation between one topic and another), the ability to apply knowledge and its usage in new situations.

This approach is based on the following important elements:

- Knowledge.
- Skills.
- Academic experience.
- Awareness of names, symbols and concepts.
- Relationships between different knowledge fields.
- Ability to use and implement knowledge.

For the purposes of this thesis, skills are the ability to perform a task with accuracy; they include writing, mathematical, experimental and other physical and mental skills.

Student achievement definition from an academic syllabus familiarity perspective

Learning is defined as the amount of academic knowledge acquired, therefore it is measured based on the grade the student has obtained in his/her exams, which is directly related to studying, understanding and application level (Sawatfa, 2010).

Also, a student's achievement is related to his/her ability to read, especially with regard to understanding, and the implementation of what they learn and achieve (Kirmizi, 2009).

This approach is based on the following important elements:

- Syllabus knowledge.
- Recalling ability.
- Understanding.
- Application.
- Reading.

Student achievement definition from a teaching perspective

Learning is defined as the amount of knowledge the student has acquired, comprehends and has been taught during a certain period. Here learning is assessed through exams, as the content of the exam reflects what has been taught in the syllabus. Therefore the exam will reflect what the examinee has learned in terms of knowledge and skills (Peterson et al., 2010).

This approach is based on the following important elements:

- Teaching knowledge.
- Required time frame to acquire knowledge.
- Exams. Exam contents. Exam results. Students' accomplishment.

Student achievement definition from an attitude alteration and teacher performance perspective

Learning is measured by the degree to which the student has understood and comprehends the academic syllabus, as well as the degree to which his/her attitudes have been altered for the better.

This alteration will be a result of the teacher's performance in the academic process either in class or outside through non-class activities (Qarqza, 2006).

This approach is based on the following important elements:

- Understand and comprehend syllabus.
- Attitude alteration.
- Teacher performance.
- Implement attitude changes in outside environment.
- Impact of teacher's performance on student's attitude.

Educational achievement motives and importance

The academic achievement motives reflect the individual's and students' preparation for achieving success which results in satisfaction in situations including performance assessment through tests (Celik & Keskin, 2009).

Also, motivations for academic achievement are reflected in a student's desire to perform school work, duties and tasks properly.

The term achievement motivation, in relation to students, applies to those who have strong motives for achievement. These allow the student to learn more quickly than those with low motivation. People with strong motives perform better spontaneously in all businesses. They may not outperform in routine work that does not contain something of a challenge, therefore it is necessary for their motivation to be strong.

For the purposes of this study, students' motivation with regard to educational achievement is related to the following aspects:

- Building and providing internal readiness in students for success and learning.
- A degree of perseverance in students.
- The desire for performance and educational diligence.
- The desire to learn knowledge and skills.
- Willingness to challenge.
- The role of the school and the teacher in raising the importance of these motives.

There are many factors which, without doubt, affect educational results:

1. Efficiency and professionalism of the teacher

The efficiency and experience of the teacher is reflected in the students' learning and understanding. The professional teacher uses educational tools positively and achieves more, sometimes with excellent results. The unqualified teacher will not achieve good results and is likely to lose his/her post (Popa & Acedo, 2006).

2. Syllabus and education courses

Fitting the syllabus to the student helps to achieve better results as people naturally prefer to study things that suit their abilities (Hargreaves, 2005).

3. Family, home and parents

The family plays a vital role in helping the teacher with the educational aspects of a child's upbringing, with preparing a suitable environment, caring about his/her health and behaviour, and maintaining contact with the school (Alhashimi & Alibrahim, 2010).

4. Equipment and school building

The concept of education must be born in mind in the design of the building and provision of classrooms, gardens and spaces for different activities. Also these buildings should be technologically equipped and should provide comfort for the students (Qarqza, 2006).

5. Providing and using the technology in education

The use of technology in education saves time and effort and helps to motivate students in their search for knowledge. It calls for well trained teachers.

6. Individual differences

The differences between individual students within a class, in terms of health, mentality and age, play a vital role in the learning level. Able students are usually oriented to the educational process and achieve good results (Giarelli et al., 2009).

7. Social and economic factors

The student who comes from a poorer family, lives in a deprived area or is from a broken home is likely to be psychologically affected and his/her learning and achievements will also be affected. The opposite is true for better off children from normal families (Bakish, 2008).

8. Ongoing training for teachers

This helps teachers to grow and develop their skills and is reflected in the learning and achievement of the student.

9. Assessments and exams system

According to the National Council of Teachers of Mathematics (NCTM), measurement and evaluation have been indispensable parts of mathematics teaching as they increase pupils' interests towards mathematics (NCTM, 2000). Evaluation systems and exams positively help in improving the students' achievement levels if such systems are advanced, modern and conform to the dimensions of the educational process and if they help to achieve effective assessment of all the education process elements. On the other hand, if such systems are typically old and do not conform to the dimensions of the educational process, they will lead to ineffective evaluation (Kirmizi, 2009).

10. Directing educational activities related to classroom activities and the non-classroom activities curriculum

Directing these activities to support and satisfy the student and his desires will reflect positively on their learning and achievements. Such activities will also help with the practical application of the curriculum (Celik & Keskin, 2009). I agree with them with regard to the importance of activities in the mathematics curriculum.

Also Robyn et al. (2004:2) said 'The curriculum in schools must reflect the changes in the wider society to ensure that schools prepare students for the world beyond compulsory schooling'.

Main factors affecting the teaching of mathematics in general

Mathematics, like other scientific subjects, is affected by several factors that have an impact upon the school syllabus. This is especially the case with the emergence of theories and academic developments that gave more focus to mathematical operations that enhance intellectual abilities. For example, there is what mathematical authorities call a philosophy that states that a student cannot depend on him/herself to define mathematical facts, however he/she will depend on the teacher. Modern directions in teaching mathematics also focus on developing teaching objectives, training teachers, developing the mathematical environment, and introducing new concepts in education like group work, relationships, associations, focuses on giving justification for each step in a mathematical calculation, and the use of accurate language. The mathematics syllabus has developed worldwide in terms of criteria, learning and teaching approach, teaching methods, content, and ways of evaluating students and syllabuses. Therefore new ways of teaching mathematics have primarily focused on mathematics syllabus content, the approach to teaching, and evaluation methods. All of these factors should be taken into consideration when preparing mathematics teachers.

Morizeek and Darweesh (2009) have highlighted that there are several quite broad factors which have affected methods of teaching mathematics. It is possible to list these as follows:

- 1- Shifts that have taken place in maths-related jobs in society, from mechanical skills to analytical skills, especially in the presence of computers, as an aiding tool, therefore more focus is now given to

knowledge and understanding.

- 2- Changes that have taken place in teaching mathematics have led to increases in the use of mathematics, not only in introducing new topics but also in solving problems and in application. Mathematical knowledge is considered a prerequisite in most computer applications and science. Accordingly there has been an increase in the number of fields that require mathematical knowledge.
- 3- It was found that one of the factors that had an impact on teaching mathematics was technological development. Particularly: the use of calculators and computers and their role in the nature of mathematics and methods of teaching; their use in solving complex problems; and the teaching of various subjects in engineering and statistics that are related to the existence of the computer and calculator.
- 4 - There is progress in educational, teaching and learning methods in terms of the conversion from memorising, indoctrination and training to the self building process where 'understanding first' is the basic element.
- 5- There was a degree of competition at the global level in terms of direction of development of educational systems and the associated improvement in the performance of students, curriculum and content of mathematics, technology and teaching methods.
- 6 - There are many changes that occur at the community level which are associated with mathematics, especially changes in labour market requirements and graduate qualification requirements. These influence the content and teaching methods of the subject.

From my point of view, factors affecting the nature of the teaching of

mathematics including some which stem from the special nature of Kuwait in the Arabian Gulf, are: the presence of changes in the nature of the labour market and its requirements; the teaching methods used in schools; the nature of educational means used in teaching; and the aspirations of the State of Kuwait with respect to the development of the curriculum in general and the mathematics curriculum in particular.

It is well known that education in every society and country seeks to build the social make-up of individuals and provide them with expertise that qualifies them to participate in society. The curriculum provided by the school, including the mathematics curriculum, is a means to achieving the objectives of education in terms of the pursuit of preparing students for public life and rehabilitation in accordance with the requirements of society (Rastegar et al., 2010). The achievement of educational goals and public and private methods in teaching the subject is dependent upon the approach and skills of teachers (Tan & Linn, 2010). It is possible to identify the most important objectives of teaching mathematics from the following (Morizeek & Darweesh, 2009; Abo zainah, 2010).

The objectives of teaching mathematics and the expected outcome

- Understanding the basics of mathematics and related concepts, rules and structures and the nature of mathematical proofs, as well as understanding the psychological aspects and recognising the meaning of what the student is doing, so that they can absorb the basics of the subject.
- The objectives of teaching mathematics are to achieve the educational aspects of building mathematical thinking as a component of the general culture of humanity, picked up by individuals and commensurate with the necessities of daily life and dealing with the community (Mohini & Sulaiman, 2010).
- On the other hand, I find that the objectives of teaching mathematics focus on achieving the goals which are related to helping students continue their

studies in universities and specialised institutions in subsequent grades. In the view of both Alastal and Alrashid (2004) and Depaepe et al. (2007), there are general objectives for the teaching of mathematics which focus on providing opportunities for students to practice ways of thinking - like minded, speculative, and inductive and deductive, to equip them with problem-solving skills and an ability to assimilate what is under consideration, and to aid the development of mental skills and innovation. Contribution to mathematics in general helps students to learn the terminology and to understand, as well as giving them knowledge of the concepts, basics and generalities related to mathematics (Alyamani, 2009).

Mathematics teaching can achieve a number of goals, which are as follows:

- 1- Acquisition of skills and concepts and the basics of numbers and calculations so that individuals can employ and use them in everyday life (Costu et al., 2009). The teaching of mathematics can also enable students to identify tools and units of measurement and the relationships between them, and to achieve sound and functional use of such tools and units as explained by the teacher (Zeleny, 1980).
- 2- Teaching of mathematics achieves understanding of the concepts and generalisations associated with geometric patterns and figures that helps students appreciate the physical environment around them and the representation of mathematical models and geometrical shapes. It also allows children to gain the ability to perform calculations mentally, to assess and verify responses, and therefore develop the basic mathematical knowledge which is useful for subsequent grades and is required to study other subjects (Obied et al., 1998).
- 3- It contributes to the identification of structure and organisation in mathematics and its areas of application in everyday life. Also it encourages proper methods of thinking and reasoning and the development of positive attitudes towards mathematics, as well as raising the performance level of students in this subject (Karaduman, 2010).

- 4- The teaching of mathematics helps children to acquire the skill of self-learning and to maintain continuity, as well as developing sound trends and habits such as being organised, focused, patient, self-confident, and appreciative of the value of time (Hanfer, 1993).
- 5- The teaching of mathematics aims to help students to understand the elements of the subject's language, to analyse quantitative relationships, and to build mathematical knowledge (Powell et al., 2003), and comprehension of the nature of the conclusions and appreciation of mathematical structure and its components. Mathematics is taught to students to increase their ability to perform calculations and to use more than one method to reach the answers, as well as promoting convergence and extrapolation (Demirbilek & Tamer, 2010).

This can increase students' ability to solve problems and to identify information related to a specific situation, and to formulate data in a way that facilitates understanding.

Introduction to the educational objectives of teaching mathematics

Education is a vital process which, having decided what will be taught to and learned by its students, seeks to bring about desirable changes within them.

- These objectives seek to achieve changes in the behaviour of students in the classroom (Alhwaiti, 2006; Mooij, 2008). This educational goal is associated with an increase in knowledge and understanding, a change in attitudes, or improved physical skills and proficiency.

Therefore, this introduction to the educational objectives of teaching mathematics focuses on a number of important elements, as shown below (Alhwaiti, 2006):

- Choice of educational experiences which students have to pass through to achieve the desired objectives.
- Choice of methods, means and activities which can be provided through educational experiences to achieve the desired objectives.

- Measurement of objective accomplishment.
- The educational goals of teaching mathematics are expected to change the way mathematics is taught to students and to change the way they think and feel about the subject. Educational objectives focus on predicting potential changes in the personalities of students after the acquisition of expertise in the field of mathematics that will help them in life outside school.

Also, educational goals focus on making behavioural changes in students' performance, where this is possible, and are linked to learning and adding to student's experience in the field of mathematics.

The diagram below shows the main cornerstones of setting educational objectives:

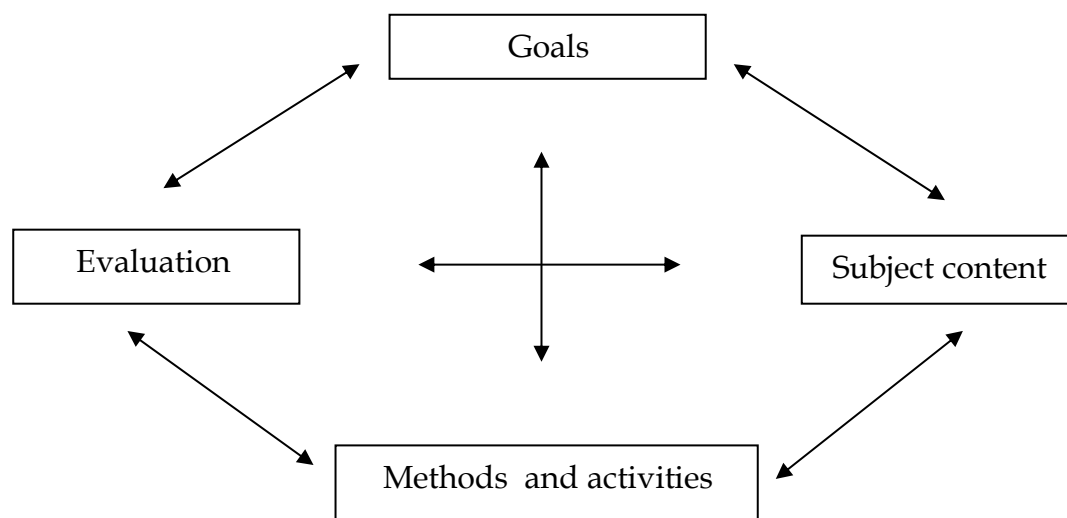


Figure (2 -4)

The present study has identified the following student-related dimensions to educational objectives for studying mathematics:

- Intellectual and informative perspective related to mathematics;
- Behaviour and physiological perspectives related to comprehension of mathematics;
- Learning and experience building perspectives related to mathematics;

- Alteration in behaviour and the way students handle different situations in life and in mathematical operations (ibid).

Objectives of teaching mathematics at primary level

Tawalbah et al. (2010) and Rastegar et al. (2010) highlight that teaching mathematics in primary schools involves knowledge of symbols and numbers and the ability to perform calculations. In addition, it requires knowledge of mathematical information, that students build a positive attitude towards the subject, and that they acquire particular abilities with mathematical proofs and problem solving. The following table points out the objectives of teaching various areas of mathematics in primary education.

Table (2-5) Teaching mathematics in primary school - classification of objectives

Teaching mathematics in primary school - classification of objectives	Details and components of each classification
General objectives	<ul style="list-style-type: none"> - Acquire understanding of number skills, figures and mathematical operations - Identify mathematical measurement units - Identify shapes - Perform calculations mentally - Identify fields of implementing mathematics in practical life - Acquire ability to learn
Understanding of mathematics principles	<ul style="list-style-type: none"> - Define mathematical concepts and symbols - Identify quantitative and qualitative operations - Understand external environment and its relation with mathematics
Know mathematical proofs	<ul style="list-style-type: none"> - Identify concepts and meanings

and logical sequences	<ul style="list-style-type: none"> - Mathematical interpretations - Student knowledge of mathematical make-up - Develop students' logical way of thinking
Understand mathematical operations	<ul style="list-style-type: none"> - Identify way of undertaking mathematical operations - Develop mathematical skills in practical life - Identify different ways of reaching mathematical solutions - Develop students' skills for achieving results and approximation skills
Ability to solve mathematical problems	<ul style="list-style-type: none"> - Describe mathematical problems - Identify different mathematical situations - Represent figures in graphs
Develop students' positive attitude toward mathematics	<ul style="list-style-type: none"> - Highlight the beauty of mathematics to students - Let students acquire self-confidence and a desire to learn - Identify the vital role mathematics is playing in their lives

Source: Suffian & Rahman (2010), Kasule & Mapolelo (2005), Maienza et al. (2001)

A study by Khasawna et al. (2000) highlights: the objectives of teaching mathematics in primary public education in countries of the Arabian Gulf; the goals and objectives related to mathematical knowledge; objectives related to methods of thinking and solving problems; and objectives related to perceptions, attitudes and values. These are explained as follows:

Objectives related to mathematical knowledge include its acquisition and quantitative aspects, understanding mathematical operation-related meanings, and awareness of mathematical language, symbols and shapes.

- Key objectives related to mathematical skills included: the attainment of skills to interpret daily life phenomena; the acquisition of mathematical sense; teaching

the skill of conducting operations which help proper selection; development of the ability to collate and sort quantitative and numerical data; and teaching the use of mathematical language to express real life situations.

- The study showed that thinking and problem-solving methods relate to: the use of thinking approaches for induction and drawing conclusions; the implementation of mathematical problem solving steps; and the development of an ability to use mathematical concepts and skills.
- With regard to students' perceptions, attitudes and values, the study indicates that they focus on the accuracy, organisation, objectivity and proper use of time in a way that develops a positive approach to mathematics.

Teaching methods and processes in general and factors that affect them

Teaching process and strategy are one of the important factors that must be taken into account when managing education, as they are considered to be one of the most important success factors in achieving educational goals (Rich, 1993). As teaching methods or strategies represent groups of procedures and methods used by the teacher to enable students to gain educational experiences, also the teaching strategy reflects the ability to use the capabilities and the means available in an optimal way to achieve the desired goals.

Strategic teaching is a coherent set of incremental steps that the teacher can turn into teaching methods and tasks that suit the nature of the teacher and the learner and the course and conditions of the educational situation (Taweel, 2006). Teaching is a process of formulating the learner environment to enable the student to learn specific behavioural practices; it is a set of successive events, which work in line with a specified timeframe for what is expected from activities. Also teaching is considered to be a medium for learning.

The learning process depends on three complementary elements that contribute to the integration of the educational process in the classroom. These are the student, teacher, and curriculum, and the teacher is considered one of the most important variables in this process. His role cannot be ignored in educational aims to reform and develop, as he is considered an educational leader who can offer behavioural training, exploit all opportunities, and create conditions for the

development of a student's expertise and skills, directing them towards the path that will help them to cope with themselves and society (Mohammed & Gawi, 1998).

Teaching also has an idiomatic meaning, for it is perceived as the giving of information and knowledge to students, but includes all efforts made by the teacher to help the pupils in his or her care. Alyamani and Askar (2010) state that the definition of teaching includes the following:

- The teaching process is the transmission of information from teacher to students.
- Teaching or facilitating learning.
- Teaching is a dynamic activity of three elements (teacher, student, study material).
- Teaching is an event that can take place in certain conditions between the three elements of teaching.
- Teaching is the process of human communication.
- Teaching is a system of relationships and dynamic interactions.
- Teaching is a practical activity.
- Teaching as a profession is mastered by those who teach students.
- Teaching is guiding with the aid of instructions and diverse information.

I agree with the two researchers that teaching incorporates the communication of information and knowledge from the teacher to the learner, and is therefore more comprehensive than communication alone. I fully agree with them that it includes the transference of skills, thoughts, facts, values and trends and that the teaching process is one of exchange between teacher and learner.

Teaching methods reflect different approaches used by teachers to bring about a change in the behaviour of students and the delivery of information and the necessary skills required to understand the subjects taught (Prakay & Stanford, 2005).

It depends on a number of factors that must be taken into account (Alyamani & Askar, 2010; Alfadala, 2010; Alharbi, 2000; Gultekin, 2010):

1. The student is the focal point in contemporary education.
2. It is necessary to consider that principles and procedures of teaching must coincide with the students' cognitive and physical state, therefore teaching methods should vary according to the type of student.
3. The educational method adopted by the teacher must be consistent with the results of educational research and psychology, which emphasise the importance of student participation in classroom activity.
4. The method adopted by the teacher should be in line with the educational objectives that are accepted by the community and the subject objective taught by the teacher.
5. The method of teaching takes into account the individual differences between students and therefore this method should be modified to conform to students' levels.
6. Teaching style should take into account students' level of development and degree of awareness and the types of educational experience they have had.

In the view of Alfadala (2010), Prakay and Stanford (2005), and Alfaraji and Abosl (2006), teaching methods can be divided into the following types:

- Teaching methods based on learning and adding new behaviours, and direct instruction and transmission of information and skills from teacher to student.
- Teaching methods focusing on students' development process. This method is based on building the capacity to think, to ensure students' understanding of the thinking process, and to focus on deductive logical thinking.
- Teaching methods based on the thought processes. This is dependent on memory, creativity, information processing and reliance on the human mind.
- Teaching methods based on cooperation between colleagues. This is based primarily on the creation of a motivational atmosphere among students, helping colleagues, and ensuring collaborative research.

Another set of teaching methods provided by Alyamani and Askar (2010), and Habib (2010) can be listed as follows:

- **The standard method:** This approach starts with learning rules, following examples and observing evidence that confirms and clarifies the meaning.
- **Inductive method:** This is unlike the standard method; it starts with observation, and moves towards rules and theories.
- **Modified method:** This is a combination of the standard method and inductive method.
- **Project method:** This links educational atmosphere with social environment in order to implement educational projects in real life.
- **Problem-solving method:** Here students are involved in solving a problem under teacher supervision.
- **Lecture-based method:** Depends on the teacher's clarification and interpretation of information.
- **Question-discussion method:** Depends on discussion as a main method in educating students. This is used in addition to other approaches and is not a stand-alone method.
- **Dialogue method:** This method depends on dialogue between the teacher and students using a question and answer technique in relation to a certain lesson subject.

In my view, there are several factors that should be considered from the teacher's side concerning teaching methods and learning approaches. These are explained as follows:

- 1- There are several methods of teaching mathematics.
- 2- We can rely on several methods according to the nature and suitability of the objectives.
- 3- Teaching method is correlated with learning objectives.

Teaching is a series of steps which the teacher implements to reach the desired goals of the syllabus, and the manner or method of teaching is related to some personal, educational and psychological aspects of the teacher and their approach (Wei et al., 2010). It is known that when planning to teach a specific theory,

it is important to analyse the topic to be taught and to break in into gradual parts and steps. These are matters to be taken into account when adopting a particular method for teaching (Alexander et al., 2007). Mathematics is considered to be an abstract knowledge that is built on a sequence of ideas, methods and patterns of thinking; it is based on individual cognition, and use of clear and specific symbols and expressions (Tezer & Aktunc, 2010). Mathematics depends on a number of practices, adopted by the teachers in terms of representation of mathematical ideas, solving problems with the development of thinking, and solving issues and difficulties faced by students as they learn the subject (Albrakat & Khasawna, 2010).

Planning for teaching mathematics at primary level

Planning is an integral component of the teaching and learning process. 'In order to develop a quality learning environment, the teacher needs to plan for short, medium and long term goals. Without good planning, teaching risks becoming ad hoc and thus threatening the gains that can be made by students' (Robyn et al., 2004: 63).

Planning is an important tool that enables an entity to reach a desired goal. In the field of teaching, planning focuses on the process of selecting strategies and teaching methods and selecting the appropriate syllabus content and methodology, as well as creating a comfortable learning environment (Tawalbah et al., 2010). Also, planning is important in the way educational activities are managed and in the presentation of educational content and tools used to assess the desired results (Leikin & Kawass, 2005).

Planning for teaching mathematics at the primary stage requires the teacher to acquire knowledge from experienced teachers and look at previous plans and textbooks, to visit the school library, identify the levels of students, and provide appropriate means, equipment and classroom management (Alfadala, 2010). In my opinion, planning for teaching can be defined as a pre-plan of what the teacher will use in terms of methods, activities and procedures, and the use of tools, equipment

and teaching aids in order to achieve the desired educational goals. The educational planning mode consists of these levels: annual plan, long term plan, and the unit plan; a medium-range, and the curriculum; a short-range, where the plan includes in general objectives, methods, means, activities and the calendar (Alyamani & Askar, 2010).

Alhwaiti (2006) and Alabsi (2009) mention the importance of the following with regard to planning the teaching of mathematics:

- Allow the teacher to identify the desired objectives to be achieved by students.
- Help the teacher to choose the best methods for teaching mathematics.
- Choose the most important means of education and activities that match the levels of students.
- Choose the right questions for students and ask questions related to the objective.
- Contribute to planning while taking into account the time factor required to teach and study mathematics.

Planning for teaching mathematics should take several factors into consideration that are directly related to the teacher (Westbrook et al., 2009; McDougall, 2010; Alyamani, 2009). These are:

- Scientific knowledge and facts, rules and principles of mathematics.
- Knowledge of educational goals and objectives of mathematics education in particular, and to facilitate the planning process for teaching.
- Ability to identify the capabilities and the needs, interests and inclinations of students and their psychological characteristics.
- Knowledge of teaching strategies in order to choose the appropriate strategy for each educational objective.
- Knowledge of methods of measurement and evaluation and use of appropriate measurement tools to measure achievement of objectives.
- Ability to achieve flexibility in the teaching plan and to take into account the time available to the classrooms and the time required for each educational objective.

- Planning should take place for a full academic year and not for a single class, in order for the teacher to know what has been taught to students and what will be taught.

I totally endorse the researchers' view that when planning the teaching process for any subject, particularly mathematics, we should: identify what we need from teaching such subjects and the key objectives of teaching certain topics in the first primary grade, as opposed to the second primary grade; determine whether such information, knowledge and facts suit the students' abilities, capabilities and levels as well as the environment in which they live; and decide whether to give daily life examples and problems related to day-to-day living and how such information, skills and concepts are taught.

Therefore, planning is of vital importance in the educational process for any field whether the planning of an academic day, classroom or academic year.

Alyamani (2009) points out that the planning for the teaching of mathematics contributes to the achievement of its many benefits. The most important aspects, in his/her opinion, are; good execution, avoiding random, and identifying the most appropriate, measures for developing and assessing a lesson. Also, planning for mathematics lessons avoids emergencies and embarrassing situations and helps to detect defects in the syllabus.

According to Alastal and Alrashid (2004) the importance of planning in the teaching of mathematics is evidenced in aspects such as: choosing the subject of the lesson, the formulation of objectives and identifying methods to introduce it; analysing its content and organising its topics; choosing educational activities that can achieve its objectives and teaching methods that suits these goals; and identifying and preparing methods to evaluate the extent to which lesson objectives are met. Thus, planning for the lesson can be considered as a clear procedure within the teacher's role (Hill et al., 2005).

Abo zainah (2010) stated that planning for teaching mathematics has three stages, namely study and information gathering, planning and writing, and plan implementation. Components of each stage can be explained as below:

- **Study and information gathering phase:** In this stage the following are determined; objectives, content and vocabulary, curriculum, activities, means and methods of evaluation, textbook content, and credit hours for each subject.
- **Plan writing phase:** Write the general objectives, syllabus evaluation, and determine the relative importance of the issues. Define the number of classes during the academic year, and put in extra classes to deal with emergencies.
- **Implementation phase:** Implement what has been specified in the plan, take notes on the implementation, and amend the plan according to feedback obtained during execution.

Here follows an example of a plan for teaching mathematics in primary school that deals with the subject 'multiply one integer by another integer' (Abo zainah & Ababnaa, 2010).

Grade: 5 primary

Content: multiply one integer by another integer (skill)

Goals:

- 1 - student has to find the result of multiplying two numbers, each consisting of two digits, by using the algorithm
- 2 - to solve verbal problems (of one step) using multiplication

Table (2-6) Scientific procedures

Activities related to multiplication of one integer by another integer.	Required time
Ensure that basic multiplication requirements are known by students.	5 minutes
Present three examples to be solved by the teacher (43×85 , 35×46 , 45×37).	15-20 minutes
Individual training under teacher's supervision (at least 2 exercises).	10 minutes
Give homework that includes exercises from the book and two word problems.	20-30 minutes

Evaluation is divided into two types:

- A. **Progress evaluation:** used to measure students' proficiency in multiplication and obtain required feedback from individual exercises.
- B. **Final evaluation:** takes place upon completion of the mathematics unit and before going on to the next unit (it takes the form of a written exam).

The principles and factors associated with the teaching of mathematics at the primary stage, and the foundations and requirements of successful teaching methods

The selection of an appropriate teaching method is one of the most important factors in the educational process, especially in mathematics. This is because it enables the teacher to succeed in his role as deliverer of knowledge to students (Birgin & Baki, 2009). Also the teaching method is an expression of the way the teacher chooses to convey mathematical knowledge and skills in an easy, time and cost efficient way.

- The successful method in teaching mathematics is the one that addresses many of the deficiencies in the curriculum, textbook content, or in the student himself, or other education-related problems (Day, 2002).

Also the teacher cannot adhere solely to a certain way of teaching mathematics. It is not correct to focus on only one method to achieve goals related to mathematics teaching. Thus, there are several factors associated with choosing the best way to teach the subject at primary school (Alhouli, 2007):

- Goal of the topic that the teacher is teaching.
- The number of students in class.
- The academic and maturity level of students.
- School equipment level, in terms of availability of school aids, devices and model.
- The teacher himself, in terms of expertise, skills and ability to undertake a specific teaching method.

In the view of Alhwaidei (2006), Alruchid (2007), Nilsson and Driel (2010), and Rots et al. (2007), there are a number of principles and standards that need to be taken into consideration when teaching. These are as follows:

Principles of teaching mathematics

- 1- Teaching methods consist of educational activities, where the teacher has to organise these activities in the form of steps to facilitate the process of achieving goals.
- 2- The role of the teacher is to organise the education process related to mathematics.
- 3- Focus on teaching and learning principles such as repetition and raise and reinforce students' motivation towards learning.
- 4- Organise educational content so as to promote methods of individualised instruction and self-learning.
- 5- Engage the learner in planning, implementation, monitoring and evaluation where the teaching becomes more effective.
- 6- Take into account individual differences among students in terms of capabilities and tendencies and students' aptitudes.
- 7- Take into account the developmental characteristics of learners, whether physical, mental, linguistic, emotional or social.
- 8- Diversify teaching methods and place emphasis on the learning in groups concept.

Besides these principles, there are a number of rules that must be considered when teaching mathematics in primary education and these are as follows (Alhwaidi, 2006; Blomeke & Paine, 2008; Morizeek & Darweesh, 2009):

- **Moving from the known to the unknown:** This means that, when teaching new subjects, the teacher must capitalise on previously taught ones.
- **Move from simple to complex:** The teacher should progress from easy to more difficult topics when teaching mathematics.

- **The transition from concrete to abstract:** Teaching becomes more effective when the student uses more of his senses. This facilitates the rapid absorption of knowledge.
- **Focus on understanding:** Relates to the student's ability to express what they have learned in their own language. The teacher should focus on the students' understanding, clarifying the knowledge by deploying teaching aids.
- **Feedback:** The teacher should inform students of the results of their work, reinforcing knowledge with is correctly understood, and pointing out errors so that they are not repeated.
- **Motivation and incentive for students:** The teacher can raise the motivation of students towards learning of mathematics by linking what they have learned with their needs and preferences.
- **Strengthening what has been learned:** The objective is to confirm the information learnt by the students during the learning process through evaluation.
- **Individual differences:** The teacher should take into account individual differences and deploy teaching methods taking into account the pupil's previous circumstances.

Albrakat and Khasawna (2010), Mohammed (2004) and Kurawa (2010), on the other hand, find that there are a number of criteria that must be taken into account when choosing good and appropriate ways of teaching mathematics. These are:

- **Importance:** This refers to making the importance of a concept clear to the student so that they understand its potential to help them achieve a high level of performance.
- **Method steps and accuracy:**
Teaching methods should consist of a number of defined steps that teachers follow to enable students to reach the desired objective.

- **Lack of assumptions which depends on the method of teaching mathematics:**

The fewer the assumptions that a teaching style depends upon, the better the choice of teaching method.

- **The possibility of achieving individual and social growth of the student:**

The method of teaching mathematics must take into account individual differences on one hand, and on the other hand work to embed a set of values, attributes and skills that help the student to be an active member of society.

- **Use appropriate assessment methods and techniques:**

It is necessary for the teaching method to include assessment of what has been learned by the student.

From the above studies, the present investigation concludes that there are a number of features and characteristics associated with good teaching methods for mathematics at the primary level, as shown below. They:

- Contribute to facilitating and organising learning.
- Are able to use all sources available in the learning environment.
- Appear in the form of steps and each step includes educational activities and procedures, learning sources, evaluation, feedback and the time required for the implementation of each step.
- Achieve mathematics teaching objectives effectively and with minimal effort and time.
- Take into account the individual differences between students and their developmental characteristics.
- Raise the motivation of students to learn and develop thinking capabilities.
- Enable students to acquire skills, competencies and required performance.
- Develop students' attitudes and desired values.
- Use enjoyable techniques to convey vigilance and attention to students.
- Meet student's expectations and raise their interest, motives and desire to discover and innovate.

- Use suitable methods for primary school students, in line with their tendencies, desires and abilities.
- Organise the material to fit the time allocated to the class.

The skills and capabilities of teachers and their role in implementing teaching methods.

The good performance of the teachers and their constant adaptation in relation to that performance should enable them to provide the new forms of education and knowledge that are required by society and enable students to gain the skills required to effectively engage with the challenges of society. This is in addition to those changes that enforce progression from current educational practices to new which should be backed by teachers' skills, as shown below (Harris & Sass, 2010).

Table (2-7): Teachers' practice of traditional and creative skills

Present traditional educational practices	Future educational practices
<ul style="list-style-type: none"> - Develop study and memory recall skills. - Reinforce values of respect. - Minimal level of general knowledge training. - Educate on similarity and sameness. - Educate on direct learning culture. - Deal with what are common and known skills. 	<ul style="list-style-type: none"> - Develop abstract and creativity skills. - Develop analytical, creative and interpretation skills. - Difference and distinction education. - Training on assessment and evaluation skills. - Risk taking and scientific adventure training.

The present study finds that teachers' skills must focus on several aspects as illustrated below:

- Psychological observation and diagnosing students' degree of learning.

- Motivating students to learn.
- Technological education and computer knowledge.
- The development of personal skills in dealing with students and the syllabus and assessing students.
- The ability to carry out social and educational guidance and solve the students' problems.
- Management skills and planning the learning environment, teaching time, and development of training methods.
- Skills involved in the link between school and parents concerning talking and listening.

Soudien (2001) and Alfadala (2010) point out that teaching is a noble profession, performed by human beings in general and the teacher in particular, because it has an obvious effect on society as a whole, and not only on individuals. The teacher, through the teaching profession, changes, and illuminates the minds of students and prepares them to build a successful society.

There has been a change in the concept of the teacher in the contemporary era and in his role in activating the process of teaching, especially in light of enhancements that have taken place in the learning process, and in educational and modern technology. The teacher manages experiences and organises them in a way that achieves the desired goals, and must also have a vast background in his field in addition to his knowledge of other fields (Ciani et al., 2008).

The following table highlights the main attributes that must be present in a teacher besides his teaching skills.

Table (2-8) Areas and aspects of teachers' skills in teaching

Teachers' skill fields	Teachers' skill details
Contemporary academic process	Teachers' skills concentrate on the student as the focal point of the academic process.
Emotions and cognition	Here, teachers try to achieve a match between teaching principles and the student's cognitive and emotional state.
Professionalism	Here, teachers' skills focus on analysing the student's characteristics and abilities, on developing educational activities, and on the academic and educational preparation of the student to face the present and the future.
Understand student's nature	Teachers' skills should focus on knowing and understanding students' skills and characteristics, and the way to enrich these by developing their own skills.
Achieve teaching and learning integrity	<ul style="list-style-type: none"> - Achieve students' ambitions and desires. - Diversify motivational activities for students. - Ability to listen to students and deal with them. - Use of innovative educational methods.

According to Day (2002), Bogler and Somech (2004), and Alfadala (2010), the efficiency of the teacher can be determined by the presence of the following attributes. These tend to go hand in hand with efficient methods of teaching and effective student learning.

- 1- Abides by the laws and the requirements of the teaching profession, which result in a regular, meaningful and effective educational outcome.

- 2- High degree of flexibility so that he can continue in the profession in a way that enables him to acquire the knowledge and various skills needed in mastering teaching.
- 3- Teachers should have a strong personality which is characterised by intelligence, objectivity, justice and firmness, vitality and social cooperation.
- 4- Awareness that an effective teaching situation is one that results in a fruitful interaction between himself and his students.
- 5- Being educated and broad-minded in response to anyone interested in reading and erudition, accepting of criticism, characterised by objectivity and justice, and averse to bias or favouritism.
- 6- A role model for the students: the teacher builds the character of the student and is a role model for them in different situations. S/he should be firm enough to control the class, draw students' attention to learning, and create an encouraging environment for the same.
- 7- Be aware of several teaching processes. S/he may have to use several methods for teaching and explaining depending on the type of lesson involved.
- 8- Characterised by certain physical characteristics, such as clear voice projection, honesty, truthfulness, humility and possessed of a sense of humour.

I fully support the researchers' view that there are certain characteristics which distinguish the highly skilled teacher. These include punctuality and reliability, flexibility, a desire to search for new information, enthusiasm for development in the work field, good relations with colleagues and students, mutual respect, and a willingness to benefit from colleagues' experience in terms of skills and methods suited to the teaching of mathematical topics. All of these qualities mark out the efficient teacher.

Mohammed (2004), on the other hand, identifies teachers' skills and efficiency as follows:

1 - Skills related to teacher preparation:

- Use the principles and fundamentals of mental education.
- Use the principles of child development.
- Create the appropriate climate in the classroom.
- Use different teaching methods.
- Use analytical procedures and therapeutic techniques effectively.
- Effectively manage the class.

2 - Skills related to monitoring and guiding students:

- Use the basic principles of growth and development.
- Build effective relationships with parents.
- Collect and use guiding information.
- Use appropriate demonstrations.
- Establish good appropriate relations to provide guidance and direction.

3 - Skills related to understanding and appreciation of cultural heritage:

- Stimulate and encourage the cultural development of individuals and groups.
- Work on the important applications of education in the classroom.
- Stimulate and encourage the cultural development of students.

4 - Skills to participate effectively in school activities:

- Plan the means to achieve the educational goals.
- Has a role in bearing responsibility.
- Establish friendly relations with colleagues.

5 - Skills involved in creating good relations between the school and the community:

- Use community resources in classroom activities.
- Get parents to co-operate with class activities.
- Assist in identifying and resolving community problems.

I totally agree with the researcher that the teaching process becomes valid when there is harmony between school and the society which comprises its families and students. Such harmony between school and society should be continuous if it is to respond to the students' strengths and weaknesses, and there should be ongoing cooperation between school and society in order to achieve the goals of this relationship; the student's success, which evidences the success of the educational process, ultimately leads to the success and benefit of society as a whole.

Methods of teaching mathematics

There are many methods of teaching mathematics. This research agrees with Good and Brophy (1987) who found that some teachers are more successful than others with regard to the achievement of mathematics objectives using specific methods. From the author's point of view the teaching of mathematics requires that the teacher allocates time to a sequence of activities, organises the learning process, and ensures that the educational tools are available, well-prepared and appropriate to the lesson and the level of the students.

The teaching of mathematics, and of subjects in general, at primary stage is of vital importance, because this is the foundation phase for the establishment of knowledge and skills. Therefore the teacher should be well-prepared (Philipp et al., 2002). Teaching methods depend on a number of approaches that focus on the major axis of the mathematics syllabus, which Morizeek and Darweesh (2009) and Nilsson and Driel (2010) believe should include the following:

- Using the direct method of teaching in which the teacher uses ideas to direct students and to provide information about mathematics.
- Using the indirect method of teaching to encourage students and involve them in the learning of mathematics.
- Teaching methods can be based upon praise and criticism; this is in order to leave a positive impact on students' learning of mathematics at the primary stage.

- Teaching methods in mathematics at the primary stage can be based on feedback to measure student academic achievement and to determine required elements to measure a student's progress level.
- Taking into account the method of teaching, which should utilise students' ideas and determine the relationship between the ideas of the teacher and those of the students, in addition to summarising the ideas of students.
- Mathematics should be clearly presented and provide scientific material in a way that students can easily accommodate. In addition, the teacher should be enthusiastic which will have an impact on students' learning.
- In mathematics, it is important that the teacher promotes individual competitiveness among students. This affects their understanding and perception of mathematics.
- Teaching of mathematics at the primary level requires a number of important rules to be taken into account, the most important of which are what are known as walking into the unknown from the known, from the simple to the complex, and moving from the abstract to the reasonable.

Models of teaching mathematics at the primary stage

There are a number of models for teaching mathematics at the primary stage, as follows:

1 - Structured developed model for teaching mathematics at primary school

This pattern focuses first on presenting the most comprehensive ideas, then ones which are less so, followed by the least comprehensive (Abozainah, 2010; Sengul & Uner, 2010). It is based on:

- Commitment to basic mathematical givens.
- Presenting the most comprehensive and particular ideas.

- Compatibility and coherence of new information with the students' previous knowledge.

I find that this method of teaching mathematics at the primary stage depends on the student's previous mathematical background and requires a rich knowledge of mathematics.

2 – Direct presentation model for teaching mathematics

In this method of teaching mathematics at primary school, the teacher is the speaker and the student is the recipient of the information and explanation of the curriculum provided by his/her teacher. This method provides an important benefit which is that it presents mathematics related concepts, skills and principles in a timely manner (Algamidi & Osairi, 1992). In my opinion, however, this method is not effective with respect to developing the skills of mathematical proof and the development of problem-solving skills, ways of thinking and creativity.

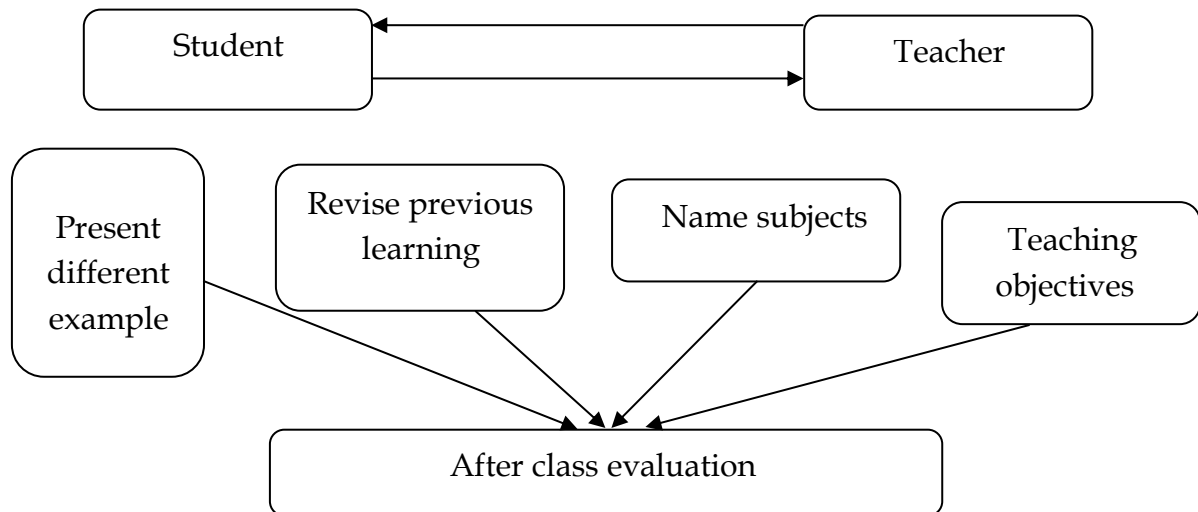
The method of direct presentation depends on a number of measures and steps as set out below (Albrakat & Khasawna, 2010):

- Inform students of the objectives of teaching mathematics and the objectives of each unit of the course.
- Identify and name the subject of the lesson.
- Review of learning which took place during the previous lesson.
- Provide a variety of mathematical examples on mathematics subject.
- Post-class evaluation to identify to what extent goals have been accomplished.

In my own experience in the educational field, this method can enable students to identify the purpose of studying mathematics, as it generates a degree of conviction, comprehension and understanding, especially in the presence of a variety of examples that lead to the delivery of mathematical information.

Figure (2-5) illustrates this mechanism for teaching mathematics in primary school:

Teaching mathematics in primary school using the direct presentation method



3- Perfect learning model for teaching primary school mathematics

Morizeek and Darweesh (2009) state that this model for teaching mathematics focuses on the ability of students to achieve educational goals to the extent that is permissible to them. It focuses on acquisition of knowledge, students' attitude towards mathematics, and their degree of improvement, and is based on a number of important steps and procedures related to teaching, namely.

- To achieve a degree of clarity of presentation and use of multimedia displays and appropriate teaching aids.
 - Enhancing learning through the proof of the correct answer and reinforcing it for the students.
 - The presence of feedback between teacher and students.
 - Carrying out correction of the concepts for students in an appropriate way.
- When using this method, the teacher undertakes a number of steps, the most important of which are (Alajmi & Aldokhi, 2010):

- Dividing the content into units and then dividing the units into smaller topics.

- Identifying the concepts, skills, and principles the students are required to learn in each lesson.
- Producing adequate exercises and exams for use after each lesson.

I find that this model is based on a degree of in-depth interaction between the teacher and students and the use of presentation and illustration to convey information and build skills related to the teaching of primary school mathematics.

Success factors in teaching mathematics at primary level using the question method

This success of this method depends on a number of factors that contribute to delivering knowledge, skills, enhancing students' capabilities, reinforcing the teacher's role and developing his/her teaching skills (Nishimura et al., 2008; Wigfield & Cambria, 2010).

The most important factors are:

- 1- Plan questions beforehand, which focus on the main knowledge points and mental skills. Questions should range in level of difficulty.
- 2- Allow sufficient time for students to provide their answers. This will enable them to think about the question and offer the information they know, as well as leaving space for creativity and recalling previous knowledge without undue pressure.
- 3- The teacher should listen carefully to the students' answers to give them a chance to provide the best answers.
- 4- Ask questions in a simple, precise and direct way. It is advisable to avoid questions with multiple answers so as not to cause students confusion.
- 5- Design various questions with different levels of difficulty to encourage all students to participate.

Teaching aids and mathematics at primary level

Teaching aids are believed to be the most important elements in teaching mathematics; they are considered to be the link between the teacher and mathematical knowledge.

These aids play a crucial role in the achievement of learning objectives as well as facilitating the acquisition of knowledge. They can rely on new technology, IT development and the Internet (Karahoca et al., 2010).

Teaching aids are tools for learning and for gaining more experience. However, they have to suit the teaching approach.

These aids are tools that the teacher uses to enhance learning, illustrate definitions, explain ideas, train students in new skills, develop thinking and enrich values.

In fact, due to the abstract nature of mathematics, these aids have a special importance because they make the subject more acceptable to primary stage students and teach them how to implement the concepts in real life.

The main factors that make teaching aids important in the teaching of mathematics are shown below (Abo zainah, 2010; Alharbi, 2000; Rayan, 2000):

- 1- They provide tangible experience to students and clarify concepts by making them less abstract, which saves time and effort in teaching.
- 2- They make students more positive, increase enthusiasm for the learning material, and increase their acceptance of symbols, expressions and mathematical operations.
- 3- They allow the teacher to identify personal differences between students, different levels of skill, and readiness to learn mathematics, thereby increasing the students' learning level (Harris & Sass, 2010).
- 4- They help students to recall and reinforce learning material, increase their acceptance of learning, develop their ability to understand relations and mathematical facts and to make links between different mathematical relationships.

Also, the success of these aids depends of the teacher's understanding of the students' nature, their perception of mathematics (Bolger & Somech, 2004), their ability to use the tools and the degree to which they benefit the pupils.

There are a number of factors which should be considered when choosing suitable teaching aids; for example, the number of students, and mathematics learning objectives concerning the development of thinking and positive attitudes.

Personal differences between students and learning speeds are also significant when choosing suitable tools (Alnoeemi et al., 2006).

Conditions that should be taken into account when selecting teaching aids include: the purpose of the aid, its appropriateness to the mathematical content, ease of use, size, space requirements, whether it can be used with a given class size, students' level of understanding, and individual differences (Abo zainah & Ababnaa, 2010).

Examples of teaching aids that can be used in teaching mathematics at primary level include:

1. 3D materials such as coins, measurement units, stop watches. Also the symbolic number line and material artefacts such as Dienes blocks. Some of these materials can be made of cardboard or wood.
2. Boards: white/black boards, wooden board, cloth or pin board.
3. Drawings: geometric shapes and graphs.
4. Visual and audio aids: TV, video, projectors and data show.
5. Role plays: games and activities using dominos, in order to provide an entertaining environment.

Educational management, school and the school environment, and their role in the teaching of mathematics and learning and achievement

There are many factors that affect the efficiency of teaching methods and student learning, but this section focuses on educational management, the school environment and its elements and components (Prakay & Stanford, 2005).

The concept of educational management

Every organisation needs to arrange its activities and coordinate its efforts in order to achieve its objectives. Educational management organises the human capabilities in departments, committees and schools, and their finance, equipment, furniture and labs (Lingard et al., 2002).

Since educational management aims to achieve preset objectives, it is always interested in the manner in which these objectives are put into practice. There are many general aspects to education management, such as coping with a country's social and political environment, flexibility, and adaptation to changing situations and circumstances.

It should be efficient, effective, and make optimal use of human and fiscal capabilities to successfully achieve a school's teaching and educational aims (Ng & Chan, 2008).

Educational management is one of the patterns of general management as they agree in terms of the main steps in the work methodology. Educational management participates with general management in planning, organising, guiding and putting in place rules and main approaches which will lead to success, as follows (Motawi & Hasan, 2007):

- Putting in place the main goal and strategies for education.
- Educating children and youths and preparing them to live and mingle in society.
- Providing the needed human resources to push forward work to achieve educational goals.

The educational management is a group of complicated activities that integrate internally or with educational organisations to achieve set goals and objectives (Bell, 2002).

It can also be a group of transactions that integrate with each other to achieve a common purpose and is a kind of professional work that culminates in leading human activities through planning, organisation and measurement.

The relationship between education management and school management is the relationship which exists between the whole and the part. That means that school management is part of educational management and mainly led by a headmaster/headmistress.

Previously, the role of government was limited to caring for primary schools and some high schools, putting together syllabuses and education plans, preparing text books and selecting educational methods, and preparing teachers and facilitating the needed environment (Mustafa, 2000). Government should now, however, give priority attention to educational management since its unprecedented expansion.

Characteristics of educational management and related areas of work and teaching and learning mathematics

Educational management is characterised by properties which affect the ways of teaching and learning mathematics and depends on these attributes to achieve effective learning and efficient achievement. The most important are:

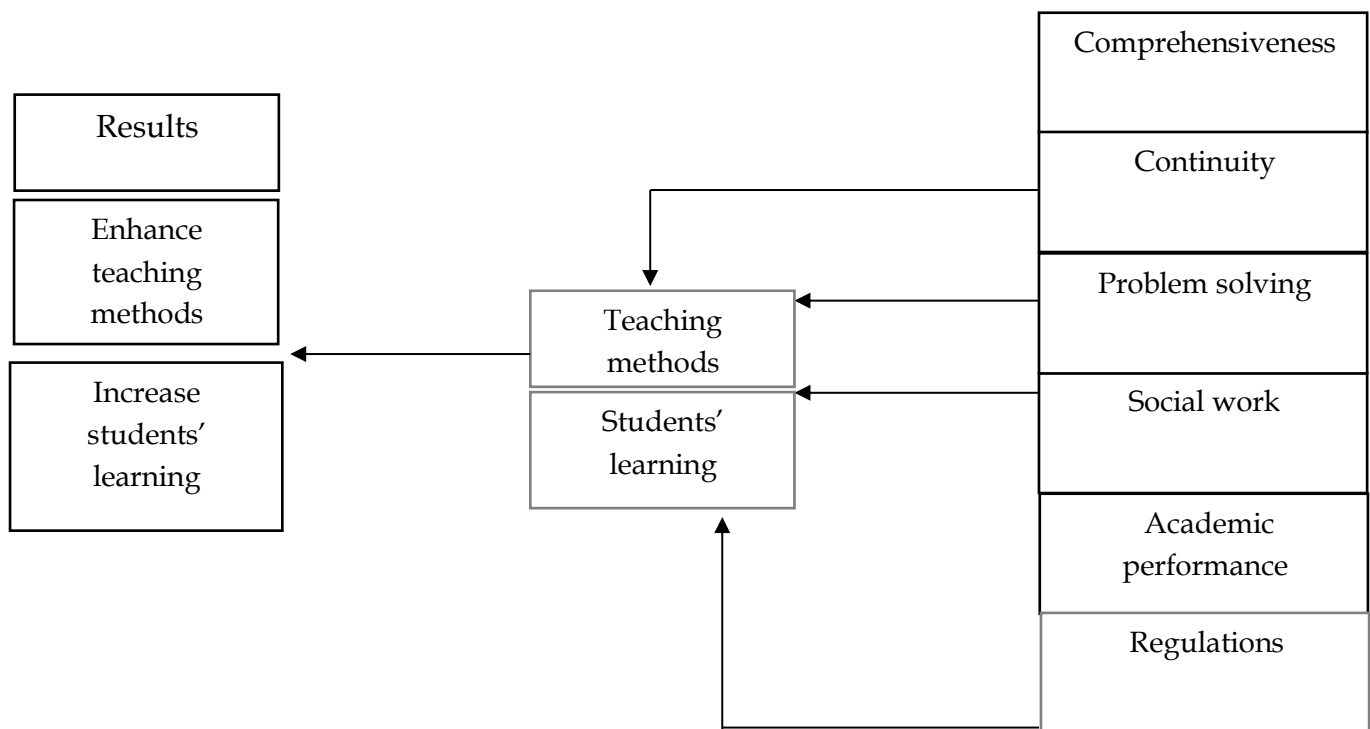
- Educational management is an ongoing process as there are specific goals (Celep & Cetin, 2005).
- The comprehensiveness of educational management is not only limited to execution and routine aspects. It is everything related to students, teachers, technicians, managers, supervisory staff and organising the relationship with society (Mustafa, 2000).

Educational management is characterised by overlapping and integration. Under the process of managerial management a set of processes related with the planning, organising, coordination and guiding taking decisions (Bell, 2002).

- The new concept of educational management specifies that it is undertaken through collective human action which means that it is a form of human social work.

I believe that the previously presented characteristics concerning educational management are related to the teaching methods and students' achievement in mathematics through the comprehensiveness, integration and continuity achieved by such characteristics in dealing with and solving problems as well as organising the educational performance and the human and social work of the school. This is explained in the following diagram:

Figure (2-6)



Educational management is connected with many axes and important aspects of educational and instructional work which are characteristics of the teacher, characteristics of the learner and their behaviour, school characteristics, and subject and external factors related to education (Motawi & Hasan, 2007).

Prakay and Stanford (2005), Mustafa (2000), and Lingard et al. (2002) explain that there are a number of fields that are associated with educational management and play a vital role, from my point of view, in developing teaching methods and learning, as shown in the table below:

Table (2-9) The relationship between areas of educational management, teaching methods, and student learning

Areas	Details	The relationship between educational management, teaching methods, and student learning from this study's point of view
The relationship between school and society	The extent of the association with external society and provision of educational programmes which serve society and link youths with schools.	This leads to the guidance of teaching methods to fit society's needs and achieve learning in light of the elements of the environment.
Syllabus development	Means developing the educational process, how to do it, the manner of learning, and the innovative method.	This contributes to finding developed methods of teaching, making it possible to teach more skills to students.
Students	Related services that complete the organised education inside the classroom.	This reflects positively on the teaching methods and provides a suitable environment to increase learning among students.
Staff	This is one of the main areas for educational management and it is concerned with providing human resources, staff and supervision.	This leads to the increased efficiency of the responsible human resources who manage the education process and lead to an improved learning curve.

Table (2-10) The relationship between areas of educational management, teaching methods, and student learning

Areas	Details	The relationship between educational management, teaching methods, and student learning from this study's point of view
School premises and equipment	New school premises are a huge consideration as they should provide conditions which fit the educational process.	From this study's point of view school equipment plays a vital role in activating teaching methods and raising student learning levels.
Organisational structure of the educational institution	The mutual relationship between individuals and the organisation for achieving set objectives. Also this concerns organisational structure and decisions.	The organisational structure contributes to creating a proper environment for managing education activities and thus has a positive effect on student learning.

School management and its role in activating teaching methods and student learning

School management is one of the main topics in education management and it concerns taking decisions and executing them professionally. Education management is responsible for executing educational policies (Mustafa, 2000).

School management is an important element of the educational process as it links with the results and achievements in education. Educational management is expressed through a set of transactions performed by more than one person through participation, cooperation and mutual understanding and is executed by a headmaster/headmistress, deputy and teaching staff. These people work through organised, well intentioned, targeted activities to achieve the published educational objectives.

Components of school climate and its relationship to methods of teaching and student achievement

Each school or educational institution has a set of attributes and characteristics which derive from the school and its members and provide a unique educational climate which expresses the attributes of the internal environment of the organisation and differentiates it from others (Tolba, 2008).

School climate links to the behaviours, policies, and attributes for the work environment in terms of official organisation, teacher needs, students, managerial communications, patterns of supervision and the groups' behaviours inside the establishment which have an effect on producing and achieving efficiency and effectiveness (Murphy, 2008).

The school climate expresses the mutual interactivity between the inputs and outputs in the school which determine whether it has an open social system or a closed one, and the extent to which it achieves its educational objectives. The education process is carried out within a school climate (Eason et al., 2009).

Stockton (1997) sees the school environment as an open and divided system that prevails in the educational process and combines: democracy; openness and ease of dealing with society and surroundings; an independent atmosphere that depends on routine work procedures and bylaws; or a directed ethos that depends on the role of educational leadership in orienting and managing the educational process. Or it might be a dependent climate that depends on rules and work procedures, or a directed climate that depends on a leadership role.

Factors affecting school climate and its role in activating teaching methods and students' learning

The following are the most important factors that affect school climate and are associated with activating teaching methods, performance and student learning (Hoy & Cecil, 1991; Ng & Chan, 2008; Motawi & Hasan, 2007).

- 1- The relationship between students and teachers through building social relations amongst them. The relationship should be built on kindness, affection and respect. The teacher should be capable of dealing with the student.
- 2- The relationship between the teachers. This helps with cooperation and understanding. However, each teacher should play his part in the education process. This determines the relationships and activities in the school and affects the educational process of delivering knowledge and learning achievements for students.
- 3- The relationship between the teachers and the headmaster. Good relations will push the educational organisation forward to achieve its goals.
- 4- The nature of administrative organisation as well as the methods and procedures through which the educational process is managed in terms of the organisational structure, reporting, supervisory responsibility, duties and responsibilities, school workflow and the teachers' motivation system.
- 5- Update and develop the educational system and ensure effective usage of the inputs to achieve integration between all elements of the education process.
- 6- Qualification level in solving the problems that face the educational organisation and the solution selected to deal with it.

The style and nature of educational leadership adopted by the headmaster affects his/her impact on the staff and teachers, and his/her ability to guide them towards achieving the goals of educational and academic process at the school. Therefore, leadership depends on social, behavioural, psychological and mental aspects when discharging its role.

Also the educational leadership here must be linked with some social, psychological, and behavioural aspects (Wong, 2003).

The role of school climate in activating teaching methods and student learning is explained by Prakay and Stanford (2005), Mustafa (2000), and Motawi and Hasan (2007).

The school climate should use ongoing planning for the education process and the goal must be clear to students and teachers alike. The goal itself must be achievable and the student should be ready and motivated.

Taking student abilities into consideration. Students will not learn or acquire what is above their maturity level.

Using the learning tools that fit students in terms of age, experience, circumstances and capabilities, and linking the things that need to be learned with the student's life and circumstances will encourage them to study.

To utilise the positive and negative incentives in orienting the students' behaviour towards good learning, to positively involve the students in the learning process and to give them the opportunity in the educational process to enhance their learning experience.

Taking personal differences into consideration should help students to transfer their knowledge to use it in real life.

Students should be notified about their progress, recognise their mistakes, and be told how to avoid them. Audiovisual equipment should be used effectively in the learning process.

Summary

The text in Part A has looked at methods of mathematics teaching at the primary stage as the study focuses on the issue of teaching methods in general and influential factors which include the teaching process, the teaching situation, teachers' skills, teaching principles and some teaching models for the primary stage. It highlighted only the methods that have a direct impact on primary stage students' achievement in mathematics. These included educational games, interaction between teachers and students, dialogue, discussion, question, problem-solving, lecture-based and project methods.

I think that these methods are suited to the nature of the primary stage and students' achievement and to building the scientific and intellectual framework for teaching mathematics to children of this age. In addition, the text focuses on student achievement in terms of influential factors such as educational management and the school environment, as well as the nature of the mathematics curriculum, and teacher' skills and their perception of the student's achievement, whilst also referring to the issue of public and private education in the State of Kuwait.

Part B

This part of the chapter reviews the literature related to the study variables. The text discusses methods of teaching mathematics, teachers' perception of student achievement, teachers' skills, the mathematics curriculum, components of the educational and scholastic environment, and student achievement.

Ding Rui's 2007 study investigated the effects of new mathematics curriculum reform in the mathematics classroom and proposed to address the weakness of the traditional mathematics curriculum in China; 1,416 primary school students and their mathematics teachers were invited to take part in this study. The researcher used qualitative and quantitative methods to analyse the primary school mathematics classroom environment in Mainland China.

First, a qualitative method was used to analyse the current situation of the primary school mathematics classroom environment. Results showed that since the implementation of the new curriculum there have been significant changes in the mathematics classroom environment: there are more small group discussions; more freedom is given to the students, though lecturing still dominates classroom activities; students have more opportunities to participate in classroom learning, for example, through asking questions and explaining their ideas; and the mathematics presented is connected more to daily life.

Second, the primary school mathematics classroom environment questionnaire was developed accordingly to better understand the mathematics classroom environment in Mainland China. The questionnaire consisted of 50 items in seven dimensions, namely, enjoyment, teacher involvement, knowledge relevance, teacher-student relationship, student voice, student involvement and student negotiation. Three types of primary school mathematics classroom environments were identified in Mainland China - the constructivistic, the traditional and the intermediate. The cognitive and affective performances among the students brought up in the constructivistic classroom environment were better than those of their counterparts. In addition, significant differences were discovered between students' perceived and preferred classroom environments.

At the same time, the relationships between classroom environments, learning approaches and students' mathematical performances were investigated. It was found that some dimensions of the actual and preferred classroom environments can predict students' learning approaches, attitudes toward and conceptions of mathematics, open problem solving abilities, traditional test scores, and so on, with statistical significance.

Jiban and Deno (2007) conducted a study with a view to researching and developing mathematics teaching methods through reading of the mathematics curriculum and identification of technical factors related to such reading. The study supports the method of reading the mathematics curriculum when teaching the subject, especially in the advanced stages, and in the first grades of primary school. It surveyed 35 students from the third primary grade and 49 from the fifth primary grade to measure and test the application of this method. Results indicated that reliability and criterion validity of 1-minicurriculum-based measurements (CBM) administrations were insufficient. When scores from 2 administrations were aggregated, moderate correlations were achieved. This is one of the key variables that make this method a success.

Mevarech and Kramarski's (1997) study aimed to research the multidimensional method of teaching mathematics focusing on the students' knowledge of mathematics, the interaction among students and improvement of their reaction towards the correction of mathematical topic-related information. The method is called IMPROVE, and it is based on current theories in social cognition and metacognition.

As for the multidimensional method of teaching mathematics to the seventh grade, Mevarech and Kramarski (1997) conducted a study on a sample of two groups of seventh grade students. The first group consisted of 247 students where the study focused on mathematics learning and how to benefit from the mathematical information, while the second group consisted of a sample of 265 students whose thinking development was tested in terms of mathematical topics. Through comparison of the control and non-control groups of the surveyed

students, the study results concluded that there was a great improvement in the performance of the control group in terms of mathematics understanding due to their reliance on the tested multidimensional method. The results of both studies showed that IMPROVE students significantly outperformed the non-treatment control groups on various measures of mathematics achievement.

Alsahel's 2005 study focused on teachers' perception of the reasons behind a decline in Kuwaiti primary school students' achievement. Alsahel (2005) aimed to identify the factors that affect primary school teachers' perception of the problems concerning students' understanding of topics discussed in class.

The study showed that a number of problems lead to falling achievement levels amongst Kuwaiti primary school students, as the surveyed sample of 520 primary school teachers indicated that there are certain family factors which affect the students' achievement, and other factors are related to the teacher's skill in managing the class and classroom and in interacting with students. Comparing teachers' perceptions of underachievement, the results showed that there were no significant differences between male and female teachers. On the other hand, the results indicated significant differences between subjects according to the teachers' length of experience and the locations of schools.

This study dealt with the issue of teachers' perceptions of the problems affecting student achievement, teachers' performance in the classroom as well as the skills and experiences they have. However, teachers believed that they were able to help underachievers to become higher achieving students.

Jennings and Diprete (2010) looked at the role of the social and behavioural skills of primary school teachers and the impact of such skills on the teachers' performance in the teaching process. Although many recognise that social and behavioural skills play an important role in educational stratification, no studies have attempted to estimate the effect of teachers on these outcomes. In their study, Jennings and Diprete (2010) indicated that it is necessary for primary stage teachers

to have good social and behavioural skills, given the nature of the students at this stage. Teachers are required to be good social role models for their pupils. They are also required to perform an influential role in orienting the students' behaviours in addition to displaying skills that create a favourable environment for understanding the topics taught.

Jennings and Diprete (2010) find that observable characteristics of teachers and the instructional approaches utilised in their classrooms are weak predictors of teacher effects. However, the present results suggest that the teachers who produce better than average academic results are not always the same teachers who excel in enhancing social and behavioural skills. Teachers who are good at enhancing social and behavioural skills provide an additional indirect boost to academic skills in addition to their direct teaching of academic skills.

The present study focuses on the effect of the primary stage mathematics curriculum on advanced levels of student achievement. It attempts to research the variables affecting achievement and related to mathematics curriculum topics. In their research, Gavin et al. (2009) aimed to find the factors of the relationship between understanding mathematics and primary school student achievement. The study relied on the development of tests for primary third and fifth grade students in a sample of 11 primary students, and the analysis of the results of the tests for the experimental group and the control group, assessing the differences between them.

The findings of this curriculum study suggest to practitioners that mathematics curriculum units that are challenging and engaging with a focus on important mathematics concepts which encourage students to think and act like practicing mathematicians contribute to students' mathematics achievement. The fact that this study was replicated with a second cohort strengthens the result. Since almost 50% of the students came from economically disadvantaged backgrounds, the work illustrates that the curriculum was highly effective with this special population, while meeting the needs of all talented students.

It is necessary for the primary stage mathematics curriculum to contain factors which encourage students to think. In addition, it is necessary that the curriculum encourages them to ask questions and make inquiries on certain topics during class with the objective of enhancing their thinking on the mathematics curriculum topics.

Harnstra et al. (2010) conducted a study on this issue where a sample of 30 teachers was surveyed with reference to the mathematics achievement levels of 307 students.

The study revealed that there is a link between teachers' perception of student achievement and the students' ability to read and understand mathematics. Neither the implicit nor the explicit measures of teacher attitudes were related to teacher expectations. The results show implicit attitude measures to be a more valuable predictor of the achievement of students with dyslexia than explicit, self-report attitude measures.

To conclude, teachers' perception of student achievement in terms of the variable of mathematical reading and understanding difficulties can be attributed mainly to the teacher's performance in the classroom and their ability to communicate information to students.

In his paper, Midthassel (2004) focuses on the development of scholastic environment and school activities as well as the teacher's role in making such developments. The study examines associations between teacher involvement in school development activity (SDA) and teachers' attitudes toward SDA as well as their perceived working environment concerning innovation activity among staff and the principal's involvement in SDA. The study surveyed a sample of primary, preparatory and secondary school teachers in 47 Norwegian provinces. The sample included 1,435 teachers.

The study results showed that the basis of the development of an educational and scholastic environment in such schools requires the presence of innovative

culture and thinking in the teachers' performance. Results also suggest that the relevance of SDA has a stronger effect on teacher involvement in SDA if the innovation culture is perceived to be positive and the principal is seen to be involved in SDA.

Heck (2007) explored the issue of student achievement and its relationship to teachers' quality and level of organisation. The purpose: No Child Left Behind (NCLB) brought attention to the need for states to upgrade the criteria used to certify teachers for entry into the profession. This study focused on collective teacher qualifications mandated by NCLB and the role they play in explaining differences in school achievement and growth rates.

In terms of research methods, the study examined whether school-level differences in teacher quality were related to student learning in reading and mathematics in a longitudinal cohort consisting of more than 14,000 students nested in a random sample of 197 elementary schools.

The findings were as follows. First, as a school-level resource, collective teacher quality was positively related to school achievement levels in reading and mathematics. Second, the strength of the relationship was conditional on school demographic composition; for example, the positive relationship in reading was enhanced in school contexts where targeted student subgroups (for example, low socioeconomic students, or students receiving help with their English) were more highly clustered. Third, collective teacher quality was related to increased student growth rates in mathematics. Fourth, within schools, higher teacher quality was associated with reduced gaps in student learning rates associated with social class and race/ethnicity.

The results are consistent with studies that have found that teachers' professional qualifications matter in explaining differences in student achievement. They also suggest other promising avenues through which collective teacher quality influences school effectiveness and equity outcomes.

Stein and Kaufman (2010) address the question “What curricular materials work best under what kinds of conditions?” from the point of view of teachers and their ability to implement mathematics curricula that place varying demands and provide varying levels of support on students' learning. The study was applied to a sample of 48 mathematics teachers. The data include interviews and survey results gathered from teachers, as well as observations of instruction, over a two-year period.

The results showed that one of the most important criteria that should be present in the mathematics curriculum is an appreciation of the level of knowledge to be passed on and its suitability to the students' level and their academic stage. There should also be different elements that urge students to think logically about the mathematical topics. Further qualitative analysis indicated that the Investigations part of the curriculum provided more support to teachers for locating and understanding the big mathematical ideas within lessons compared to the Everyday Mathematics section. The study also showed that the achievement of mathematics curriculum objectives depends on the teachers' skills, abilities and teaching experiences.

Chen (2008) explained the relationship between different social elements, such as the teacher's social role in his/her relationship with the students, the role of family and parents in the follow-up of students' academic achievement, and the students' mutual relationships, and their impact on academic achievement. As we know, students' academic achievement requires teachers to undertake different social roles in the classroom particularly with regard to the teacher's relationship with the students from the social point of view and requires the creation of a classroom environment that conforms to the students' family environment. Structural equation modelling analyses revealed important and interesting grade-level differences in academic support-based achievement relationships. The study surveyed a sample of 270 ninth and eleventh grade students. The perceived peer support had no significant direct or indirect relationship to student achievement. The study showed that the social relationship between the teacher and the students

and his parental role in the classroom affects the students' achievement, as does the family and parents' role in the follow-up of the students' achievement level.

The importance of the social role variable and the teacher's relationship with students in high levels of student academic achievement is due to the fact that the academic achievement process largely depends on some behavioural aspects and the level of communication between the teacher and the students.

A study by Winter and Morgenthal (2002) discussed the issue of employment in schools and its effect on the scholastic environment and the students' academic achievement. The study looked at the impact of policy, with regard to managers and teachers' employment, on the performance of the educational process. It aimed to assess the reasons for low performance amongst teachers and managers and their relationship with the educational and scholastic environment. The study surveyed a sample of 189 managers and teachers and the results showed that the policy with regard to managers' and teachers' employment plays a major role in building an educational environment and an appropriate climate for student achievement. The study attributed low performance of the educational process to the weak abilities and skills of some teachers and managers as a result of a gap in employment policies and their incompatibility with the performance of educational process. The most significant finding, detected by a three-way analysis of variance, was that 64% of the variance in job ratings was accounted for by school achievement, with low performing schools being greatly disadvantaged in recruiting principals. Implications for recruitment practice and research are discussed.

The study confirms the relationship between the components and elements of the educational and scholastic environment and employment policies. This relationship is reflected in the efficiency of the teachers and managers' performance of the educational process.

As for the impact of the type of teacher leadership on the students' achievement and the identification of how this variable affects the students'

academic achievement levels, Leithwood and Mascal (2008) provide an explanation. Their study was applied to one sample of 90 primary and secondary schools and another of 2,570 primary and secondary school mathematics and language teachers.

The results showed that the school leadership and manager types which rely, in the management of the academic process, on the teachers' involvement, result in high levels of student achievement. In addition, the study showed that such a role leads to high levels of students' achievement in the case of parental involvement and adoption of their suggestions related to the academic process.

Principals were awarded the highest levels of influence in schools at all levels of achievement. Influence seems to be an infinite resource in schools. The more those in formal leadership roles give it away, the more they acquire. The results of this study indicate that the type and style of school leadership play a key role in the improvement of students' achievement levels but in an indirect way through the teacher's orientation. Therefore, the study results might be more beneficial had it investigated the impact of demographic variables of the school managers on the students' achievement, particularly the variables of experience and qualifications.

In their study, Mohini and Sulaiman (2010) present some initial findings from a study on the use of examples by expert mathematics teachers in their lessons. They involved expert mathematics teachers who teach in upper secondary school, in Johor in Malaysia. So far, data from the teaching process of three expert mathematics teachers and 90 students have been collected. The purpose of the ongoing study is to build a framework that can assist mathematics teachers to choose, use and improve mathematics examples in their teaching. This study adopts a multiple case study design whereby data is gathered from observation, interviews and teachers' notes. The preliminary analyses of data from the teaching process of several expert mathematics teachers has begun to uncover the framework of knowledge and teaching skills of these teachers in the use of mathematics examples.

From the above presentation of studies which dealt with the variables a number of points can be drawn, as follows:

- The students' academic achievement reflects the level of education, learning and knowledge acquired by the students as a result of the academic process performance.
- Students' academic achievement requires the teachers to possess high level abilities and skills to discover the essential differences between the students' levels, to identify and diagnose their problems and to set procedures that enable the improvement of students' academic achievement levels.
- The mathematics teaching method requires the teacher to focus on discussion and students' motivation to think in the classroom. In addition, teachers should pay attention to proper reading of the mathematics curriculum which will lead to proper understanding and a rise in the students' level of understanding.
- The mathematics teaching method requires the use of various educational resources and a graduation in the presentation of topics from the easiest to the most difficult. Also, it requires the creation of a motivational environment in order for the students to acquire the knowledge and skills related to mathematics.
- It is important that the mathematics teaching method contributes to the treatment of difficulties that the students face in understanding the nature and topics of this subject, and that a tangible development is made to the students' level of understanding. It is possible that the teaching method depends in treating difficulties on that facilitate the explanation and interpretation of mathematical topics.
- This perception is achieved through good interaction and communication between the teacher and students and by understanding the students' nature.

- The teacher's ability to plan the educational process and teach in the classroom while knowing the problems affecting the students' achievement levels, in addition to the level of effort made by the teachers for teaching subjects.
- The efficiency of assessment and testing method used by the teacher through which the s/he can form a real image of the students' achievement levels.
- Teachers' abilities may correlate with certain characteristics including social or behavioural aspects and levels of knowledge in addition to their level of qualification.
- There is a close relationship between teachers' skills and the level of students' understanding, and these skills directly or indirectly contribute in the development of that understanding.
- Teachers' skills should match the nature of the educational stage because every age requires certain abilities and skills related to the simplification of the curriculum and communication of information as well as understanding of the students' nature. Teachers should also be able to open discussion channels with their pupils and have skills associated with developing their own knowledge and abilities.
- The characteristics and specifications of the primary school mathematics curriculum include its contribution to building a relationship between the teachers' performance and the practices of academic process in the classroom. This means that there will be a harmony between the curriculum characteristics and the teachers' practices.
- In order for the mathematics curricula to contribute to the high levels of students' achievement, it is necessary to create dialogue and discussion between the teacher and the students and the curricula should be suitable to the students' levels and motivate them to think logically about the mathematical topics.

- It is necessary to design the primary school mathematics curricula in a way that helps students to properly read and understand the problems and vocabulary of mathematical topics.
- The quality of the educational and scholastic environment is one of the key components related to the educational policies and the way of management of the education process as are the available educational resources, material facilities, buildings and students' entertainment facilities.
- The components of the educational and scholastic environment rely on the school leadership role in creating a convenient climate for: the performance of the education process; the communication and involvement of the parents in order to enhance the students' achievement; and the level of teachers' involvement in solving the problems facing the education process.
- Moreover, the components of the educational and scholastic environment are related to the types of teaching method, the innovation and development factor in the performance of the education process, and the implemented school management approach.
- There are certain factors that affect the students' academic achievement. Some of these factors relate to the students themselves, like discipline in study and intelligence levels. Other factors are related to the teacher's skills and style of dealing with students, the nature of the curriculum and the culture of the school leadership in handling the academic process.

Summary

The study subject focused on the comparison between public and private schools, mathematics teaching and students' achievement in the State of Kuwait. The second chapter of this research discussed the issue of education in Kuwait, referring to the nature of the education and history and development of the educational systems in Kuwait in general, which includes public and private education both of which are subject to the supervision of the Kuwaiti Ministry of Education.

The chapter tackled the issue of comparison between public and private education in the State of Kuwait by highlighting a number of elements that explain the difference between them whether in terms of the academic process, the management systems, educational management or the teaching methods. It then moved on to the issue of public and private education in primary schools.

This chapter also looks at the elements related to the study variables in terms of mathematics, its nature, objectives and teaching methods as well as the teachers' skills related to mathematics teaching and the educational resources associated with teaching the subject. It moves on to the issue of students' achievement, the concept of this variable and the relation between scholastic and educational management, and the classroom environment with mathematics teaching and students' achievement.

Part B of the second chapter reviewed the studies which have focused on the study variables related to mathematics teaching, teachers' perception of students' achievement in mathematics, teachers' skills, the mathematics curriculum, components of the educational and scholastic environment, and the students' achievement, which are all variables related to the study.

Conclusion

This study attributes the importance of the comparison between the methods of teaching mathematics to the fifth primary grade and the students' achievement in public and private schools in the State of Kuwait to the fact that the nature and subject of the study are applied in Kuwait for the first time. In addition, and to my knowledge, it is the first study in the Arab countries which tackles the issue of comparison while there are a few foreign studies that have focused on the issue of comparison between public and private schools in terms of mathematics teaching methods and fifth primary grade students' achievement.

Therefore, the importance of this study lies in its treatment of a modern issue in the field of comparison between public and private schools. Furthermore, the study conducts the comparison in a key curriculum and in an important academic stage, as the mathematics curriculum in primary school in particular creates and develops the students' thinking at this age.

This chapter has focused on the dimensions and concepts related to the comparison between public and private schools in Kuwait, as well as the mathematics teaching methods and students' achievement. The aim was to build a clear vision of the scientific frames related to the subject of the study to benefit from them in building a research tool in addition to the studies related to this subject so that it forms an integrated vision on the study subject.

CHAPTER THREE

METHODOLOGY

Preface

This chapter deals with the methodological framework of the research, which looks at mathematics teaching methods in public and private education and its effect on students' achievements at primary school. It addresses the methodology, the limitations of the research and the scholarly community. In addition, it describes the rationale for the chosen research tools and the procedures followed to ensure their effectiveness and stability. Also, it explains how the research was executed and the statistical methods used to analyse the acquired data. Finally, it sets out a response to the research hypotheses.

The following table shows the study hypotheses.

Table (3-1)

Hypotheses of the study	Data collected	Form of analysis used
(1) There are statistically significant differences in the properties and attributes of the methods of teaching mathematics in the fifth primary grade of government and private schools.	Questionnaire that is administered to teachers to elicit information about the methods of teaching mathematics in the fifth primary grade; a comparison between government and private schools in Kuwait.	The questionnaire results were statistically analysed in terms of percentage. In addition, T test analysis was used to measure the differences between methods of teaching mathematics in the fifth primary grade, as a comparison between government and private schools in Kuwait.
(2) There are statistically significant differences in the teachers' perception of students' achievement and factors affecting it with regard to mathematics in the fifth primary grade of government and private schools.	Questionnaire that is administered to teachers to elicit information about the teachers' perception of students' achievement in the fifth primary grade; a comparison between government and private schools in Kuwait.	The questionnaire results were statistically analysed in terms of percentage. In addition, T test analysis was used to measure the differences between teachers' perception of students' achievement in the fifth primary grade, as a comparison between government and private schools in Kuwait.
(3) There are statistically significant differences in the teachers' mathematics skills in the fifth primary grade of government and private schools.	Questionnaire that is administered to teachers to elicit information about the teachers' mathematics skills in the fifth primary grade; a comparison between government and private schools.	The questionnaire results were statistically analysed in terms of percentage. In addition, T test analysis was used to measure the differences between teachers' mathematics skills in the fifth primary grade of government and private schools.
(4) There are statistically significant differences in the	Questionnaire that is administered to	The questionnaire results were statistically

nature of the mathematics curriculum in the fifth primary grade of government and private schools.	teachers to elicit information about the mathematics curriculum in the fifth primary grade; a comparison between government and private schools.	analysed in terms of percentage. In addition, T test analysis was used to measure the differences between mathematics curricula in the fifth primary grade of government and private schools.
(5) There are statistically significant differences in the educational and scholastic environment components and features that are influential in the teaching methods and the students' achievement in mathematics in the fifth primary grade of government and private schools in Kuwait.	Questionnaire that is administered to teachers to elicit information about educational and scholastic environmental components and features which are influential in the teaching methods and the students' achievement in mathematics in the fifth primary grade; a comparison between them.	The questionnaire results were statistically analysed in terms of percentage. In addition, T test analysis was used to measure the differences between educational and scholastic environment components and features in the fifth primary grade; a comparison between government and private schools in Kuwait.
(6) There are statistically significant differences in the degree of students' mathematics achievement in the fifth primary grade of government and private schools in Kuwait.	From the pupils' marks in fifth grade elementary, which were retrieved from the results of the unified test, supervised by the Kuwaiti Ministry of Education. I obtained the files of 25 pupils from a public school for boys and of 25 pupils from a public school for girls and files of 15 pupils from a class of boys, and of 15 pupils from a class of girls from a private.	The marks were analysed in terms of percentage, and ranges of students' mathematics achievement marks. In addition, T test analysis was used to measure the differences between students' marks in fifth grade, as a comparison between government and private schools in Kuwait.

The following table defines the tools used.

Table (3-2)

Type of tool	Objectives of tool
Pilot study	To define the problem and confirm the validity of the research questions.
Questionnaire for teachers	To elicit information concerning the teaching methods employed. (See appendix A, p. 234).
Collation of pupils' achievement data	To define and discover the differences between pupils' achievement (these were taken from the mathematics achievement the unified test in the final term. The overall score of the test is 50 marks. I obtained the results from mark lists. See appendix B, p. 243).

Research method

Given the nature of the study and the information which needed to be collated (a comparative study between public and private schools in the State of Kuwait, in terms of the methods used to teach mathematics to primary stage students, and their impact on the pupils' achievement), I have adopted an analytic and descriptive methodology. This depends on the study and description of the phenomenon as it is in the real world, and its accurate description from a quantitative point of view.

This type of scientific research method helps in: the collation of information related to teaching methods and students' achievement in public and private schools; in the analysis, interpretation and assessment of elements of difference between the public and private schools; and in the presentation of a clear image of the scale of the phenomenon (Sekaran, 2003; Tuckman, 2000; Black & Champion, 2002).

The research limits

Research limitations involve the following:

1. Human limits

This research focuses on those working in education in Kuwait in public and private education in primary schools. It concentrates on teachers and supervisory educators in these establishments and those who are directly related to mathematics teaching in primary schools. The study consisted of mathematics teachers and fifth primary grade students from schools in Kuwait.

2. Spatial limits

This research focuses on public and private schools in Kuwait in the field of primary education and the private schools were chosen from amongst the bilingual schools. In this research three Kuwaiti schools were selected, one of them a private primary school and the others public primary schools. This was to make it possible to compare and contrast them in terms of mathematics teaching methods.

3. Time limits

There were time limitations for this research with regard to the practical collection of pupils' achievement marks in mathematics in primary education. Marks for fifth grade elementary pupils, were retrieved from the unified test supervised by the Kuwait Ministry of Education in the Kuwaiti primary school year 2009/2010, which started on 15th September 2009 and ended on 31st May 2010 for both public and private schools.

Research community

Based on the research goals, the target community consisted of those working in teaching positions and educational supervision in the field of mathematics for fifth grade elementary pupils in public and private schools in the State of Kuwait.

The research sample

The research sample was defined with regard to the following:

Quality of the sample method used

The study employed the method of cluster random sampling in which all components of the sample are objectively chosen and have an equal opportunity of being selected (Bryman, 2004).

Random sampling gives individuals an equal opportunity to express themselves and enables the generalisation of the research results (Sekaran, 2003). Moreover, a random sample is a segment whose individuals are probably and objectively selected from society at the same time in a way that gives all individuals equal opportunities to be chosen, and which reduces the possibility of bias to a category on account of another. This can be achieved whether the sampling is with or without replacement, and the sampling of society individuals is carried out independently. This means that the sampling of an individual from the society which is to be subject to the study will not affect the sampling of other individuals from the study society (Borg & Gall, 1983).

Sample volume

Three primary schools in Kuwait were chosen: one private and two public - one for boys and the other for girls. All private schools in Kuwait are segregated, with one building for boys and the other for girls. The chosen sample consisted of (20) mathematics teachers, all of whom taught fifth grade pupils. Of these twenty, (10) were mathematics teachers in public primary schools, and of these ten, (5) taught in the primary school for boys and the other (5) worked in the primary school for girls. The other (10) mathematics teachers, in the private primary school, were divided into (6) teachers who taught fifth grade pupils in boys' classes, and (4) who taught fifth grade pupils in girls' classes.

Also, a sample of (80) pupils were chosen from fifth grade primary consisting of (50) pupils from the public schools; (25) pupils from each class, one class from the

primary girls school and the other class from the primary boys school. The remaining (30) pupils attended the private school and consisted of (15) pupils from each of two classes, one class for boys and the other for girls. I used this sample to compare mathematics achievements in public and private schools, and I did this by referring to the pupils' mark sheets.

The table below provides details of the sample volume.

Table (3-3)

Category of the research sample		Sample volume
Public primary schools		2
Private primary schools		1
Fifth grade elementary mathematics teachers in public schools		10
Fifth grade elementary mathematics teachers in private schools		10
Fifth grade elementary pupils' marks in public schools	Boys of (1) class	25
	Girls of (1) class	25
Fifth grade elementary pupils' marks in private schools	Boys of (1) class	15
	Girls of (1) class	15

The table above shows that two public primary schools were chosen, one for boys and the other for girls, one class from each primary school. There are schools for girls only and others for boys only because we do not have mixed schools in Kuwait.

As shown in the table above, one private primary school was chosen from the private education sector because it included classes for boys and others for girls, as is

the system in the private education sector in Kuwait, which is completely different from public education.

One class of boys and another of girls in the fifth grade of elementary school were selected as a sample for private education. The purpose of selecting a sample comprising male and female students was to represent segments of students from both genders, as the school system in the State of Kuwait separates boys and girls. Private schools, however, have both genders but in separate classrooms. Moreover, I wanted to give other researchers the opportunity to discuss the differences between both genders in terms of academic achievement in future researches.

The research used a sample of (20) teachers, divided into (10) working in the field of teaching mathematics to fifth grade pupils in public primary schools and the other (10) working in the same field in private primary schools.

Ten teachers working in public primary schools were chosen, (5) of them from primary schools for males and the other five from primary schools for females.

The other (10) teachers working in private education were chosen from one private primary school. Those (10) were divided into (6) who taught fifth grade boys' classes and (4) who taught fifth grade girls.

In addition (50) pupils from fifth grade public elementary schools were chosen whose mathematics marks could be analysed. These students were divided into, (25) pupils from boys' schools and (25) from girls' schools. The reason for choosing that number of pupils was the density of classes in public schools.

For the pupil sample in private education, (30) pupils were chosen, divided into (15) males and (15) females. This number was chosen because the number of pupils in private schools is lower than the number of pupils in public schools.

Data collection

There were three aspects to data gathering on the topic of mathematics teaching methods in primary schools and pupils' achievements:

Firstly, the method used to collect the research data - this included marginal data sources from books, references, essays, courses, internet references and the previous studies associated with mathematics teaching methods in primary education and pupils' achievement. Moreover, data was collected with regard to topics related to public and private education in Kuwait; for example, publications by the Ministry of Education. All of this information was used to support the theoretical aspect of the study and to help with building the research tool.

Secondly, issues associated with building the research tool - the research tool was the questionnaire that was prepared to collect data about the sample community. It was designed to suit the study variables and employed a standard triple point Likert scale.

Thirdly, the study made use of fifth grade elementary pupils' marks in the school year 2009/2010 in both public and private schools.

Instrument of the study

The research method used was the questionnaire. This is one of the most common information collection tools used by researchers in the social and human sciences (Peeters et al., 2007). A questionnaire is a form with a list of questions asked by the researcher, running to one or more pages, and covering either a part, or the whole, of the research. The surveyed person answers the questions to provide certain information. The questionnaire is then returned to the researcher for treatment. The questionnaire questions are divided into two major sections. The first section covers personal information including age, education, income, profession and social status. The second section covers the questions related to the research topic which may be divided depending on the study assumptions, questions or objectives previously set by the researcher (Smits & Vorst, 2007).

Vehovar et al. (2008) point out that the questionnaire design requires the researcher to consider the sound and understandable formulation of the questionnaire paragraphs, as well as the phraseology and the conciseness of such paragraphs. The researcher should also consider the ease with which the questions can be answered so that answers do not require much time from the surveyed person. Murray (1999) asserts that a well designed questionnaire facilitates the achievement of the study objectives and the measurement of the assumptions on which the study is based. Moreover, the researcher should test the research tool by distribution thereof to a pilot sample to ensure that the questions measure what the researcher wants and in different time periods to determine the extent of reliability of the questionnaire as a valid measure (Marshall, 2005).

The design of the questionnaire

The design of the research tool pays attention to certain key characteristics for the effective collection of information and data. Bryman (2004) indicated that a valid survey requires the questions to be in the surveyed person's language and to be in a clear style free of any ambiguous terms and using understandable expressions. This helps the survey to achieve the intended purpose.

The design of the questionnaire takes into consideration the following:

Preliminary data

The questionnaire collected a number of personal items of preliminary data from each teacher. These are set out below.

1. School type (public or private)
2. Gender (male / female)
3. Teacher's age
4. Gender of the pupils in their class

5. Number of years' teaching experience
6. Teacher's educational qualifications

The preliminary data was collected in order to compare public education with private. Comparison between them in relation to the results was expected to give a complete and clear analysis for public and private primary education in Kuwait. The reason for collecting this data was to build a compatibility view about the sample of study, and to provide a new research point for other researchers to build their future studies upon in relation to this data, especially in the area of the Arabic environment and Arabic schools.

Main themes of the questionnaire

The questionnaire covered five themes. Each theme involves a group of clauses. The following table shows the distribution of these within the questionnaire.

Table (3-4) Research themes and measurement statement

Theme name	Number of statements	Percentage of the total number of statements
1. Characteristics of mathematics teaching methods.	20	33.2%
2. The teacher's perception of students' achievement.	10	16.7%
3. Teacher skills.	10	16.7%
4. Mathematics curriculum.	10	16.7%
5. The components of the educational and scholastic environment.	10	16.7%
Total	60	100%

The table above shows how the themes of the questionnaire are designed to meet the research objectives and hypotheses and contribute to the collection of information from the research community about public and private schools.

The themes and measurement clauses outlined in the table are strongly related to the research objectives and hypotheses as explained. They deal with:

- Characteristics of mathematics teaching methods for the fifth grade pupils.
- The teacher's perception of the student's achievement.
- Teachers' skills, for those working in the field of mathematics teaching to fifth grade elementary students.
- The mathematics curriculum for fifth grade elementary level.
- The educational environment which is provided in primary education in both public and private education.

This study adopted a tridimensional 'Likert' scale for the questionnaire. It was designed such that, each statement was ranked by the respondent against a three point list of 'Agree – Neutral – Disagree'. The ranks, or marks, were then processed statistically as follows:

Agree (3) marks, Neutral (2) marks and Disagree (1) one mark.

This afforded a level of ease and simplicity so that the surveyed person could express his/her opinion on the questions asked. One of the specifications for a valid and sound survey is that it should be easy and simple to use (Bryman, 2004; Sekaran, 2003; Black & Champion, 2002).

The validity of the research

Validity is the extent to which the tool is able to measure that which it was designed to measure and how suitable it is for such purpose (Sardantakos, 1998).

Also, validity is a characteristic that is related to the test results rather than the test itself, and it is linked to the test. Validity depends on the test invariability; when the test gives the same results every time it is applied (David, 1984).

Validity has many characteristics and, amongst others, depends on two factors: the test purpose (or the function it should undertake) and the category or group to which the test is applied (Luis & Germa, 2006). Validity is a relative or a gradual rather than an absolute characteristic. There is no invalid test and, similarly, there is no absolutely valid test.

There are several types of validity. These include:

1. Apparent validity, which depends on how logical the contents of the test are and to what extent they are related to the measured phenomenon. It represents the general shape or appearance of the test in terms of its particulars, objectivity and clearness of instructions. It may also be called the surface validity as it indicates the general appearance of the test (Anastasi & Urbina, 1997).
2. Criterion-related validity. This is a criterion through which we can judge the test and may include a number of degrees or estimates that the test is designed to predict or relate to as a measure of their validity.
3. Predictive validity which indicates the correctness with which we can predict a certain characteristic or ability in the individuals through a test that is supposed to measure such characteristics.
4. Building or concept validity, which refers to the extent of a test's success in measuring a certain concept. Concept validity reflects the test's ability to anticipate the theoretical predictions of the measured behaviour or characteristic. It is supposed, in this type of validity, that each measure or measurement tool implies a characteristic, behaviour or ability theory that, in turn, sets predictions and assumptions about that characteristic or ability. If the test is effective (valid) in measuring such a characteristic or ability, its degrees should predict such expectations or assumptions (Kirk and Miller, 1986).

I here refer to the fact that validity, as a characteristic of the measurement tools, can be used in educational, psychological and social researches, and are essential and important for the study results and the contributions based thereupon in the field of theory building in such research areas.

Validity of the questionnaire

Face validity

This is related to: the external or superficial validity of the study tool through which the tool and the measurement phases are judged in terms of their relation to the research subject; the clarity of the tool and appropriateness to the study sample; the right order, types and validity of the measurement items; and the paragraphs used to draw proper responses from the study sample.

Content validity

This type of validity is a measurement of the content of the research tool in terms of the phrases and research variables, and how effectively such phrases deal with measurement of the variables in relation to the research assumptions, objectives and subject. In this study, the jury assessed the validity of the research tool and the modifications they suggested were considered and incorporated where appropriate.

Furthermore, an experiment was conducted on a small, randomly selected sample of public and private primary school teachers to assess their understanding of the tool before its final application to the study sample (Abu Alnasr, 2004).

Measure of validity

The questionnaire was presented to a group of judges who had experience in the field of teaching methods and pupils' achievement in mathematics, especially in primary education, and to a number of scientific research experts, in order to be sure of aspects of form, order, and the validity of measurement clauses and their

acceptability to the topic of teaching methods and pupil achievement. The suggested modifications were then added to the research tool (see appendix D, p. 252 in the attached file).

The group of educational experts in this case were asked specifically for their opinions on the clauses of the questionnaire in relation to:

- ❖ The convenience of tool clauses for the research field.
- ❖ The convenience of clause language and its clarity for the research sample.
- ❖ The clarity of clauses.
- ❖ The suitability of a clause to measure what it is intended to measure.
- ❖ The convenience of answer measurement in relation to the research objectives.
- ❖ The suitability of the expected results for analysis by statistical methods.

Measures taken to modify the survey in view of the jury members' assessment of its validity

In view of the opinions of jury members, some modifications to the questionnaire were necessary. They involved the deletion of some paragraphs or phrases found inappropriate to the measures, and the reformulation of some paragraphs, and introduction of others, until the tool acquired its final form. The questionnaire was then presented again to the jury members to verify its final validity.

The following table shows the measures adopted to modify the questionnaire.

Table (3-5)
Measures taken to modify the survey in
view of jury members' assessment of its validity

Questionnaire elements	Number of statements before submission to jury members	Modifications suggested by jury members			Number of statements after assessment by jury members
		Modification	Addition	Deletion	
Mathematics teaching methods	23 statements	6	-	3	20
Teachers' perception of students' achievement	12 statements	4	-	2	10
Teachers' skills	8 statements	3	2	-	10
Mathematics curriculum	11 statements	2	-	1	10
Educational and scholastic environmental components	13 statements	5	-	3	10
Total	67 statements	20	2	9	60

The reliability of the questionnaire

A stable research tool gives the same result if it is used again under the same circumstances. Consistency is one of the major factors and characteristics that should be considered in the validity of any test or measurement device. A consistent measure or device will give almost the same results when the test is conducted for several persons, several times, on the same day; in such cases, the results are a good indicator of the abilities of such a measure or device (Brinberg, Mc Grath, 1985).

Consistency is related to the measurement of accuracy regardless of what is measured. This means that the test is reliable. Consistency means also that if the same test is applied to the same person more than once, it will give consistency of results. Consistency refers to the level of stability or harmony achieved by a measurement tool over time. Consistency is one of the key and important features of measurement tools and it should be considered when selecting the measurement tools used in research (Kirk & Miller, 1986).

Consistency is affected by a number of factors the most important of which are the surveyed person in terms of his/her ability to perform the measured skills, his/her performance method and the test in terms of the formulation of its items, instructions, test conduction method and test length. Consistency is also related to objectivity which means that the test should be objective in measuring the phenomenon for which it was originally designed and should be unbiased.

Stability was calculated using the Alpha coefficient which is available from the statistical computer programming package, SPSS, which is used in social sciences.

Assessment of reliability of the questionnaire using the SPSS programme (Cronbach's Alpha)

To assess stability according to this method, I distributed the questionnaire to a sample of (10) teachers comprising (5) public school teachers and (5) private school teachers. Questionnaires were collected after completion by the participants. This

sample was not a part of the main sample for the study, but was selected for the purpose of assessing the stability of the tool.

One month later, I redistributed the questionnaire to the same stability assessment sample. Questionnaires were collected, the statistical program SPSS and Cronbach's Alpha test were used, the correlation coefficient was calculated and the test was redone. The result was ($r=0.907$) which is indicative of questionnaire stability, and of a correlation between the questionnaire elements and the study elements, as shown in the following table:

Reliability Statistics	
Cronbach's Alpha	N. of Variables
0.907	2

The procedures for implementing the research

The apparent and structural validity of the research tool, its integrity, as determined by the panel of judges, and its consistency were all evaluated. The study was then administered to teachers from public and private primary schools in Kuwait using the following ethical steps:

- ✓ Approval and acceptance from the authorities of both public and private sectors at the Ministry of Education in Kuwait were obtained (see appendix E, p. 254).
- ✓ Before distributing the questionnaires to teachers, the officials of public and private schools were called and notified, to explain to them the aims of the research and to give them instructions.
- ✓ The questionnaires were distributed to (10) teachers from public schools and (10) teachers from private schools. They were asked to cooperate with the dates suggested and given a period of two weeks to fill in the questionnaires.

- ✓ It was agreed with the officials and teachers of the public and private schools that the files of the pupils' marks in fifth grade elementary would be made available. The files of (25) pupils from a public school for boys and of (25) pupils from a public school for girls were supplied. Those of (15) pupils from a class of boys, and of (15) pupils from a class of girls from a private school were also provided.
- ✓ Twenty questionnaires were distributed with 100% response rate. These questionnaires were reviewed and checked to ensure that they were 100% complete.
- ✓ The data from these questionnaires were entered into SPSS after they had been encoded.
- ✓ All informants were told that their responses would be kept confidential and would only be used for academic purposes.

The methods of statistical processing used in the research

A number of statistical tools from the SPSS package for analysing social research data were used, the most important of which were:

- 1- Cronbach's Alpha to ensure the reliability of the questionnaire.
- 2- Frequencies and percentages to determine the sample response rates.
- 3- T testing was used to determine the differences between public and private schools according to the five themes of the research tool.

The T test method was used to determine the difference in opinions about public and private education in the fifth primary grade. Black and Champion (2002) and Sekaran (2003) indicated that this test can be used to explain the differences between the average opinions of a surveyed sample. This is especially appropriate since this study adopts the method of comparison between schools in terms of teaching mathematics and fifth primary grade students' achievement.

Summary

This chapter explains that the descriptive analytical methodology was used and discusses the subjective, human, place and time limits of the study. It refers also to the study community and sample, which were representative of teachers and students of Kuwaiti public and private schools in the primary stage.

It explains the data collection methods and the study tool including the design measures, validity and stability statistics employed to ensure the soundness of the study. The research adopted the methods of face validity and adjudged validity, and measured the stability of the study tool using the Cronbach Alpha method. The chapter explains the measures that were adopted to carry out the study and has described the approval obtained from the authorities at the Kuwaiti Ministry of Education for the distribution of surveys to the sample.

Moreover, it indicates the statistical methods adopted in conducting the data analysis to obtain the study results.

CHAPTER FOUR

ANALYTICAL RESULTS

Introduction

This chapter presents the statistical analysis and results obtained with the procedures and tools of the Statistical Package for the Social Sciences, SPSS, which will focus on the following:

- The results of the research sample description at government and private schools that are the subject of the study.
- The frequencies and percentage results of the questionnaire at the level of the total sample at government and private schools.
- The frequencies and percentage results to compare between government and private schools at the level of the questionnaire.
- T test results for the differences between government and private schools.
- The analysis and study of marks lists for the students' achievements for mathematics, grade five at government and private schools.

Description of the research sample at government and private schools

The first analysis refers to the overall general characteristics and attributes of the research sample. Following this, the characteristics and attributes of the research sample for government and private schools separately are addressed in frequency tables produced by the SPSS programme.

Characteristics and attributes of the research sample in general (government and private school samples together)

Table (4-1)

Distribution of total research sample at government and private schools according to the 'Gender' variable

Gender	Frequency	Percent	Valid percent	Cumulative percent
Male	11	55.00	55.00	55.00 100.00
Female	9	45.00	45.00	
Total (n)	20	100.00	100.00	

As the above Table (4-1) shows; the total research sample of 20 teachers is distributed evenly according to the 'Gender' variable; 55% males, 45% females. The next table shows the comparison between private and government schools.

Table (4-2)

Comparison between private and government schools according to the 'Gender' variable

Gender	Frequency		Percent		Valid percent	Cumulative percent
	P	G	P	G		
Male	6	5	60.00	50.00	55.00	55.00 100.00
Female	4	5	40.00	50.00	45.00	
Total (n)	10	10	100.00	100.00	100.00	

Table (4-3)

Distribution of the total research sample at government and private schools according to the 'Age' variable

Age	Frequency	Percent	Valid percent	Cumulative percent
22:30	4	20.00	20.00	20.00 45.00 70.00 100.00
31:40	5	25.00	25.00	
41:50	5	25.00	25.00	
Over 50	6	30.00	30.00	
Total	20	100.00	100.00	

From Table (4-3), 50% of the total research sample is in the age range 31-50 years. Other participants are distributed as 20% aged 22-30, and 30% over 50 years. This shows that the sample are predominantly middle aged. The next table show the comparison between private and government schools.

Table (4-4)

Comparison between private and government schools according to the 'Age' variable

Age	Frequency		Percent		Valid percent	Cumulative percent
	P	G	P	G		
22:30	2	2	20.00	20.00	20.00	20.00 45.00 70.00 100.00
31:40	2	3	20.00	30.00	25.00	
41:50	2	3	20.00	30.00	25.00	
Over 50	4	2	40.00	20.00	30.00	
Total	10	10	100.00	100.00	100.00	

Table (4-5)

Distribution of the total research sample at government and private schools according to the 'Years of Experience' variable

Years of experience	Frequency	Percent	Valid percent	Cumulative percent
1:5	1	5.00	5.00	5.00 25.00 60.00 100.00
6:10	4	20.00	20.00	
11:15	7	35.00	35.00	
Over 15	8	40.00	40.00	
Total (n)	20	100.00	100.00	

From Table (4-5), the majority of participants in the sample have 15 or more years' experience, which means that, to some extent, there is a high level of experience in the research sample. The next table shows the comparison between private and government schools.

Table (4-6)

Comparison between private and government schools according to the 'Years of Experience' variable

Years of experience	Frequency		Percent		Valid percent	Cumulative percent
	P	G	P	G		
1:5	0	1	0.00	10.00	5.00	5.00 25.00 60.00 100.00
6:10	1	3	10.00	30.00	20.00	
11:15	3	4	30.00	40.00	35.00	
Over 15	6	2	60.00	20.00	40.00	
Total (n)	10	10	100.00	100.00	100.00	

Table (4-7)

Distribution of the total research sample at government and private schools according to the 'Educational Level' variable

Educational level	Frequency	Percent	Valid percent	Cumulative percent
Diploma	3	15.00	15.0	15.00 75.00 85.00 100.00
Bachelor	12	60.00	60.00	
Higher diploma	2	10.00	10.00	
Master	3	15.00	15.00	
Total	20	100.00	100.00	

The above Table (4-7) shows that the total research sample is focused, at a rate of 85%, between Bachelors and Masters Qualifications. This means that, to some extent, the sample are highly educated. The next table shows the comparison between private and government schools.

Table (4-8)

Comparison between private and government schools according to the 'Educational Level' variable

Educational level	Frequency		Percent		Valid percent	Cumulative percent
	P	G	P	G		
Diploma	1	2	10.00	20.00	15.00	15.00 75.00 85.00 100.00
Bachelor	7	5	70.00	50.00	60.00	
Higher diploma	0	2	0.00	20.00	10.00	
Master	2	1	20.00	10.00	15.00	
Total	10	10	100.00	100.00	100.00	

Characteristics and attributes of the research sample at government schools

Table (4-9)

**Distribution of the research sample at government schools according to the
'Gender' variable**

Gender	Frequency	Percent	Valid percent	Cumulative percent
Male	5	50.00	50.00	50.00 100.00
Female	5	50.00	50.00	
Total	10	100.00	100.00	

The above Table (4-9) shows that the research sample at government schools is distributed evenly (50% : 50%) between male and female teachers.

Table (4-10)

Distribution of the research sample at government schools according to the 'Age' variable

Age	Frequency	Percent	Valid percent	Cumulative percent
22:30	2	20.00	20.00	20.00 50.00 80.00 100.00
31:40	3	30.00	30.00	
41:50	3	30.00	30.00	
Over 50	2	20.00	20.00	
Total	10	100.00	100.00	

From the above Table (4-10), 60% of the teachers are between 31 and 50 years of age at the sampled government schools. The other rates are distributed as 20% in the category 22 - 30 years and 20% aged over 50.

Table (4-11)

Distribution of the research sample at government schools according to the 'Years of Experience' variable

Years of experience	Frequency	Percent	Valid percent	Cumulative percent
1:5	1	10.00	10.00	10.00 40.00 80.00 100.00
6:10	3	30.00	30.00	
11:15	4	40.00	40.00	
Over 15	2	20.00	20.00	
Total	10	100.00	100.00	

From Table (4-11), 70% of the government school samples have between 6 and 15 years experience. The remainder of the sample is distributed as 10% for the category 1-5, and 20% for the category over 15 years. This means that government schools' teachers have above-average levels of experience.

Table (4-12)

Distribution of the research sample at government schools according to the 'Educational Level' variable

Educational level	Frequency	Percent	Valid percent	Cumulative percent
Diploma	2	20.00	20.00	20.00 70.00 90.00 100.00
Bachelor	5	50.00	50.00	
Higher diploma	2	20.00	20.00	
Master	1	10.00	10.00	
Total	10	100.00	100.00	

From the above Table (4-12), those educated to higher than Bachelor level in the government schools account for 30% of the sample. This means that, to some extent, there is a high level of education in the research sample at government schools.

Characteristics and attributes of the research sample at the private schools

Table (4-13)

Distribution of the research sample at the private schools according to the 'Gender' variable

Gender	Frequency	Percent	Valid percent	Cumulative percent
Male	6	60.00	60.00	60.00 100.00
Female	4	40.00	40.00	
Total	10	100.00	100.00	

From the above Table (4-13), it is clear that the research sample is distributed as 60% males and 40% females.

Table (4-14)

Distribution of the research sample at the private schools according to the 'Age' variable

Age	Frequency	Percent	Valid percent	Cumulative percent
22:30	2	20.00	20.00	20.00 40.00 60.00 100.00
31:40	2	20.00	20.00	
41:50	2	20.00	20.00	
Over 50	4	40.00	40.00	
Total	10	100.00	100.00	

From Table (4-14), 40% of the research sample at the private schools are in the age range 31-50 years. This means that there is an emphasis on this category but at a lower rate than for government schools where the rate of this same category was 60%. This indicates a higher working-age of teachers in the government schools than in the private ones.

Table (4-15)

Distribution of the research sample at the private schools according to the 'Years of Experience' variable

Years of experience	Frequency	Percent	Valid percent	Cumulative percent
1:5	0	00.00	00.00	00.00 10.00 40.00 100.00
6:10	1	10.00	10.00	
11:15	3	30.00	30.00	
Over 15	6	60.00	60.00	
Total	10	100.00	100.00	

From the above Table (4-15), the Years of Experience for the category 6-15 years is 40% of the total private schools sample, which is less than for government schools which reached 60% in the same category.

Table (4-16)

Distribution of the research sample at private schools according to the 'Educational Level' variable

Educational level	Frequency	Percent	Valid percent	Cumulative percent
Diploma	1	10.00	10.00	10.00 80.00 80.00 100.00
Bachelor	7	70.00	70.00	
Higher diploma	0	0.00	0.00	
Master	2	20.00	20.00	
Total	10	100.00	100.00	

From the above Table (4-12), 20% of the private schools sample are educated to higher than Bachelor level. This means that, to some extent, there is a high level of education in the research sample at private schools.

Frequency analysis tables at the level of the total research sample at government and private schools with respect to the statements contained in the teacher's questionnaire (see appendix A, p. 234)

The tables in this analysis give frequencies and percentages on the level of the total research sample for government and private schools.

1. Frequency analysis tables for the levels of attributes and characteristics of the methods of mathematics teaching for all 20 teachers

Table (4-17)

The frequencies and percentages of the attributes and characteristics of the methods of mathematics teaching on the level of the total research sample.

No	Statement	Agree		Neutral		Disagree	
		F	%	F	%	F	%
1	I'm still looking for a better method of teaching mathematics.	14	70	3	15	3	15
2	The teaching method focuses on increasing the students' awareness about the mathematical subjects.	19	95	1	5	--	--
3	The method of teaching mathematics contributes to providing students with the concepts, the basics of numbers and figures, and with mathematics operations.	17	85	1	5	2	10
4	The method of teaching mathematics aims to develop the students' positive attitudes towards mathematics.	13	65	4	20	3	15
5	I use different teaching methods when teaching mathematics.	16	80	3	15	1	5
6	The method of teaching mathematics	16	80	2	10	2	10

No	Statement	Agree		Neutral		Disagree	
	helps to build the thinking abilities of the students.						
7	The method of teaching builds a stimulating atmosphere for the students.	19	95	1	5	--	--
8	I start a dialogue with the students about the mathematical topics.	15	75	5	25	--	--
9	The method of teaching contains questions that are asked of the students when teaching.	19	95	1	5	--	--
10	The method of teaching takes into account various principles of teaching and learning.	15	75	4	20	1	5
11	The method of mathematics teaching considers transition from easy to difficult issues.	15	75	4	20	1	5
12	The method of teaching focuses on achieving students' understanding of the subject.	15	75	5	25	--	--
13	When I teach mathematics, I have clear steps to follow.	18	90	2	10		
14	The method of teaching mathematics focuses on providing new ideas.	17	85	3	15	--	--
15	When teaching mathematics, I use different types of discussion with students.	15	75	3	15	2	10
16	I plan for teaching mathematics before entering the classroom.	16	80	1	5	3	15
17	When teaching mathematics, I allow	14	70	6	30	--	--

No	Statement	Agree		Neutral		Disagree	
	students enough time to answer the questions.						
18	I use a method for teaching mathematics which fosters new behaviours in the students.	13	65	6	30	1	5
19	I use a method that is based on clarification and explanation of the mathematical information.	10	50	6	30	4	20
20	I give the students lots of questions and exercises.	12	60	7	35	1	5

From the above table of the attributes and characteristics of the methods of mathematics teaching for the total research sample, it is clear that the most important statements which have high marks for agree were:

- The method of teaching mathematics contributes to providing students with the concepts, the basics of numbers and figures, and with mathematics operations.85%
- The method of teaching builds a stimulating atmosphere for the students.95%
- The method of teaching contains questions that are asked of the students when teaching.95%
- The method of teaching mathematics focuses on providing new ideas.85%
- When I teach mathematics, I have clear steps to follow.90%

Factors or statements that have low marks for agree were:

- I use a method that is based on clarification and explanation of the mathematical information.50%
- I give the students lots of questions and exercises.60%

2. Frequency analysis tables for the level of teachers' perception of students' achievement for all 20 teachers

Table (4-18)

Frequencies and percentages for the teachers' perception of achievement of students on the level of the total research sample

No	Statement	Agree		Neutral		Disagree	
		F	%	F	%	F	%
1	Most of the students have the desire and the ability to learn mathematics.	12	60	5	25	3	15
2	There are a great number of students whose knowledge about mathematics has been developed day after day.	14	70	4	20	2	10
3	There are a great number of students who have the necessary skills to read and interpret the mathematics topics.	13	65	7	35	--	--
4	There are a great number of students who master mathematical operations.	13	65	5	25	2	10
5	I spend a long time explaining the topics to students.	10	50	7	35	3	15
6	Students achieve concrete completion that appears on their behaviour according mathematics subject.	11	55	5	25	4	20
7	In many cases, students ask for further explanation of some subjects.	6	30	8	40	6	30
8	Students need more time to accommodate mathematical issues.	13	65	4	20	3	15
9	There is always a great disparity between the students' marks.	7	35	10	50	3	15
10	I put a great deal of effort into explaining the lessons but without fruitful results.	7	35	8	40	5	25

From the above Table (4-18), the statements with which most agree with regard to teachers' perception of students' achievement are as follows:

- There are a great number of students whose knowledge about mathematics has been developed day after day.70%
- There are a great number of students who master mathematical operations.65%
- Students need more time to accommodate mathematical issues.65%
- There are a great number of students who have the necessary skills to read and interpret the mathematics topics. 65%

Statements with which participants disagreed (note; there were above average marks for agree) were:

- There is always a great disparity between the students' marks.35%
- In many cases, students ask for further explanation of some subjects.30%
- I put a great deal of effort into explaining the lessons but without fruitful results.35%

3. Frequency analysis tables for teachers' mathematics skills for all 20 teachers

Table (4-19)

The frequencies and percentages for teachers' skills on the level of the total research sample

No	Statement	Agree		Neutral		Disagree	
		F	%	F	%	F	%
1	I have the ability to discover individual differences between students concerning mathematical issues.	12	60	5	25	3	15
2	I recognise the educational and behavioural issues for the students concerning mathematical subjects.	10	50	6	30	4	20
3	I have the ability to use suitable evaluation methods.	15	75	3	15	2	10

No	Statement	Agree		Neutral		Disagree	
4	I can identify the capabilities, needs and interests of the students.	13	65	5	25	2	10
5	I can use many different educational aids to teach mathematics.	11	55	4	20	5	25
6	I can stimulate the students to learn mathematics.	10	50	6	30	4	20
7	I take notice of briefings on all new matters in the field of mathematics teaching.	14	70	3	15	3	15
8	I use different skills to communicate with the students inside class.	14	70	5	30	1	5
9	I can determine the most suitable method for teaching mathematics and consider the individual differences of the students.	11	55	8	40	1	5
10	I recognise the students' weaknesses in relation to learning mathematics.	13	65	5	25	2	10

From the previous Table (4-19), for the total research sample at government and private schools in relation to teachers' skills, the statements with which most agreed were as follows:

- I take notice of briefings on all new matters in the field of mathematics teaching.70%
- I have the ability to use suitable evaluation methods.75%
- I can identify the capabilities, needs and interests of the students.65%
- I use different skills to communicate with the students inside class.70%
- I recognise the students' weaknesses in relation to learning mathematics.65%

The statements which have high marks for disagree were:

- I recognise the educational and behavioural issues for the students concerning mathematical subjects.50%
- I can stimulate the students to learn mathematics.50%

4. Frequency analysis tables for the mathematics curriculum for all 20 teachers

Table (4-20)

Frequencies and percentages for the mathematics curriculum on the level of the total research sample

No	Statement	Agree		Neutral		Disagree	
		F	%	F	%	F	%
1	The goals of the mathematics curriculum are clear to me.	15	75	3	15	2	10
2	The curriculum progresses from easy to difficult.	11	55	6	30	2	15
3	The curriculum deals with topics which are attractive to students.	16	80	2	10	2	10
4	The nature of the curriculum encourages investigation and questioning.	15	75	3	15	2	10
5	The mathematics curriculum includes clear examples.	11	55	4	20	5	25
6	The topics of the mathematics curriculum are suitable for the students.	12	60	4	20	4	20
7	Students find the images, printing and typesetting of the textbooks attractive.	12	60	4	20	4	20
8	Students find the curriculum hard to understand.	16	80	2	10	2	10
9	I find it difficult to explain the curriculum to the students.	14	70	6	30	--	--

No	Statement	Agree		Neutral		Disagree	
10	The curriculum is suitable for the students at this level.	15	75	5	20	--	--

From Table (4-20), the statements with which most agree were:

- The curriculum is suitable for the students at this level.75%
- The curriculum deals with topics which are attractive to students.80%
- The nature of the curriculum encourages investigation and questioning.75%
- I find it difficult to explain the curriculum to the students.70%
- The goals of the mathematics curriculum are clear to me.75%
- Students find the curriculum hard to understand.80%

The statements most disagreed with were:

- The curriculum progresses from easy to difficult.55%
- The mathematics curriculum includes clear examples.55%

5. Frequency analysis tables for the components of the educational and scholastic environment for all 20 teachers

Table (4-21)

Frequencies and percentages of the components of the educational and scholastic environment on the level of the total research sample

No	Statement	Agree		Neutral		Disagree	
		F	%	F	%	F	%
1	All teachers take part in the process of planning and arranging the work together with the school administration.	12	60	7	35	1	5

2	There are clear criteria for evaluating school performance.	8	40	10	50	2	10
3	Educational resources appropriate for the teaching process are available.	12	60	6	30	2	10
4	The school administration encourages teachers to work harder.	12	60	5	25	3	15
5	Supervisors work with inspectors to solve teachers' problems.	9	45	7	35	4	20
6	All facilities related to the educational process are available at school.	13	65	4	20	3	15
7	The school administration considers ongoing development of teachers' competencies.	9	45	8	40	3	15
8	Good communications exist between principal and teachers.	7	35	6	30	7	35
9	Teachers play a part in solving the school's problems.	9	45	4	20	7	35
10	The style of school administration contributes to the lifting of teachers' morale.	15	75	4	20	1	5

From Table (4-21), the statements with which most agree were:

- The school administration encourages teachers to work harder.60%
- The style of school administration contributes to the lifting of teachers' morale.75%
- Educational resources appropriate for the teaching process are available.60%
- All facilities related to the educational process are available at school.65%
- All teachers take part in the process of planning and arranging the work together with the school administration. 60%

On the other hand, the statements with which most disagreed were:

- Good communications exist between principal and teachers.35%
- There are clear criteria for evaluating school performance.40%
- Teachers play a part in solving the school's problems.45%
- Supervisors work with inspectors to solve teachers' problems.45%
- The school administration considers ongoing development of teachers' competencies. 45%

Frequency analysis tables for the comparison between government and private schools

In this analysis, I will indicate to the frequencies and percentages statistical results of the research tool between government and private schools, as we'll explain in the hereafter:

1. Frequency analysis tables for the methods of mathematics teaching, comparing government and private schools

Table (4-22)
Frequencies and percentages for the attributes and characteristics of the methods of mathematics teaching

No	Statement	Government schools						Private schools					
		Agree		Neutral		Disagree		Agree		Neutral		Disagree	
		F	%	F	%	F	%	F	%	F	%	F	%
1	I'm still looking for a better method of teaching mathematics.	5	50	2	20	3	30	9	90	1	10	--	--
2	The teaching method focuses on increasing the students' awareness about the mathematical subjects.	9	90	1	10	--	--	10	100	--	--	--	--
3	The method of teaching mathematics contributes to providing students with the concepts, the basics of numbers and figures, and with mathematics operations.	7	70	1	10	2	20	10	100	--	--	--	--
4	The method of teaching mathematics aims to develop the students' positive attitudes towards about mathematics.	5	50	2	20	3	30	8	80	2	20	--	--
5	I use different teaching methods when teaching mathematics.	7	70	2	20	1	20	9	90	1	10	--	--
6	The method of teaching mathematics helps to build the thinking abilities of the students.	8	80	1	10	1	10	8	80	1	10	1	10
7	The method of teaching builds a stimulating atmosphere for the students.	10	100	--	--	--	--	9	90	1	10	--	--
8	I start a dialogue with the students about the mathematical topics.	7	70	3	30	--	--	8	80	2	20	--	--
9	The method of teaching contains questions that are asked of the students when teaching.	10	100	--	--	--	--	9	90	1	10	--	--
10	The method of teaching takes into account various	7	70	2	20	1	10	8	80	2	20	--	--

No	Statement	Government schools						Private schools					
		Agree		Neutral		Disagree		Agree		Neutral		Disagree	
	principles of teaching and learning.												
11	The method of mathematics teaching considers transition from easy to difficult issues.	8	80	2	20	--	--	7	70	2	20	1	10
12	The method of teaching focuses on achieving students' understanding of the subject.	6	60	4	40	--	--	9	90	1	10	--	--
13	When I teach mathematics, I have clear steps to follow.	9	90	1	10	--	--	9	90	1	10	--	--
14	The method of teaching mathematics focuses on providing new ideas .	8	80	2	20	--	--	9	90	1	10	--	--
15	When teaching mathematics, I use different types of discussion with students.	6	60	3	30	1	10	9	90	--	--	1	10
16	I plan for teaching mathematics before entering the classroom.	7	70	1	10	2	20	9	90	--	--	1	10
17	When teaching mathematics, I allow students enough time to answer the questions.	5	50	5	50	--	--	9	90	1	10	--	--
18	I use a method for teaching mathematics which fosters new behaviours in the students.	5	50	5	50	--	--	8	80	1	10	1	10
19	I use a method that is based on clarification and explanation of the mathematical information.	3	30	5	50	2	20	7	70	1	10	2	20
20	I give the students lots of questions and exercises.	3	20	6	60	1	10	9	90	1	10	--	--

From Table (4-22), the statements with which most agree are as follows:

For government schools:

- The method of teaching builds a stimulating atmosphere for the students.100%
- The method of teaching contains questions that are asked of the students when teaching.100%

- The teaching method focuses on increasing the students' awareness about the mathematical subjects.90%
- When I teach mathematics, I have clear steps to follow.90%
- The method of teaching mathematics helps to build the thinking abilities of the students.80%
- The method of teaching mathematics focuses on providing new ideas.80%

For private schools:

- I'm still looking for a better method of teaching mathematics.90%
- The teaching method focuses on increasing the students' awareness about the mathematical subjects.100%
- The method of teaching mathematics contributes to providing students with the concepts, the basics of numbers and figures, and with mathematics operations.100%
- I use different teaching methods when teaching mathematics.90%
- The method of teaching builds a stimulating atmosphere for the students.90%
- The method of teaching contains questions that are asked of the students when teaching.90%
- The method of teaching focuses on achieving students' understanding of the subject.90%
- When I teach mathematics, I have clear steps to follow.90%
- The method of teaching mathematics focuses on providing new ideas.90%
- When teaching mathematics, I use different types of discussion with students.90%
- I plan for teaching mathematics before entering the classroom.90%
- When teaching mathematics, I allow students enough time to answer the questions.90%
- I give the students lots of questions and exercises.90%

The statements with which most disagree at government schools are:

- I'm still looking for a better method of teaching mathematics.30%
- The method of teaching mathematics aims to develop the students' positive attitudes towards mathematics.30%
- The method of teaching mathematics contributes to providing students with the concepts, the basics of numbers and figures, and with mathematics operations.20%
- I use different methods when teaching mathematics.20%
- I plan for teaching mathematics before entering the classroom.20%
- I use a method that is based on clarification and explanation of the mathematical information.20%

The statements with which most disagree at private schools are:

- I use a method that is based on clarification and explanation of the mathematical information.20%

2. Frequency analysis tables for the teachers' perception of the students' achievement comparing government and private primary schools

Table (4-23)

Frequencies and percentages for the teachers' perception of the students' achievement comparing government and private primary schools

No	Statement	Government schools						Private schools					
		Agree		Neutral		Disagree		Agree		Neutral		Disagree	
		F	%	F	%	F	%	F	%	F	%	F	%
1	Most of the students have the desire and the ability to learn mathematics.	8	80	2	20	--	--	4	40	3	30	3	30
2	There are a great number of students whose knowledge about mathematics has been developed day after day.	5	50	3	30	2	20	9	90	1	10	--	--
3	There are a great number of students who have the necessary skills to read and interpret the mathematics topics.	4	40	6	60	--	--	9	90	1	10	--	--
4	There are a great number of students who master mathematical	6	60	3	30	1	10	7	70	2	20	1	10

No	Statement	Government schools						Private schools					
		Agree		Neutral		Disagree		Agree		Neutral		Disagree	
	operations.												
5	I spend a long time explaining the topics to students.	7	70	2	20	1	10	3	30	5	50	2	20
6	Students achieve concrete completion that appears on their behaviour according mathematics subject.	7	70	3	30	--	--	4	40	2	20	4	40
7	In many cases, students ask for further explanation of some subjects.	4	40	5	50	1	10	2	20	3	30	5	50
8	Students need more time to accommodate mathematical issues.	5	50	3	30	2	20	8	80	1	10	1	10
9	There is always a great disparity between the students' marks.	5	50	3	30	2	20	2	20	7	70	1	10
10	I put a great deal of effort into explaining the lessons but without fruitful results.	5	50	4	40	1	10	2	20	4	40	4	40

From the previous Table (4-23)

The statements with which most agree at government schools are:

- Most of the students have the desire and the ability to learn mathematics.80%
- I spend a long time explaining the topics to students.70%
- Students achieve concrete completion that appears on their behaviour according mathematics subject.70%

The statements with which most agree at private schools are:

- There are a great number of students whose knowledge about mathematics has been developed day after day.90%
- There are a great number of students who have the necessary skills to read and interpret the mathematics topics.90%
- There are a great number of students who master mathematical operations.70%
- Students need more time to accommodate mathematical issues.80%

The statements with which most disagree at government schools are:

- There are a great number of students whose knowledge about mathematics has been developed day after day.20%
- Students need more time to accommodate mathematical issues.20%
- There is always a great disparity between the students' marks.20%

The statements with which most disagree at private schools are:

- Most of the students have the desire and the ability to learn mathematics.30%
- Students achieve concrete completion that appears on their behaviour according mathematics subject.40%
- In many cases, students ask for further explanation of some subjects.50%
- I spend a long time explaining the topics to students.20%
- I put a great deal of effort into explaining the lessons but without fruitful results.40%

3. Frequency analysis tables for teachers' skills comparing government and private primary schools

Table (4-24)

Frequencies and percentages for teachers' skills comparing government and private primary schools

No	Statement	Government schools						Private schools					
		Agree		Neutral		Disagree		Agree		Neutral		Disagree	
		F	%	F	%	F	%	F	%	F	%	F	%
1	I have the ability to discover individual differences between students concerning mathematical issues.	4	40	3	30	3	30	8	80	2	20	--	--
2	I recognise the educational and behavioural issues for the students concerning mathematical subjects.	5	50	4	40	1	10	5	50	2	20	3	30
3	I have the ability to use suitable evaluation methods.	8	80	1	10	1	10	7	70	2	20	1	10
4	I can identify the capabilities, needs and interests of the students.	5	50	3	30	2	20	8	80	2	20	--	--
5	I can use many different educational aids to teach mathematics.	4	40	1	10	5	50	7	70	3	30	--	--
6	I can stimulate the students to learn mathematics.	3	30	3	30	4	40	7	70	3	30	--	--
7	I take notice of briefings on all new matters in the field of mathematics teaching.	6	60	2	20	2	20	8	80	1	10	1	10
8	I use different skills to communicate with the students inside class.	8	80	1	10	1	10	6	60	4	40	--	--

No	Statement	Government schools						Private schools					
		Agree		Neutral		Disagree		Agree		Neutral		Disagree	
9	I can determine the most suitable method for teaching mathematics and consider the individual differences of the students.	7	70	3	30	--	--	4	40	5	50	1	10
10	I recognise the students' weaknesses in relation to learning mathematics.	6	60	3	30	1	10	7	70	2	20	1	10

The statements with which most agree at government schools are:

- I have the ability to use suitable evaluation methods.80%
- I use different skills to communicate with the students inside class.80%
- I can determine the most suitable method for teaching mathematics and consider the individual differences of the students.70%

The statements with which most agree at private schools are:

- I have the ability to discover individual differences between students concerning mathematical issues.80%

- I have the ability to use suitable evaluation methods.70%
- I can identify the capabilities, needs and interests of the students.80%
- I can use many different educational aids to teach mathematics.70%
- I can stimulate the students to learn mathematics.70%
- I take notice of briefings on all new matters in the field of mathematics teaching.80%
- I recognise the students' weaknesses in relation to learning mathematics.70%

The statements with which most disagree at government schools are:

- I have the ability to discover individual differences between students concerning mathematical issues.30%
- I can use many different educational aids to teach mathematics.50%
- I can stimulate the students to learn mathematics.40%
- I can identify the capabilities, needs and interests of the students.20%
- I take notice of briefings on all new matters in the field of mathematics teaching.20%

The statements with which most disagree at private schools are:

- I recognise the educational and behavioural issues for the students concerning mathematical subjects.30%

4. Frequency analysis tables for the mathematics curriculum comparing government and private primary schools

Table (4-25)

Frequencies and percentages for the mathematics curriculum comparing government and private primary schools

No	Statement	Government schools						Private schools					
		Agree		Neutral		Disagree		Agree		Neutral		Disagree	
		F	%	F	%	F	%	F	%	F	%	F	%
1	The goals of the mathematics curriculum are clear to me.	7	70	2	20	1	10	8	80	1	10	1	10
2	The curriculum progresses from easy to difficult.	2	20	6	60	2	20	9	90	1	10	--	--
3	The curriculum deals with topics which are attractive to students.	8	80	1	10	1	10	8	80	1	10	1	10
4	The nature of the curriculum encourages investigation and questioning.	8	80	1	10	1	10	7	70	2	20	1	10
5	The mathematics curriculum includes clear examples.	3	30	3	30	4	40	8	80	1	10	1	10
6	The topics of the mathematics curriculum are suitable for the students.	4	40	3	30	3	30	8	80	1	10	1	10

No	Statement	Government schools						Private schools					
		Agree		Neutral		Disagree		Agree		Neutral		Disagree	
7	Students find the images, printing and typesetting of the textbooks attractive.	5	50	1	10	4	40	7	70	3	30	--	--
8	Students find the curriculum hard to understand.	9	90	1	10	--	--	7	70	1	10	2	20
9	I find it difficult to explain the curriculum to the students.	5	50	5	50	--	--	9	90	1	10	--	--
10	The curriculum is suitable for the students at this level.	6	60	4	40	--	--	9	90	1	10	--	--

The statements with which most agree at government schools are:

- The goals of the mathematics curriculum are clear to me.70%
- The curriculum deals with topics which are attractive to students.80%
- The nature of the curriculum encourages investigation and questioning.80%
- Students find the curriculum hard to understand.90%

The statements with which most agree at private schools are:

- The goals of the mathematics curriculum are clear to me.80%
- The curriculum progresses from easy to difficult.90%
- The curriculum deals with topics which are attractive to students.80%
- The mathematics curriculum includes clear examples.80%
- The topics of the mathematics curriculum are suitable for the students.80%
- I find it difficult to explain the curriculum to the students.90%
- The curriculum is suitable for the students at this level.90%

The statements with which most disagree at government schools are:

- The mathematics curriculum includes clear examples.40%
- The topics of the mathematics curriculum are suitable for the students.30%
- Students find the images, printing and typesetting of the textbooks attractive.40%
- The curriculum progresses from easy to difficult.20%

The statements with which most disagree at private schools are:

- Students find the curriculum hard to understand.20%

5. Frequency analysis tables for the components of the educational and scholastic environment comparing government and private primary schools

Table (4-26)

Frequencies and percentages for the components of the educational and scholastic environment comparing government and private primary schools

No	Statement	Government schools						Private schools					
		Agree		Neutral		Disagree		Agree		Neutral		Disagree	
		F	%	F	%	F	%	F	%	F	%	F	%
1	All teachers take part in the process of planning and arranging the work together with the school administration.	7	70	3	30	--	--	5	50	4	40	1	10
2	There are clear criteria for evaluating school performance.	1	10	7	70	2	20	7	70	3	30	--	--
3	Educational resources appropriate for the teaching process are available.	4	40	5	50	1	10	8	80	1	10	1	10
4	The school administration encourages teachers to work harder.	5	50	4	40	1	10	7	70	1	10	2	20

No	Statement	Government schools						Private schools					
		Agree		Neutral		Disagree		Agree		Neutral		Disagree	
5	Supervisors work with inspectors to solve teachers' problems.	2	20	5	50	3	30	7	70	2	20	1	10
6	All facilities related to the educational process are available at school.	5	50	2	20	3	30	8	80	2	20	--	--
7	The school administration considers ongoing development of teachers' competencies.	5	50	3	30	2	20	4	40	5	50	1	10
8	Good communications exist between principal and teachers.	3	30	2	20	5	50	4	40	4	40	2	20
9	Teachers play a part in solving the school's problems.	2	20	3	30	5	50	7	70	1	10	2	20
10	The style of school administration contributes to the lifting of teachers' morale.	8	80	2	20	--	--	7	70	2	20	1	10

The statements with which most agree at government schools are:

- All teachers take part in the process of planning and arranging the work together with the school administration.70%
- The style of school administration contributes to the lifting of teachers' morale.80%

The statements with which most agree at private schools are:

- There are clear criteria for evaluating school performance.70%
- Educational resources appropriate for the teaching process are available.80%
- The school administration encourages teachers to work harder.70%
- Supervisors work with inspectors to solve teachers' problems.70%
- All facilities related to the educational process are available at school.80%
- Teachers play a part in solving the school's problems.70%
- The style of school administration contributes to the lifting of teachers' morale.70%

The statements with which most disagree at government schools are:

- Supervisors work with inspectors to solve teachers' problems.30%
- All facilities related to the educational process are available at school.30%
- Good communications exist between principal and teachers.50%
- Teachers play a part in solving the school's problems.50%

The statements with which most disagree at private schools are:

- The school administration encourages teachers to work harder.20%
- Good communications exist between principal and teachers.20%
- Teachers play a part in solving the school's problems.20%

Results of the T-test for the differences between government and private schools

This analysis looks at the differences between government and private schools in terms of the research questions set out in the first chapter of the study, namely:

1. There are statistically significant differences in the properties and attributes of the methods of teaching mathematics in the fifth primary grade of government and private schools.
2. There are statistically significant differences in the teachers' perception of students' achievement and factors affecting it concerning mathematics in the fifth primary grade of government and private schools.
3. There are statistically significant differences in the teachers' mathematics skills in the fifth primary grade of government and private schools.
4. There are statistically significant differences in the nature of the mathematics curriculum in the fifth primary grade of government and private schools.
5. There are statistically significant differences in the educational and scholastic environment components and features which are influential in the teaching methods and the students' achievement in mathematics in the fifth primary grade of government and private schools in Kuwait.
6. There are statistically significant differences in the degree of students' mathematics achievement in the fifth primary grade of government and private schools in Kuwait.

The T-test will be used to analyse the first five questions. For the sixth question, the study turns to lists of fifth primary grade students' marks; (50) students at government schools and (30) at private schools. This will be explained in detail after a discussion of the T-test.

Table (4-27)

T-test for the differences between government and private schools in terms of the properties and attributes of the methods of teaching mathematics

Theme	Sample	n	d.f	Mean	Std.	T value	Sig. *
Properties and attributes of the methods of teaching mathematics	G.S.	10	18	2.59	0.18	2.958	0.008**
	P.S.	10		2.81	0.15		

** Statistical significance at confidence level 1%

The previous Table (4-27) measures the extent of the statistically significant differences between the government and private schools concerning the properties and attributes of methods of teaching mathematics in the fifth primary grade. The value of 't' is 2.958 and the value of Sig. is 0.008 at a confidence level of 1%. This means there are significant differences between government and private schools with respect to the properties and attributes of methods of teaching mathematics in the fifth primary grade.

The above table also shows that the mean is equal to 2.59 and the standard deviation to 0.18 in the government schools. On the other hand, in private schools the mean value is 2.81 with a standard deviation of 0.15. This means that the differences are in favour of the private schools which have a high mean value compared to the mean value of the governmental schools for the properties and attributes of methods of teaching mathematics.

This means that the first hypothesis is proven; it is accepted that there are statistically significant individual differences for the properties and attributes of the methods of teaching mathematics in the fifth primary grade of government and private schools.

Table (4-28)

T-test for the differences between government and private schools in terms of the teachers' perception of the students' achievement in mathematics

Theme	Sample	n	d.f	Mean	Std.	T value	Sig. *
The teachers' perception of the students' achievement in mathematics	G.S.	10	18	2.40	0.29	0.418	0.680
	P.S.	10		2.35	0.24		

* Statistical significance at confidence level 5%

The previous Table (4-28) measures the extent of the differences between the government and private schools concerning the teachers' perception of the students' achievement in mathematics in the fifth primary grade. The value of 't' is 0.418 and the value of Sig. is 0.680 at a confidence level of 5%. So there are no statistically significant differences between government and private schools with respect to the teachers' perception of the students' achievement in mathematics.

From the above table it appears that the mean value is 2.40 and the standard deviation 0.29 in the government schools. On the other hand, in private schools the mean value is 2.35 and the standard deviation 0.24. This means that there are no differences between government and private schools in terms of the teachers' perception of the students' achievement in mathematics. This means that the second hypothesis is not proven; I reject the hypothesis that there are significant differences in the teachers' perception of students' achievement and factors affecting it concerning mathematics in the fifth primary grade of government and private schools.

Table (4-29)

T-test for the differences between government and private schools in terms of teachers' skills

Theme	Sample	n	d.f	Mean	Std.	T value	Sig. *
Teachers' skills	G.S.	10	18	2.36	0.34	1.922	0.070
	P.S.	10		2.60	0.18		

* Statistical significance at confidence level 5%

The previous Table (4-29) measures the extent of the differences between the government and private schools concerning the teachers' skills. The value of 't' is 1.922, and the value of Sig. is 0.070 at a confidence level of 5%. So, there are no statistically significant differences between government and private schools with respect to the teachers' skills.

The table shows that the mean value is 2.36 and the standard deviation 0.34 in the government schools. On the other hand, in private schools the mean value is 2.60 and the standard deviation 0.18. This means that there are no differences between governmental and private schools in terms of teachers' skills.

This means that the third hypothesis is not proven; we reject the hypothesis that there are significant differences in the teachers' skills and factors affecting them concerning mathematics in the fifth primary grade of government and private schools.

Table (4-30)

T-test for the differences between government and private schools in terms of the mathematics curriculum

Theme	Sample	n	d.f	Mean	Std.	T value	Sig. *
Mathematics curriculum	G.S.	10	18	2.41	0.22	2.939	0.008**
	P.S.	10		2.71	0.22		

** Statistical significance at confidence level 1%

The previous Table (4-30) measures the extent of the differences between the government and private schools concerning the mathematics curriculum in the fifth primary grade. The value of 't' is 2.939 and the value of Sig. is 0.008, at a confidence level of 1%. So, there are statistically significant differences indicated between government and private schools with respect to the mathematics curriculum.

The table shows that the mean value is 2.41 and the standard deviation 0.22 in the government schools. On the other hand, in private schools the mean value is 2.71 and the standard deviation 0.22. This means that the differences are in favour of the private schools which have a high mean value when compared to the mean of the government schools with respect to the mathematics curriculum.

This means that the fourth hypothesis is proven; there are individual statistically significant differences in the nature of the mathematics curriculum in the fifth primary grade of government and private schools.

Table (4-31)

T-test for the differences between government and private schools in terms of the components of the educational and scholastic environment

Theme	Sample	n	d.f	Mean	Std.	T value	Sig. *
Components of the educational and scholastic environment	G.S.	10	18	1.96	0.30	2.258	0.037*
	P.S.	10		2.26	0.28		

* Statistical significance at confidence level 5%

The previous Table (4-31) measures the extent of the differences between the government and private schools concerning the components of the educational and scholastic environment. The value of 't' is 2.258 and the value of Sig. is 0.037 at a confidence level of 5%. So, there are statistically significant differences between government and private schools with respect to the components of the educational and scholastic environment.

The table shows that the mean value is 1.96 and the standard deviation 0.30 in the government schools. On the other hand, in private schools the mean value is 2.26 and the standard deviation 0.28. This means that the differences are in favour of the private schools which have a high mean value when compared with the mean value of the government schools with respect to the components of the educational and scholastic environment.

This means that the fifth hypothesis is proven; there are individual statistically significant differences between the components of the educational and scholastic environment in the fifth primary grade of government and private schools.

The results of the analysis and study of the students' achievement in mathematics in the fifth primary grade at government and private schools from the students' mark lists of the final term of the year 2009/2010

In this analysis, students' achievement in mathematics in the fifth primary grade at government and private schools was measured by returning to the students' mark lists for the final term of the year 2009/2010. The measurement process was as follows:

1. I looked at the students' mark lists of 2 government schools where the system of education was one of separate primary schools for boys and girls. I collected the marks of (25) schoolboys from the boys' school and of (25) schoolgirls from the girls' school, giving a total of 50 schoolchildren in the total sample for government schools. This was a larger sample than that of the private school because the number of students in government classes is bigger than in private classes.
2. I looked at the students' mark lists of 1 private school with classes for both boys and girls. I collected the marks of (15) schoolboys in the fifth primary grade and those of (15) schoolgirls from a girls' class at the same school.
3. The students' marks were divided into four categories (these were taken from the mathematics achievement the unified test in the final term). The overall score of the test is 50 marks.
 - The first category (10 - 20 marks)
 - The second category (21 - 30 marks)
 - The third category (31 - 40 marks)
 - The fourth category (41 - 50 marks)
4. Use frequencies analysis throw "SPSS" to the categories of the students' marks to calculate the frequencies and percentages.

This was in order to calculate the frequencies and percentages of the categories of the students' marks at private and government schools.

The next table indicates the categories of the students' marks, with frequencies and percentages, for government and private schools.

Table (4-32)

Distribution of the categories of the students' achievement marks in the fifth primary grade in mathematics comparing government and private schools

No.	Categories of the students' achievement marks	Government schools (2 schools)				Private schools (1 school)			
		Boys' school (1 Class)		Girls' school (1 Class)		Boys' Class (1 private school)		Girls' Class (same private school)	
		Frequencies	%	Frequencies	%	Frequencies	%	Frequencies	%
1	10 - 20	3	12	5	20	1	6.6	---	---
2	21 - 30	9	36	11	44	4	26.7	5	33.3
3	31 - 40	5	20	3	12	4	26.7	6	40
4	41 - 50	8	32	6	24	6	40	4	26.7
	Total	25	100	25	100	15	100	15	100

From the above Table (4-32), the students' achievement marks at government and private schools were distributed across the marks categories as follows:

Government schools

The largest category at the boys' school is (21 – 30) at 36%, the next category is (41 – 50) at 32%. On the other hand, at the girls' school, the largest rate is category (21 – 30) at 44%, followed by category (41 – 50) at 24%.

Private schools

The largest category at the boys' school is (41 – 50) at 40%, followed by (21 – 30) and (31-40) which are joint second at 26.7%. Category (10 – 20) is at 6.6%. At the girls' school, the categories were (31 – 40) at 40%, (21 – 30) at 33%, and (41– 50) at 26.7%.

Table (4-33)

Distribution of the categories of the students' achievement marks in the fifth primary grade in mathematics comparing government and private schools

No.	Categories of the students' achievement marks	Government schools		Private schools	
		Frequencies	%	Frequencies	%
1	10 – 20	8	16	1	3.33
2	21 – 30	20	40	9	30
3	31 – 40	8	16	10	33.33
4	41 – 50	14	28	10	33.33
	Total	50	100	30	100

From the above Table (4-33), the students' achievement marks at government and private schools were distributed across the marks categories as follows:

Government schools

The largest category for government schools is (21 – 30) at 40%, the next category is (41 – 50) at 28%. On the other hand, the lowest rate, at 16%, is the same for categories (31 – 40) and (10 – 20).

Private schools

The largest categories for private schools were (41 – 50) and (31 – 40), both at 33.33%, followed by (21 – 30) at 30%. The smallest was category (10 – 20) at 3.33%.

T-test for the differences between government and private schools in terms of the students' achievement marks in the fifth primary grade in mathematics

Table (4-34)

T-test for the differences between government and private schools in terms of the students' achievement marks in the fifth primary grade in mathematics

Theme	Sample	n	d.f	Mean	Std.	T value	Sig. *
Students' achievement marks	G.S.M.	50	19	2.56	1.07	12.441	0.000**
	P.S.M.	30		2.97	.90		

The previous Table (4-34) measures the extent of the differences between the government and private schools concerning the students' achievement marks in the fifth primary grade in mathematics. The value of 't' is 12.441 and the value of Sig. is 0.000 at a confidence level of 1%. So, there are statistically significant differences

between government and private schools with respect to the students' achievement marks.

The above table shows that the mean value is 2.56 with a standard deviation of 1.07 in the government schools. On the other hand, in private schools the mean value is 2.97 with a standard deviation of .90. This means that the differences are in favour of the private schools which have a high mean compared to the mean value in government schools with respect to the students' achievement marks.

This means that the sixth hypothesis is proven; there are individual statistically significant differences between the students' achievement in the fifth primary grade of government and private schools.

Summary

This chapter referred to the statistical analysis and the statistical study results and characteristics of the research sample in the public and private schools in terms of gender, age, years of experience and academic level. It then highlighted the frequency results and the percentages of the study elements, including: mathematics teaching methods, teachers' perception of students' achievement, teachers' skills, the mathematics curriculum, and the components of the educational and scholastic environment at the level of the total elements of the sample. The chapter then compared the public and private schools at the level of each element, referring to 't' test results to explain the differences between public and private schools in terms of mathematics teaching methods, teachers' perception of students' achievement, teachers' skills, the mathematics curriculum, and the components of the educational and scholastic environment. It then highlighted the results of measurement of the students' achievement in mathematics in the fifth primary grade in the public and private schools. It relied for this measurement on the students' scores and conducted a comparison between the levels of scores. Finally, it compared the public and private schools at the level of the students' scores, and referred to the results of the 't' test to explain the differences between public and private schools in the students' scores.

CHAPTER FIVE

DISCUSSION OF THE RESULTS

Introduction

In this chapter, I explain the statistical results produced in Chapter (4). I attempt to explain the results according to each of the research tool elements, compare those of the cluster random sample as a whole, and discuss them in the context of public and private schools.

I analyse and discuss the results at the level of the six assumptions of the study, and will analyse and discuss the same through the results of the T-test. In this regard, I refer to the following:

First assumption test

The assumption was that there are statistically significant differences for the properties and attributes of the methods of teaching mathematics in the fifth primary grade of government and private schools.

Through the study and analysis of the first assumption test and through the T-test, the results in table (4-27) showed certain statistical differences between public and private schools in terms of the characteristics and features of methods of mathematics teaching to the fifth primary grade, as the "sig" value was found to be equal to (0.008) where the "t" value equals (2.958). The differences are in favour of the private schools which have a high mean value equal to (2.81) with standard deviation equal to (0.15), against the government schools which have a mean value equal to (2.59) with standard deviation of (0.18).

These differences are in favour of the private schools which adopt advanced teaching methods that focus on helping students to understand mathematics, encouraging them to understand the topics of the subject and providing various questions to explain the mathematics. Public schools, however, lack the methods

which enhance the development of students' knowledge of mathematical topics. This led to these differences and to the distinction of private schools in terms of methods of teaching mathematics to the fifth primary grade when compared to public schools. This is in agreement with Jiban and Deno (2007); Good and Brophy (1987) and Renzo (2010).

From table (4-22) which refers to the frequency results and statistical percentages for the element characteristics and features of mathematics teaching methods obtained from a comparison of the opinions of public and private school teachers, it is found that the public schools adopt teaching methods which create a learning environment that motivates students to read and understand mathematical subjects while asking questions during the teaching process. In such schools, the teaching methods depend on clear procedures, and foster the students' ability to think and provide them with new ideas.

Table (4-22) shows that the mathematics teaching methods at public school in fifth primary grade involve some deficiencies and weakness including the teachers' inconsistency in planning the teaching method before starting an explanation of the lesson and their failure either to clarify or to simplify the mathematical information. This agrees with Altammar (1991). In addition teachers used various methods of mathematics teaching and relied on typical teaching approaches.

As for the methods of teaching mathematics to fifth primary stage in private schools, table (4-22) shows that the teachers develop mathematics teaching methods, and that the methods depend on the growth of students' understanding and achievement of mathematics. It shows also that the mathematics teaching methods in private schools focus on helping the students' understanding of the mathematical operations and knowing mathematical figures and symbols. Moreover, the mathematics teaching methods in private schools motivate students and encourage them to read and understand the subject.

In addition, methods of teaching mathematics to private school fifth primary students rely on asking various questions of students and ensuring their

understanding of mathematics. Furthermore, teachers have clear plans to teach mathematical topics and adopt various methods to discuss these topics with students. Teachers in private schools try to allow sufficient time for students to understand mathematical topics and answer the questions asked in the classroom while asking students many questions which enable them to increase their perception and understanding of the subject.

Table (4-22) shows that the methods of teaching mathematics to private school fifth primary grade are lacking in the enhancement of students' abilities to develop mathematics-related information, and focus only on the topics of the mathematics curriculum without either providing additional information or explaining additional topics.

Second assumption test

The assumption was that there are statistically significant differences in the teachers' perception of the students' achievement and factors affecting it concerning mathematics in the fifth primary grade of government and private schools.

Through the study and analysis of the second assumption test and through the T-test, the results in table (4-28) showed no statistical differences between public and private schools in terms of the teachers' perception of the factors affecting fifth primary grade students' achievement of mathematics. The "t" value equals (0.418) and the value of Sig. equals (0.680), with mean value equal to (2.40) and standard deviation equal to (0.29) in government schools, against the private schools which have a mean value equal to (2.35) with a standard deviation of (0.24). Through a comparison between public and private schools with regard to the element of teachers' perception of the students' achievement, and table (4-23), it was found that, in public schools, teachers concentrate on knowledge of skills and students' abilities in mathematics. In addition, teachers' perception of the students' achievement in public schools depends on the observation of the students' behaviour towards the

mathematics topics and their interest in this subject. This is in agreement with Gavin et al. (2009) and Jennings and Diprete (2010).

Table (4-23) shows some weaknesses and deficiencies in the teachers' perception of the fifth primary grade students' achievement in public schools, as such schools concentrate on the teachers' efforts without achieving appropriate results in students' performance which reflect these efforts. Such schools do not pay attention to the day to day growth of students' development in mathematics, while the teachers are not interested in observing the time students take to understand mathematics and solve mathematical problems.

Weaknesses in the public schools with regard to the teachers' perception of the students' achievement in mathematics are reflected in the teachers' failure to observe the development of the number of students who can conduct calculation operations.

As for the private schools and the teachers' perception of students' achievement therein, table (4-23) shows that the teachers' perception of the students' achievement is concentrated in the observation of the development of students' abilities in the knowledge of mathematics and the development of the students' reading skills, as well as the observation of students whose ability to read and understand mathematical topics and to conduct calculation operations are developed, in addition to the observation of the students who need more time to understand mathematical topics. This is in agreement with Ayoob (2007); Renzo (2010) and Harnstra et al. (2010).

Table (4-23) shows some weaknesses and deficiencies in the private school teachers' perception of students' achievement. Such weaknesses and deficiencies include the non observation of students' behaviour towards the achievement of mathematics and non observation of students who ask for further explanation of certain mathematical topics as well as the non observation of the time needed for the explanation of some subjects so that students will understand.

Third assumption test

The assumption was that there are statistically significant differences in the teachers' skills in the fifth primary grade of government and private schools.

Through the study and analysis of the third assumption test and through the T-test, the results in table (4-29) showed no statistical differences between the public and private schools in terms of the fifth primary grade teachers' skills, as the "sig" value was found to be equal to (0.070). The "t" value was equal to (1.922), with a mean value equal to (2.36) and standard deviation equal to (0.34) in government schools, against the private schools which had a mean value equal to (2.60) and a standard deviation of (0.18).

Comparison of the results concerning the elements of teachers' skills in public and private schools in the State of Kuwait, together with the results in, table (4-24) shows that the teachers in public schools have the skills to use appropriate methods to evaluate the teaching of methods, and good communication skills with students in the classroom. In addition, teachers in public schools have the skills to identify appropriate mathematics teaching methods which take into account the individual differences among students in understanding and achievement of mathematics.

Table (4-24) shows also that public school teachers' skills involve some weaknesses reflected in low-level skill and ability to identify the students who are capable of learning mathematics rapidly and low-level skill in identifying the students' needs in mathematics. In addition, teachers have low-level skills when it comes to learning new methods of teaching mathematics to primary stage children.

With regard to the private school teachers' skills, table (4-24) and the study and analysis of statistical results of frequencies and percentages showed that teachers have the skill and ability to identify individual differences among students as well as the skill and ability to use an appropriate method to assess the mathematics teaching. They also have good skills for identifying the students' needs in mathematical topics and follow various and proper mathematics teaching methods.

These results agree with those of Harris and Sass (2010); Mohammed (2004) and Mohini and Sulaiman (2010). Table (4-24) shows also that the private school teachers in the State of Kuwait have the skill of observing the students' level of development in learning mathematics, the skill of learning new methods of teaching mathematics and the skill of observing students' weaknesses in the achievement and understanding of mathematics.

The table shows also some weaknesses and deficiencies in the private schools teachers' skills reflected in their low-level skill in observing the students' behaviours towards mathematics understanding.

Fourth assumption test

The assumption was that there are statistically significant differences in the nature of the mathematics curriculum in the fifth primary grade of government and private schools.

Through the study and analysis of the fourth assumption test results and through the T-test and the statistical results in table (4-30), where the "t" value is equal to (2.939) and the value of Sig. is equal to (0.008**), which indicates the existence of statistical differences because the value of Sig. < 0.05, the differences are in favour of the private schools which have a high mean value equal to (2.71) and a standard deviation equal to (0.22), against the government schools which have a mean value equal to (2.41) and a standard deviation equal to (0.22). There have been some statistical differences between public and private schools in terms of the fifth primary grade mathematics curriculum. Such differences are in favour of the private schools due to the clarity of the objectives of the mathematics curriculum to the teachers and the escalation of the curriculum topics from easy to more difficult. In addition, the mathematics curriculum in private schools contains clear topics and examples that encourage the students to understand mathematics from the point of view of private school teachers. Public school teachers, however, have some difficulties related to the progression of the curriculum from easy to more difficult

and they think that the mathematics curriculum has some weaknesses and is not suited to the nature of fifth primary grade students.

Through the study and analysis of the comparison between the public and private schools with regard to the fifth primary grade mathematics curriculum, and by reference to the frequencies and percentages of the primary public schools as shown in table (4-25), it was found that the mathematics curriculum has clear objectives. The curriculum comprises topics which attract students and encourage them to achieve in mathematics. Table (4-25) shows also some subjects which create difficulty of understanding for students and shows the low number of explanatory examples and poor progression of the curriculum from easy to more difficult. Furthermore, the mathematics curriculum is not well suited to the nature of the fifth primary grade students. This agrees with Altammar (1991).

With regard to the private primary school mathematics curriculum, table (4-25) shows that the curriculum is clear and escalates from easiness to difficulty. It shows also that the curriculum comprises clear topics and examples which attract students to understand mathematics. The table shows that the subjects of the mathematics curriculum are suitable to the fifth primary grade from the point of view of the sample of private primary school teachers. This agrees with Renzo (2010); Stein and Kaufman (2010) and Ding Rui (2007).

It was found from table (4-25) that the private primary school mathematics curriculum involved weakness due to the presence of topics which students find it difficult to understand.

Fifth assumption test

The assumption was that there are statistically significant differences in the educational and scholastic environmental components and features which are influential in the teaching methods and the students' achievement in mathematics in the fifth primary grade of government and private schools in Kuwait.

Through the study and analysis of the fifth assumption test results and through the T-test and the statistical results in table (4-31), where the "t" value is equal to (2.258) and the value of Sig. is equal to (0.037*) (which is a smaller value than 0.05), there are statistical differences, and the differences are in favour of the private schools which have a high mean value equal to (2.26) and standard deviation equal to (0.28). This is against the government schools which have a mean value equal to (1.96) with a standard deviation equal to (0.30).

This shows some statistical differences between the public and private schools in favour of the private schools, in terms of the educational and scholastic environment components affecting the teaching methods and fifth primary grade students' achievement of mathematics. This is due to the fact that the private schools have good facilities, and educational and illustrative resources which contribute to the achievement of the educational process objectives. In addition, there is an interest on the part of the school management in solving the teachers' problems and motivating them. Moreover, the school leadership tries to get the teachers involved in solving the school's problems and encourages them to make more effort in the performance of the educational and teaching process. This agrees with the findings of Midthassel (2004); Winter and Morgenthal (2002); Renzo (2010) and Ding Rui (2007).

On the other hand, we find that the public schools suffer from a weakness in terms of appropriate educational resources and facilities, the non-involvement of teachers in solving the school's problems, and a lack of communication between the school director and the teachers.

Through the study and analysis of the statistical results related to the frequencies and percentages of the educational and scholastic environmental components and a comparison between the public and private schools in the State of Kuwait, and by reference to table (4-26), it was found that the public school teachers take part in work planning and organisation and cooperate with school management. It was also found that the school management tries to motivate the teachers and encourage them to perform their duties well.

As for the weaknesses of the educational and scholastic environmental components in the public schools, table (4-26) shows a weakness in the solving of teachers' problems and a lack of proper educational resources and facilities and illustrative tools related to the educational resources, in addition to a lack of communication between the school director and teachers. Also there is low involvement of teachers in solving the problems facing the school and performance of the educational process. This agrees with Altammar (1991).

With regard to the educational and scholastic environmental components at the level of private primary schools, table (4-26) and the statistical results of frequencies and percentages show that the private schools have clear criteria for assessing school performance and have the appropriate facilities, educational and illustrative resources. It was also found that the private schools encourage teachers to exert more effort in the performance of the educational and teaching process, and that there should be cooperation between the mentor and the counsellor in solving teachers' problems. Table (4-26) showed also that private school teachers take part in solving the school problems. In addition, the management type contributes to motivating teachers. This agrees with Alghanim (1990).

The table also shows a weakness in communication methods between the school leadership and teachers.

Sixth assumption test

The assumption was that there are statistically significant differences in the degree of students' achievement in the fifth primary grade of government and private schools in Kuwait.

Through the study and analysis of the sixth assumption test results and through the T-test and the statistical results in table (4-34), where the “t” value is equal to (12.441) and the value of Sig. is equal to (0.000**) (which is a smaller value than 0.05), there are statistical differences in favour of the private schools which have a high mean value equal to (2.97) with a standard deviation equal to (.90), against the government schools which have a mean value equal to (2.56) with a standard deviation equal to (1.07).

This indicates that there are some statistical differences between the public and private schools in terms of fifth primary grade students' achievement levels in favour of the private school students, as such schools have good teaching methods and encourage improvements in students' achievement in mathematical topics, in addition to the good understanding by private school teachers of the nature and objectives of the mathematics curriculum, the availability of adequate educational resources and facilities for teaching mathematics in private schools and the school management type which encourages teachers' involvement in solving the problems of the educational process and motivates them to make more effort and develop their performance in mathematics teaching. This is in agreement with the findings of Ayooob (2007); Gavin et al. (2009); Dronkers and Robert (2008) and Renzo (2010).

I think these differences are due to some other variables which are not the subject of this analytical study. Future studies could be conducted to find out the role of such variables in creating differences between the students' achievement in mathematics in public and private schools.

Through the study and analysis of the statistical results related to the frequencies and percentages of the categories of marks of the public and private schools students, and as shown in table (4-33), it was found that the public schools

have the higher level of student achievement as an average score of (21-30) is achieved by (40%) of the total students of public schools while (28%) achieve a score average of (41 – 50).

In the case of private schools, through the study and analysis of statistical results related to the frequencies and percentages of the categories of marks of the students, and as shown in table (4-33), it was found that the highest average scores range between (31 – 40) and (41 – 50) representing (33.33%) of the total number of private school students, followed by the category of (21 – 30) marks representing 30% of the total number of private school students.

This indicator reflects a difference between public and private schools in terms of students' achievement marks as indicated in the score categories in table (4-33). This means that private schools are better than public in terms of students' achievement marks.

Summary

This chapter referred to the study results in terms of the elements on which the research relies. These are: the characteristics of the mathematics teaching methods; teachers' perception of the students' achievement; teachers' skills; the mathematics curriculum; components of the educational and scholastic environment; and the fifth primary grade students' achievement in mathematics. The latter was measured from the marks of students currently at this stage and the study and analysis of such scores to assess the differences between public and private schools.

The chapter also discussed factors related to the differences between the government and private schools, and identified the reasons for these differences, and their relationship with the literature.

It also appears from this chapter that there are statistical differences between the government and private schools concerning: the attributes and characteristics of the methods of teaching mathematics; the mathematics curriculum; the components of the educational and scholastic environment; and the students' achievement.

In addition to this, it also appears from this chapter that there are no statistical differences between the government and private schools concerning: the teachers' perception of students' achievement; and the teachers' skills.

CHAPTER SIX

CONCLUSION OF THE STUDY

This chapter is a conclusion to the study. It provides an overview of the purpose and direction of the thesis; the results of the study; the relation between these results and the literature review; the claim for a unique contribution to knowledge; methodological difficulties with the study; the validity of the research; the methods of statistical processing used in the research; study boundaries; implications, and further research. These can be described as follows.

The purpose and direction of the study

The purpose of the study can be summarised as an attempt to identify the aspects associated with teaching mathematics and students' learning through a framework for the scientific and theoretical features and properties related to: a) teaching mathematics at primary school level, b) mathematics students' achievement in connection with the attributes of an educational environment, schools and teachers, c) the nature of primary education in private and governmental schools in Kuwait, d) the differences between these in Kuwait in the light of fifth primary class teaching methods and skills, and student learning and factors that affect it.

This can be described through the following questions:

Are there actual differences between public and private schools in terms of:

- 1) Methods of teaching mathematics to the fifth primary grade?
- 2) Teachers' skills and their perception of students' achievement, the nature of the mathematics curriculum and the educational and scholastic environmental components?
- 3) Students' achievement?

The study has both theoretical and applied importance that can be described as follows:

a) The theoretical importance

The scientific importance of the study lies in the contribution of its framework which adds to our understanding of maths teaching and learning at fifth primary grade level. This framework deals with: education in Kuwait; public and private education in primary schools and the factors and elements influencing teaching methods and student achievement; the nature of mathematics as a subject; trends and factors affecting the nature of teaching mathematics as a subject; the goals of teaching mathematics; planning for teaching mathematics at the primary stage; related principles and factors in teaching mathematics; teachers' skills and abilities and their role in activating teaching methods; principles associated with the ways and methods of teaching mathematics; samples of teaching mathematics to the primary stage; teaching methods of some applications related to mathematics in primary school; methods of teaching mathematics that depend on educational activities, the open questions method and the interaction method between teacher and student; educational tools and teaching mathematics to primary stage children; the concept of student achievement and the factors and variables associated with this concept; educational administration, teachers, the scholastic atmosphere, and their role in teaching mathematics.

b) The applied importance

The study is the first of its kind in Kuwait which compares the methods of mathematics teaching in public and private schools. It also presents recommendations and suggestions for public and private schools concerning students' learning of mathematics at fifth primary grade, educational systems, the syllabus, teachers' skills, and environmental components which enhance teaching methods and improve students' learning of mathematics. The study also benefits the Ministry of Education in Kuwait because it highlights the main differences between public and private education in terms of mathematics teaching methods, students' learning, and the possibilities for development. The table below details the research assumptions, the data collected, collection methods, and techniques used for data analysis.

Table (6-1)

Hypotheses of the study	Data collected	Form of analysis used
(1) There are statistically significant differences in the properties and attributes of the methods of teaching mathematics in the fifth primary grade of government and private schools.	Questionnaire that is administered to teachers to elicit information about the methods of teaching mathematics in the fifth primary grade; a comparison between government and private schools in Kuwait.	The questionnaire results were statistically analysed in terms of percentage. In addition, T test analysis was used to measure the differences between methods of teaching mathematics in the fifth primary grade, as a comparison between government and private schools in Kuwait.
(2) There are statistically significant differences in the teachers' perception of students' achievement and factors affecting it with regard to mathematics in the fifth primary grade of government and private schools.	Questionnaire that is administered to teachers to elicit information about the teachers' perception of students' achievement in the fifth primary grade; a comparison between government and private schools in Kuwait.	The questionnaire results were statistically analysed in terms of percentage. In addition, T test analysis was used to measure the differences between teachers' perception of students' achievement in the fifth primary grade, as a comparison between government and private schools in Kuwait.
(3) There are statistically significant differences in the teachers' mathematics skills in the fifth primary grade of government and private schools.	Questionnaire that is administered to teachers to elicit information about the teachers' mathematics skills in the fifth primary grade; a comparison between government and private schools.	The questionnaire results were statistically analysed in terms of percentage. In addition, T test analysis was used to measure the differences between teachers' mathematics skills in the fifth primary grade of government and private schools.
(4) There are statistically significant differences in the	Questionnaire that is administered to	The questionnaire results were statistically

nature of the mathematics curriculum in the fifth primary grade of government and private schools.	teachers to elicit information about the mathematics curriculum in the fifth primary grade; a comparison between government and private schools.	analysed in terms of percentage. In addition, T test analysis was used to measure the differences between mathematics curricula in the fifth primary grade of government and private schools.
(5) There are statistically significant differences in the educational and scholastic environment components and features that are influential in the teaching methods and the students' achievement in mathematics in the fifth primary grade of government and private schools in Kuwait.	Questionnaire that is administered to teachers to elicit information about educational and scholastic environmental components and features which are influential in the teaching methods and the students' achievement in mathematics in the fifth primary grade; a comparison between them.	The questionnaire results were statistically analysed in terms of percentage. In addition, T test analysis was used to measure the differences between educational and scholastic environment components and features in the fifth primary grade; a comparative between government and private schools in Kuwait.
(6) There are statistically significant differences in the degree of students' mathematics achievement in the fifth primary grade of government and private schools in Kuwait.	From the pupils' marks in fifth grade elementary, which were retrieved from the results of the unified test, supervised by the Kuwaiti Ministry of Education. I obtained the files of 25 pupils from a public school for boys and of 25 pupils from a public school for girls and files of 15 pupils from a class of boys, and of 15 pupils from a class of girls from a private.	The marks were analysed in terms of percentage, and ranges of students' mathematics achievement marks. In addition, T test analysis was used to measure the differences between students' marks in fifth grade, as a comparison between government and private schools in Kuwait.

Results of the study

The most important results of the study in relation to the main focus areas are detailed below:

1- Characteristics and features of methods of teaching mathematics

Statistically meaningful differences have been found between public and private schools with regard to the mathematics teaching methods employed. These differences are in favour of the private schools which apply better teaching methods than the public schools as explained below:

- A) It was found that such methods in public schools depend on encouraging the students' reading of mathematics, launching questions during the class and providing new ideas in mathematics, and they suffer from a lack of teaching method planning on the part of the teachers and the use of traditional methods which fail to move forwards. Besides this, the teachers' report inconsistency in planning their teaching methods before starting an explanation of the lesson and fail either to clarify or to simplify the mathematical information.
- B) Whereas in private schools, it was found that they depend on the development of students' understanding and achievement of mathematics and helping them to understand the mathematical operations as well as the mathematical figures and symbols. Besides this, teachers pay attention to the planning and development of teaching methods, they focus on motivation and encouragement of students to understand mathematical topics, and launch various questions to ensure their understanding of mathematical subjects. Also, teachers have clear plans to teach mathematical topics and adopt various methods to discuss these topics with students. On the other hand, the methods of teaching mathematics to private school fifth primary grade are lacking in the enhancement of students' abilities to develop mathematics-related information, and focus only on the topics of the

mathematics curriculum without either providing additional information or explaining additional topics.

2- Teachers' perception of students' achievement in mathematics

The study results show that there are no statistical differences between the public and private schools in terms of teachers' perception of students' achievement in mathematics, as explained below:

- A) The public schools focus on the assessment of the development of students' skills in understanding mathematics and observation of development of the students' behaviour towards the mathematical topics and their interest therein. However, public school teachers' perception of students' achievement in mathematics is reflected in the lack of observation of the time taken by students to understand and solve mathematical problems in addition to a lack of interest in observing the time taken and effort made to explain the mathematical topics.
- B) The private schools focus on the observation of students' skill development with regard to knowledge and understanding of mathematics, development of the topic reading skills and completing calculation operations, in addition to the observation of time needed by students to understand the mathematical topics. However, it was found that they do not observe the students' attitude towards achievement in mathematics nor do they observe the students who ask for further explanation of the mathematical topics.

3- Teachers' skills

The study results showed no statistical differences between the public and private schools in terms of teachers' skills, as explained below:

- A) Public school teachers' skills focus on communication in the classroom and the skill of identifying teaching methods suitable to the individual variations

among students in terms of achievement in mathematics. However, skill levels, competence and use of varied teaching methods are insufficient.

B) Private school teachers' skills focus on an ability to know the individual variations among students, the use of appropriate methods to assess the mathematics curriculum, and on having the necessary skills and ability to follow various and proper methods of mathematics teaching. However, teachers' ability to observe the development of students' behaviour towards understanding mathematical topics is insufficient.

4- Curriculum topics

The study results showed some statistical differences between the public and private schools in terms of the fifth primary stage mathematics curriculum in favour of the private schools due to the clarity of the curriculum for the teachers, the progression of topics from easy to more difficult and the availability of clear examples, as explained below:

A) In public schools the curriculum topics motivate students to ask questions of teachers so that they might know and understand the topics, and that the objectives of the mathematics curriculum are clear. However, the low number of illustrative examples applied to explain the mathematics curriculum topics and the inappropriateness of the mathematics curriculum to the nature of fifth primary stage students are disadvantageous because the public curriculum does not consider individual differences between students; there are too few examples and the material is not arranged in order from easy to more difficult (Altammar, 1991).

B) In private schools, the curriculum topics have clear objectives with progression of topics from easy to more difficult, as well as clear examples that help understanding. However, the difficulty of the topics is a disadvantage.

5- The educational environmental components

The study results showed some statistical differences between the public and private schools in terms of the educational environmental components. These favoured the private schools due to the availability of convenient educational resources and facilities for the proper performance of educational process, the distinctive school management type and the interest in solving teachers' problems, as explained below:

A) In public schools there was participation on the part of the teachers in work planning and organisation and in cooperation with the school management. On the other hand, school management and the director were not interested in solving the teachers' problems, there was a lack of convenient educational resources and facilities for the proper performance of educational process, and a lack of communication between the school director and the teachers.

B) In private schools there were convenient educational resources and facilities for the proper performance of educational process in addition to clear criteria for assessing school performance. Moreover, the school management and leadership encouraged teachers to make more effort in the education process and involved the teachers in solving school problems. In addition, the private schools adopt a management style that motivates teachers. However, they lacked good communication between the school leadership and teachers.

6- Students' achievement in mathematics

The study showed some statistical differences between the public and private school students in favour of the private schools due to the differences between the two types of school in terms of the teaching methods, mathematics curriculum and educational and scholastic environmental components.

The relationship between study results and literature review

This study agrees with Renzo (2010) that private schools use better methods than public schools for teaching mathematics to fifth primary grade pupils.

It also agrees with Altammar (1991) that teachers' inconsistency in planning the teaching methods to be used before starting an explanation of the lesson and their failure either to clarify or to simplify the mathematical information are considered the main deficiencies and weakness of the mathematics teaching methods at public school in fifth primary grade.

The study results show agreement with those of Gavin et al. (2009) and Jennings and Diprete (2010) in that teachers' perception of the students' achievement in public schools depends on the observation of the students' behaviour towards the mathematics topics and their interest in this subject.

Also, it should be mentioned that there is a wide agreement between the study results and those of Ayoob (2007), Renzo (2010), and Harnstra et al. (2010) regarding teachers' perception of students' achievement with regard to: the development of students' reading skills and abilities in the knowledge of mathematics; and the students who need more time to understand mathematical topics, as well as those with the developed ability to read and understand mathematical topics and to conduct calculation operations.

Besides, it agrees with Harris and Sass (2010), Mohammed (2004), and Mohini and Sulaiman (2010), that teachers have the skill and ability to: identify individual differences among students; use an appropriate method to assess mathematics teaching; identify the students' needs in mathematical topics; and to follow various and proper mathematics teaching methods.

Despite the agreement with Altammar's (1991) results, that the mathematics curriculum is not well suited to the nature of the fifth primary grade students, there is also agreement with Renzo (2010), Stein and Kaufman (2010), and Ding Rui (2007), who state that the subjects of the mathematics curriculum are suited to the fifth

primary grade from the point of view of the sample of private primary school teachers.

In addition, there is agreement with the findings of Midthassel (2004), Winter and Morgenthal (2002), Alghanim (1990), Renzo (2010), and Ding Rui (2007), with regard to the role of the school management and leadership in: solving the teachers' problems; motivating them; getting them involved in solving the school's problems, and encouraging them to make more effort in the performance of the educational and teaching process.

There is also agreement with Altammar (1991) concerning the existence of: a marked weakness in solving teachers' problems and accessing proper educational resources, facilities and illustrative tools; a lack of communication between the school director and teachers; and teachers' poor level of involvement in solving the problems facing schools.

Other agreement was found with Ayoob (2007), Gavin et al. (2009), Dronkers and Robert (2008), and Renzo (2010), that private school students surpass their peers in public schools in terms of achievement levels because of good teaching methods, the encouragement of improvements in students' achievement in mathematical topics, teachers' good understanding of the nature and objectives of the mathematics curriculum, and the availability of adequate educational resources and facilities.

Unique contribution to knowledge

It is notable that there are few researches, studies and scientific arguments that deal with the comparison between mathematics teaching in public and private education schools in general. Also, Arabic research is rare and foreign studies relatively few, and they focus only on comparison between policies, school management style, education processes, educational leadership or financing issues. One of these studies by Nor Shirin (2004) was in part a comparison between the costs of private and government schools. Also, it provided this cost information to inform issues regarding the relative cost-effectiveness of private and government secondary schooling, and the inequity implications of education privatisation. Some others

concentrate on students' academic achievement in public and private schools without focusing on the comparison between mathematics teaching methods and students' achievement in these establishments; Ayoob's 2007 study, for example, looked at student achievement in government and private schools.

To my knowledge, foreign studies are also few, and this gives the present study scientific prestige because it tackles an issue that needs more in-depth research to assess the points of difference between public and private schools in terms of mathematics teaching and students' achievement in the fifth primary grade.

The relevance of the study from an academic perspective involves the importance of the topic of teaching mathematics at primary level and its impact on building students' skills and capabilities.

This is, in fact, the first study of its kind in the State of Kuwait to compare the methods of mathematics teaching in public and private schools. It also contributes to recommendations and suggestions for public and private schools in general. These concern factors that affect students' learning of mathematics at primary stage both in general and, more specifically, in the fifth grade. Besides its recommendations it provides observations concerning educational and school systems, the syllabus, teachers' skills and environmental components; all matters which could enable them to enhance teaching methods and improve students' learning of mathematics.

Most importantly, this study also benefits the Ministry of Education in Kuwait as it highlights the main differences between public and private education concerning mathematics teaching methods and students' learning progress. It also highlights the possibility of developing these methods and enhancing students' learning.

Methodology

The study sample included (20) mathematics teachers, all of whom taught fifth grade pupils in one of three primary schools in Kuwait (one private (mixed), and two public; one for boys and the other for girls). Of these twenty, (10) were mathematics teachers in public primary schools and the other (10) were from the private primary school. Also, a sample of (80) pupils were chosen from fifth grade primary consisting of (50) pupils from the public schools (25 boys and 25 girls) and the remaining (30) pupils from the private school (15 boys and 15 girls). Many tools were administered: a) a pilot study to define the problem and confirm the validity of the research questions; b) a questionnaire for teachers to elicit information concerning the teaching methods employed; and c) collation of pupils' achievement data to define and discover the differences between pupils' achievement. Overall the methodology adopted was both analytic and descriptive. This study concentrates on mathematics teachers and fifth primary grade students in Kuwait in public and private education bilingual schools. Marks for fifth grade elementary pupils in the Kuwaiti primary school year 2009/2010 started on 15th September 2009 and ended on 31st May 2010 for both public and private schools.

Difficulties with the study

I faced many difficulties with the implementation of this study. One of these was the lack of resources and literature about teaching methods in both public and private sectors, as this was the first investigation into the methods of mathematics teaching in public and private schools in the State of Kuwait. Another was the level of bureaucracy at the Ministry of Education and its adherence to monotonous routine. Also, both teachers and students were always busy because of the extremely lengthy exam periods. Teachers were not enthusiastic about the study because they thought that the outcomes might be embarrassing for the sector, and the participants were worried about confidentiality of the information they were to provide.

The validity of the research

In this study, the jury members (including two professors and two assistant professors of curriculum and instruction in the faculty of education at Kuwait University, and two mathematics supervisors from the Ministry of Education in Kuwait) assessed the validity of the research tool. The modifications they suggested were considered, such as the deletion of some paragraphs or phrases found inappropriate to the measures, and the reformulation of some paragraphs, and introduction of others, until the tool acquired its final form. The questionnaire was presented to a group of judges (including (10) teachers comprising (5) public school teachers and (5) private school teachers) who had experience in the field of teaching methods and pupils' achievement in mathematics and especially in primary education, and to a number of scientific research experts, in order to be sure of aspects of form, order, and the validity of measurement clauses and their acceptability to the topic of teaching methods and pupil achievement. The suggested modifications were then added to the research tool. The questionnaire was then presented again to the jury members to verify its final validity.

The methods of statistical processing used in the research

A number of statistical tools from the SPSS package for analysing social research data were used, the most important of which were: Cronbach's Alpha to ensure the reliability of the questionnaire; frequencies and percentages to determine the sample response rates; and T testing to determine the differences between public and private schools according to the five themes of the research tool.

Study boundaries

This study concentrates on mathematics teachers and fifth primary grade students in Kuwait in public and private education bilingual schools. Marks for fifth grade elementary pupils in the Kuwaiti primary school year 2009/2010 started on 15th September 2009 and ended on 31st May 2010 for both public and private school. The research enriches knowledge of the topics of teaching mathematics at primary level in public and private schools, mathematics teaching methods, and students'

achievement. It also presents recommendations and suggestions for public and private schools, as well as for the Ministry of Education in Kuwait, highlighting the main differences between public and private education in terms of mathematics teaching methods and students' learning and the possibility of their development.

Again the unique contribution to knowledge

What gives the present study scientific prestige is its tackling of an issue that needs more in-depth research, which is the comparison between mathematics teaching in public and private education primary schools and its impact on building fifth grade students' skills and capabilities. It is notable that there are few researches, studies and scientific arguments that deal with this topic. In Arabic research it is rare, and in foreign studies, also relatively unknown.

This is the first study of its kind in the State of Kuwait which compares the methods of mathematics teaching in public and private schools, contributes to recommendations and suggestions for public and private schools, and concerns factors that affect student learning of mathematics at primary stage both in general and, more specifically, in the fifth grade.

Besides its recommendations it provides to the Ministry of Education in Kuwait information concerning educational and school systems, the syllabus, teachers' skills and environmental components; matters which enable them to enhance teaching methods and improve students' learning of mathematics.

I recommend that the Ministry of Education for the State of Kuwait considers encouraging teachers in both public and private schools to use various methods of teaching mathematics. For example, dialogue, discussion, question, lecture-based and project based methods.

I recommend that the Ministry of Education considers its mathematics curriculum, strives to make its objectives clear and appropriate to the level of students, and takes note of individual differences and the arrangement of topics from easy to difficult.

I recommend that the Ministry of Education provides schools with an appropriate environment by supplying suitable classes and equipping them with the tools and educational aids that serve mathematics as a subject.

I recommend that the Ministry of education introduces mutual field visits and exchange experiences between highly experienced teachers and middle level ones, in both public and private schools. This would encourage a form of cross-fertilisation between the two types of school. In addition to arranging international visits to advanced education institutions to improve their skills.

I recommend that the Ministry of Education considers making assessment and evaluation processes more suitable to the students of the fifth primary grade. For example, the teacher could be asked to make notes, observations and measurements on the performance of students in class, and given the necessary time to make such notes.

Implications

Based on the results of this field study, the research makes recommendations for the various parties involved:

First, to public and private schools in Kuwait

- The methods of teaching mathematics to the fifth primary grade should be improved through teachers' participation in training courses that explain methods of mathematics teaching that are suitable to fifth grade primary school students.
- Emphasis should be placed upon the development of positive attitudes to mathematics amongst students based on a knowledge of the students' needs and their characteristics of growth at this stage.
- Teaching methods should focus on building students' positive thinking to help them understand and motivate them to learn the subject, in addition to developing their ability to read and interpret mathematical information.

Second, to teachers of public and private schools

- Individual variations among students should be taken into account by considering all cognitive domains, Psychomotor Domain and emotional domain.
- Before they start teaching, teachers should plan the lesson well, and should take into account the time factor.
- The explanation of mathematical topics in the classroom should be given more attention, so that students understand the mathematical and calculation problems and develop their knowledge and proficiency in calculation operations.
- Skills of teachers teaching mathematics to fifth primary grade students should focus on: a) the use of appropriate methods of student achievement assessment; b) the skill of good communication with students during class and of dealing with individual variations among students; c) motivating them to learn mathematical topics; d) the use of modern educational resources; e) the understanding of students' needs and interests related to mathematics.

Third, to the Kuwaiti Ministry of Education

- The fifth primary grade mathematics curricula should be developed so that they include the factors of progression from easy to more difficult in explaining the curriculum topics.
- The fifth primary grade mathematics curriculum topics should be suited to the nature of students within this stage by giving real and factual examples of their environment.
- Mathematics textbooks, which are considered an essential part of the curriculum, should be attractive, full of illustrative examples and well designed, with pictures and high-quality printing, so that they motivate students to enhance their achievements.

Fourth, to the Ministry of Education, the government and private schools in Kuwait

- Team work is required with regard to: the development and improvement of components of the educational and scholastic environment; organisational and management factors at the schools; management and communication methods; solving problems; participation in the planning and organisation of teachers; as well as the development and improvement of the physical components in the educational and scholastic environment - these include teaching aids, materials and equipment for classes, laboratories, educational buildings, and playgrounds and recreation facilities that stimulate and encourage students.

Further research

In order to extend the research and achieve greater benefits, the following future studies could be carried out:

- A field study into the impact of the personal characteristics of teachers in mathematics teaching and students' achievement.
- An exploratory study of the difficulties faced by students in their achievement of mathematics at grade five.
- A comparative study of the evaluation methods used in government and private schools to assess students' achievements in mathematics at grade five.
- A comparative study of the efficiency of planning methods and their effect on teaching mathematics in government and private schools.
- The effect of learning and educational leadership style on the performance of primary school mathematics teachers - a comparative study between government and private schools.
- The effect of gender differences on mathematics achievement at grade five.

At the end of this study, it is clear that the methods of teaching mathematics and attitudes towards it should be improved to build students' positive thinking with regard to developing their ability to read and interpret mathematical information. So the differences among students should be taken into account; the explanation of mathematical topics in the classroom should be given more attention; and the skills of teachers teaching mathematics should focus on the understanding of students' needs and interests related to mathematics, and on the use of appropriate methods of student achievement assessment and communication, so motivating them to learn mathematical concepts.

Conclusion

The study has six chapters in addition to the references and appendices. It includes an introduction to the investigation in the first chapter, and a focus in the second chapter on the theoretical framework and variables related to the comparison of public and private schools in terms of mathematics teaching methods and students' achievement in the State of Kuwait. The third chapter discussed the methodology adopted as well as the study tool, its measures, the design method, validity and stability. The fourth chapter focused on the analysis, and then the findings were discussed in the fifth. Chapter six includes a summary of the study content, the most important results that the research produced, the suggested recommendations, and possibilities for future investigations, ending with a resume of the study layout and the subjects covered in the other five chapters.

Bibliography

1. *Abo Zainah, Fared Kamel & Ababnaa, Abdullah Yousef (2010) "Mathematics Curriculums for Primary stages" Jordan, Amman: Almaseera Publishing House*
2. *Abo Zainah, Meziad Kamel (2010) "Developing, teaching Mathematics curriculums in schools" Jordan, Amman: Dar Wael Publishing House*
3. *Abu Alnasr, Medhat (2004) Rules and phases of scientific research, Cairo: Arabic Nile Group for Publishing*
4. *Alabsi, Mohammed Mustafa (2009) "The Effect of using student work profile (Portfolio) on mathematics attainments of seventh grade students" Educational Journal, Kuwait University, N.90, Folder 23, March*
5. *Alajmi, Hamad Mleeh & Aldokhi, Fawzi Abdullatif, 2010 "Prevalence rates of difficulties in learning the Arabic language and mathematics in primary stage in Kuwait - Educational Journal - Council of Scientific Publications – Kuwait University, N.95, Folder 24, June*
6. *Alastal, Ibrahim Hamed & Alrashid, Sameer Eisa (2004) "Adequacy of course planning by Mathematics teachers in Abu-Dhabi, United Arab Emirates, Evaluative Study from an Educational Journal – Academic Publication Council – Kuwait University, N.70, Folder 18, March*
7. *Albrakat, Ali Ahmed & Khasawna, Amal Abdullah (2010) "Mathematics Teaching practices for pupils & Teachers, and its relationship to their Academic Grades and Teaching Experience for the cooperator teacher and his qualification" Educational Journal – Academic Publication Council – Kuwait University, N.97, Folder 25, December*
8. *Alexander, Melina; Kraft, Ben Lignugaris; Forbush, David (2007) Online Mathematics Methods course Evaluation: Student outcomes Generalization, and Pupil performance. Teacher Education and Special Education: The Journal of the Teacher Education Division of the Council for Exceptional Children, Fall, V.30, N.4, p.199*

9. *Alexandria, VA: Association for Supervision and Curriculum Development*
10. *Alfadala, Saleh Ali (2010) "Classroom pedagogical skills" Jordan: Amman, Dar Osama for Publishing & Distribution*
11. *Alfaraji, Hadi Ahmed & Abosl, Musaa Abdelkareem (2006) "Educational activities and skills" Jordan: Amman Dar Kono al Maarefa for Publishing and Distribution*
12. *Algamidi, Mohsen Seraj & Osairi, Mohammed Saied (1992) "The role of private schools in education – A comparative study with the state of governmental schools in Taif" Educational Journal – Academic Publication Council, Kuwait University, N.25, Autumn*
13. *Alghanim, Abdul Aziz (1990), the Situation of Private Education in the State of Kuwait from the Point of View of Parents of Students in this Type of Education, unpublished research, Faculty of Education, University of Kuwait*
14. *Alharbi, Talal Saad (2000) "Teaching patterns of Mathematics teachers in Primary schools - fourth stage, and its relation to granting their students skills to find equivalent fractions" College of Education Journal, UAE University, Year 15, N.17*
15. *Alhashimi, Abdelrahman Abd Ali & Alibrahim, Eftikar (2010) "The impact of guided discovery strategy in the collection of grammar and the development of learning processes among students in the first grade of high school in Jordan" Educational Journal, Academic Publication Council, Kuwait University, N.95, Folder 24, June*
16. *Alhazimi, Otlag Talq (1995) "Using Computers in teaching Mathematics: the relationship between programming and academic achievement in mathematics among talented students" Educational Journal, Academic Publication Council, Kuwait University, N.36, Folder 9, Summer*
17. *Alhouli, Abeer Abdullah (2007) "The effect of using a novelty educational corner in developing skills and mathematics relationships for kindergarten kids in Kuwait state" An experimental study – Educational Journal – Academic Publication Council – Kuwait University, N.85, Folder 22*

18. Alhwaidei, Zaid (2006) *"Methods and Strategies of Teaching Mathematics"* Al Ain-Emirates: University Book House
19. Ali, Sultan Mohammed (2001) *"The role of school management in achieving the goals of public education in Qatar - an evaluation study - A master dissertation, Girl's college, Ain Shams University – Arab Republic of Egypt"*
20. Aljabr, Zainab Ali (2007) *"Activation of a community partnership between the public and private sectors in Kuwait"* Kuwait University Academic Publication Council
21. Alnoeemi, Najah Mohammed , Abdelazim, Ali Mohammed & Mohammed, Mustafaa Abdel Khaliq (2006) *"Techniques of education"* Qatar: Doha, Dar Qatari bin al tajara for Publishing & Distribution
22. Aloraini, Abdelaziz Abdullah (2002) *"Factors of wasting time allotted for educational process in primary schools from the Manager's perspective"* Educational Journal – Academic Publication Council, Kuwait University, N.62, Folder 16
23. Alruchid, Nohaa Rashid (2007) *"Enrollment goals and difficulties of study, expectations among a sample of students studying Mathematics specialty, a field study in the faculty of education, Kuwait university"* Educational Journal, Academic Publication Council, Kuwait University, N.83, Folder 21
24. Alsahel, Rashed Ali (2005) *Teachers' perceptions of underachievement in Elementary schools in Kuwait. School Psychology International Oct, V.26, N.4, p.478*
25. Altammar, Jassem (1991) *Suitability of the National Council of Teachers of Mathematics Standards (1989) for the Long Term Planning of Mathematics Teaching in Kuwaiti Public Primary Schools, PhD thesis, Petersburg University*
26. Alyamani, Abdulkareem Ali (2009) *"Strategies of education & learning"* Jordan – Amman, Zamzam Publishing House
27. Alyamani, Abdelkareem Ali & Askar, Alaa Saheb (2010) *"General teaching Methods - Teaching methods and their practical applications"* Jordan, Amman, Zamzam Publishing House

28. Anastasi, A. and Urbina, S. (1997) *Psychological Testing*, 7th Ed. Upper Saddle River, N. J.: Prentice Hall
29. Armagan, F. & Koksak, E. (2010) "Factors affecting student's performances on an environment achievement test" *Procedia-Social and Behavioral Sciences*, V.9
30. Asadullah, N. (2009) "Returns to private and public education in Bangladesh and Pakistan: A comparative analysis" *Journal of Asian Economics*, V.20, N.1, January
31. Ayooob, Hussain bin Mohammed (2007) "Comparison between governmental & private schools in the academic achievement for students in high school, third grade – Natural sciences, *Future of Arabic Education Journal*, Arabic Center for Education and Development
32. Bakish, Hala Taha (2008) "Relationship between realize high school students the classroom environment, and their achievement & learning styles in chemistry in KSA" *Educational Journal*, Academic Publication Council, Kuwait University, N.89, Folder 23
33. Bell, Les (2002) "Strategic planning and school management: full of sound and fury, signifying nothing?" *Journal of Educational Administration*, V.40, N.5
34. Bergh, Linda Van Den; Denessen, Eddie; Hornstra, Lisette; Voten, Marinus; Holland, Rob W. 2010. The implicit prejudiced attitudes of teachers: relations to teacher expectations and the ethnic achievement gap. *American Educational Research Journal*, June, V.47, N.2, p. 49
35. Berlinski, S. & Galiani, S. (2007) "The effect of a large expansion of pre-primary school facilities preschool attendance and maternal employment" *Labour Economics*, V.14, N.3, June
36. Betts, R. & Fairlie, W. (2003) "Does immigration induce native flight from public schools into private schools?" *Journal of Public Economics*, V.87, N.5,6, May
37. Birgin, O. & Baki, A. (2009) "An investigation of primary school teachers' proficiency perceptions about measurement and assessment methods: the case of Turkey" *Procedia-Social and Behavioral Sciences*, V.1, N.1

38. Black, A. L. & Champion J. (2002) *Methods and Issues in Social Research*, N.Y: John Wiley and sons
39. Blomeke, S. & Paine, L. (2008) "Getting the fish out of the water: considering benefits and problems of doing research on teacher education at an international level" *Teaching and Teacher Education*, V.24, N.8
40. Bogler, Ronit & Somech, Anit (2004) "Influence of teacher empowerment on teachers' organizational commitment, professional commitment and organizational citizenship behavior in schools" *Teaching and Teacher Education*, 20(3), 277-289
41. Borg, R. & Gall, M. D. (1983) *Educational Research: An Introduction*. 4th Ed. N. Y. & London: Longman
42. Bridges, D. (2010). *Philosophy and Educational Research*, *International Encyclopedia of Education*
43. Brinberg, S. & Mc Grath, J. E. (1985). *Validity and the research process*. Beverly Hills, CA: Sage
44. Bryman, Alan (2004) *Social Research Methods*, 2nd Ed., Oxford: University Press
45. Cardon, J. (1991) "Principal of private school in the state of Ohio" *Diss-Abest. Inter*, V.52, N.5
46. Caro, Daniel ; Lenkeit, Jenny ; Lehmann, Rainer & Schwippert, Knut (2009) "The role of academic achievement growth in school track recommendations" *Studies in Educational Evaluation*, V.35, N.4
47. Celep, C. & Cetin, B. (2005) "Teachers' perception about the behaviours of school leaders with regard to knowledge management" *International Journal of Educational Management*, V.19, N.2
48. Celik, L. & Keskin, M. (2009) "The effects of primary class teacher's information technology literacy skill level on student's achievement: the case of Afyonkarahisar" *Procedia-Social and Behavioral Sciences*, V1, N.1

49. Chen, Jennifer Jun-Li. (2008) *Grade Level Differences: relations of parental, teacher and peer support to academic engagement and achievement among Hong Kong students. School Psychology International, May, V.29, N.2, p.183*
50. Cherchye, L., Witte, D., Ooghe, E. & Nicaise, I. (2010) "Efficiency and equity in private and public education: A nonparametric comparison" *European Journal of Operational Research, V.202, N.2, April*
51. Ciani, Keith, Summers, J. & Easter, A. (2008) "A top-down analysis of high school teacher motivation" *contemporary educational psychology, V.33, N.4*
52. Cleary, Timothy & Chen, Peggy (2009) *Self-regulation motivation and math achievement in middle school: variations across grade level and math context" Journal of School Psychology, V.47, N.5. Oct*
53. Costu, Serkan ; Arslan, Selahattin ; Catlioglu, Hakan & Birgin, Osman (2009) "Perspectives of elementary school teachers and their students about relating and contextualizing in mathematics" *Social and Behavioral Sciences, V.1, N.1*
54. David, Dooley, *Social Research Method* (1984) N. Y.: Prentice Hall, Inc.
55. Day, C. (2002) "School reform and transitions in teacher professionalism and identity" *International Journal of Educational Research, V.27, N.8*
56. Demirbilek, Muhammet & Tamer, Suzan Lema (2010) "Math Teacher's perspectives on using educational computer games in math education" *Procedia-Social and Behavioral Sciences, V.9*
57. Depaepe, Fien, Corte, Erikde & Verschaffel, Lieven (2007) "Unravelling the culture of the mathematics classroom: A video-based study in sixth grade" *International Journal of Education Research, V.46, N.5*
58. Ding Rui (2007) "Exploration of the Primary school Mathematical Classroom Environment in Mainland China". Unpublished Ph.D. Dissertation, the Chinese university of Hong Kong

59. Dronkers, Jaap and Robert, Peter (2008) *Differences in Scholastic Achievement of Public, Private Independent schools: A Cross-National Analysis*. *Educational Policy*, July, V.22, N.4, p.541
60. Dzemyda, Gintautas (2005) "Multidimensional data visualization in statistical analysis" *Computational Statistics & Data Analysis*, Volume 49, Issue 1, 15 April. 251
61. Eason, R., Giannangelo, D. & Franceschini, L. (2009) "A look at creativity in public and private schools" *Thinking Skills and Creativity*, V.4, N.2, August
62. Eral Babbie (2003) *The Practice of Social Research*, Belmont: Wodsworth Publishing Co., 4th ed
63. Erdogan, Emel O. (2010) "A comparison of curricula for the teaching of addition and subtraction concepts" *Procedia-Social and Behavioral Sciences*, V.2, N.2
64. Fitz, J. & Beers, B. (2002) "Education management organization and the privatization of public education: A cross-national comparison of the USA and Britain" *Cooperative Education*, V.38, N.2
65. Fletchers, J., Others (2009) "Pasifika students: teachers and parents voice their perceptions of what provides supports and barriers to pasifika students' achievement in literacy and learning" *Teaching and Teacher Education*, V.25, N.1, January
66. Freeman, Barbara & Crawford, Lindy (2008) *Creating a Middle School Mathematics curriculum for English – Language learners*. *Remedial and Special Education*, January, February, V.29, N.1, p.9
67. Gary, P & Rastogi, R. (2006) "Climate profile and OCBs of teachers in public and private schools of India" *International Journal of Educational Management*, V.20, N.7
68. Gavin, Katherine, Casa, Tutita, Adelson, Jill, Carroll, Susan, Sheffield, Linda Jensen (2009) *The impact of advanced curriculum on the achievement of mathematically promising elementary students*. *Gifted Child Quarterly*, July, V.53, N.3, p.188

69. Giarelli, E., Clarke, D., Catching, C. & Ratcliffe, S. (2009) "Developmental disabilities and behavioral problems among school children in the western south of Africa" *Research in Developmental Disabilities*, V.30, N.6, November
70. Good, T. L. & Brophy, J. E. (1987) "Looking in classrooms", New York: Harper & Row publishers Inc.
71. Gultekin, Mehmet (2010) "Program reform in primary schools in Turkey: what do primary school teachers think?" *Procedia-Social and Behavioral Sciences*, V.9
72. Habib, Soud Been (2010) "Tasks of the educational supervisor to develop vocational growth for teachers of mathematics at the intermediate stage" *Educational World Journal*, Arabic Institute for Scientific Consulting and Human Resource Development, N.30, Year 10, March
73. Hanfer, Anne (1993) *Teaching Method Scales and Mathematics – Class Achievement: what works with different outcomes?* *American Educational Research Journal*, March 20, V.30, N.1, p.71
74. Hargreaves, A. (2005) "Educational change takes ages: life, career and generational factors in emotional responses to educational change" *Teaching and Teacher Education*, V.21, N.8
75. Harnstra, Lisette, Denessen, Eddie, Bakker, Joep, Bergh, Linda van den, Voeten, Marinus (2010) *Teacher Attitudes Toward Dyslexia: Effects on Teacher Expectations and the Academic Achievement of Students with Dyslexia*. *Journal of Learning Disabilities*, November/December, V.43, N.6, p.515
76. Harris, Douglas & Sass, Tim (2010) "Teacher training, teacher quality and student achievement" *Journal of Public Economics*, Nov
77. Heck, Ronald (2007) *Examining the relationship between teacher quality as an organizational property of schools and students' achievement and growth rates*. *Educational Administrator Quarterly*, October, V.43, N.4, p.399
78. Heshmati, A. (2002) "Quality adjusted measures of services in public schools" *European Journal of Operational Research*, V.136, N.3,1, February

79. Hill, Heather, Rowan, Brian, Ball, Deborah Loewenberg (2005) *Effects of Teacher's Mathematical Knowledge for Teaching on Student Achievement*. *American Educational Research Journal*, June, V.42, N.2, p.371
80. Honingh, M. & Oart, F. (2009) "Teacher's organizational behavior in public and private funded schools" *International Journal of Educational Management*, V.23, N.2
81. Hoy, Wayne & Cecil, Miskel (1991) "Educational Administration, Theory, Research and Practice", New York: Mc Graw Hill Inc
82. Hughes, J. & Kwok, O. (2007) "Influence of student-teacher and parent-teacher relationship on lower achieving reader's engagement and achievement in the primary grades" *Journal of Educational Psychology*, V.99, N.1, February
83. Jennings, Jennifer L, Diprete, Thomas A. (2010) *Teacher Effects on Social and Behavioral Skills in Early Elementary School*. *Sociology of Education*, April, V.83, N.2, p.135
84. Jiban, Cynthia & Deno, Stanley (2007) *Using Math and Reading Curriculum-Based Measurements to Predict State Mathematics Test Performance: Are simple one – minute measures technically adequate?* *Assessment for Effective Intervention*, Winter, V.32, N.2, p.78
85. Jimenez, E. & Paqueo, V. (1996) "Do local contributions affect the efficiency of public primary schools?" *Economics of Education Review*, V.15, N.4, October
86. Karaduman, Gulsah Batdal (2010) "A sample study for classroom teachers addressing the importance of utilizing history of math in math education" *Social and Behavioral Sciences*, V.2, N.2
87. Karahoca, Dilek, Others (2010) "Evaluation of web based learning on student achievement in primary school computer courses" *Social and Behavioral Sciences*, V.2, N.2
88. Kasule, Dan & Mapolelo, Dumma (2005) "Teachers' strategies for teaching primary school mathematics in a second language: A case of Botswana" *International Journal of Educational Development*, V.25, N.6, November

89. Khasawna, Amal Abdullah, Meqdadi, Farooq Ahmed & Shitnawi, Fadel Salama (2000) *"Guide to Teaching Mathematics in Public education"* Riyadh: Arabic Center for Educational Research in Gulf Countries
90. Kirk, J. & Miller, M. L. (1986) *"Reliability and Validity in Qualitative Research"*. Beverly Hills, CA: Sage
91. Kirkgoz, Yasemin (2008) *"A case study of teachers' implementation of curriculum innovation in English Language teaching in Turkish primary education"* *Teaching and Teacher Education*, V.24, October, N.7
92. Kirmizi, Fatma (2009) *"The relationship between writing achievement and the use of reading comprehension strategies in the UK 4th and 5th grades of primary schools"* *Procedia-Social and Behavioral Sciences*, V.1, N.1
93. Kizilike, B. (2002) *"Five common mistakes in writing lesson plans and how to avoid them [on line]: available: www.Adprima.com/mistakes.htm"*
94. Kurawa, G. (2010) *"Teaching diversity in a primary school: examining teacher's classroom strategies for inclusion"* *Procedia-Social and Behavioral Sciences*, V.5
95. Leikin, Roza & Kawass, Sally (2005) *"Planning teaching an unfamiliar mathematics problem: The role of teachers' experience in solving the problem and watching pupils solving it"* *The Journal of Mathematical Behavior*, Volume 24, Issues 3-4
96. Leithwood, Kenneth & Mascal, Blair (2008) *Collective Leadership Effects on Student Achievement – Educational Administration Quarterly*, October, V.44, N.4, p.529
97. Leving, T. & Long, R. (1981) *"Effective instruction, Washington D.C, Associations for supervision and curriculum development"*
98. Lingard, B., Hayes, D. & Mills, M. (2002) *"Development in school based management: the specific case of Queensland, Australia"* *Journal of Educational Administration*, V.40, N.1

99. Luis Coromina & Germa Condors (2006) *Reliability and validity of egocentered network data collected via the web: A meta – analysis of multilevel multi method studies*. *Social Networks*, V.28, N.3, July, p.209
100. Maienza, Janice, Hahn, Dae & Joo, Chul (2001) "Mathematics instruction in Korean primary schools: structured processes and a linguistic analysis of questioning" *Journal of Educational Psychology*, V.93, N2
101. Marshall, Gill (2005) *The purpose, design and administration of a questionnaire for data collection*. *Radiography*, v. 11, N. 2, May, p. 131
102. Marzano, R. J. (2003) *What works in schools: Translating research into action*
103. McDougall, Jenny (2010) "A crisis of professional identity: How primary teachers are coming to terms with changing views of literacy" *Teaching and Teacher Education*, V.26, N.3
104. McEwan, J. & Trowbridge, M. (2007) "The achievement of indigenous students in Guatemalan primary schools" *International journal of educational development*, V.27, N.1, January
105. McEwan, P. (2001) "The effectiveness of public, Catholic and non-religious private schools in Chile's voucher system" *Education Economics*, V.9, N.2
106. Mevarech, Zemira & Kramarski, Bracha (1997) *Improve: A multidimensional Method for Teaching Mathematics in Heterogeneous Classrooms*. *American Educational Research Journal*, June, V.34, N.2, p.365
107. Midthassel, Unnivere (2004) *Teacher Involvement in School Development Activity and its Relationships to Attitudes and Subjective Norms among Teachers: A Study of Norwegian Elementary and Junior High School Teachers*. *Educational Administration Quarterly*, August, V.40, N.3, p.435
108. Ministry of Education (1991) "The General Objectives of Education in the State of Kuwait". *Kuwait, the administration of planning and training*

109. Ministry of Education (2009) *"Development of the Education in the State of Kuwait". Kuwait, the administration of planning and training*
110. Mohammed, Jasem Mohammed (2004) *"Psychology of educational administration and school, prospects for general development" Jordan, Amman, Dar Althaqafa Library for Publishing & Distribution*
111. Mohammed, Majeed Mahdi & Gawwi, Fadil Mohsen (1998) *"using the 'Tuckman' tool in the evaluation of teaching methods" Educational Journal – Academic Publication Council, Kuwait University , N.21, Folder 6, Summer*
112. Mohini, Mohamed & Sulaiman, Faridah (2010) *"Framework of Knowledge and Teaching Skills of Expert Mathematics Teachers in Using Mathematical Examples" Procedia-Social and Behavioral Sciences, Volume 8, 2010, p.325*
113. Mooij, Jos (2008) *"Primary education teachers professionalism and social class about motivation and demotivation of government school teachers in India" International Journal of Educational Development, V.28, N.5*
114. Morizeek, Hisham Yaqoob & Darweesh, Jafaar Naif (2009) *"Methods of teaching mathematics" Jordan, Amman: Alrayah Publishing House*
115. Mostafa, Abdelazim Alsaied (2006) *"The pressures of work and its relationship to career commitment in public high school education – a field study" Future of Arabic Education Journal, Folder 12, N.42, July*
116. Motaawei, Ibrahim Esmat & Metwali, Fouad Basuoni (2000) *"Public Education: its history , legislation, reformation and its future" Alexandria: Alexandria Book Center*
117. Motawi, Ibrahim Esmat & Hasan, Ameena Ahmed (2007) *"Administration of Education Principles" Cairo: Dar-Alshorooq*
118. Murphy, J. (2008) *"The place of leadership in turnaround schools: Insights from organizational recovery in the public and private sectors" Journal of Educational Administration, V.46, N.1*

119. Murray, P. (1999) *Fundamental issues in questionnaire design. Accident and Emergency Nursing*, v. 7, N. 3, July, p. 148
120. Mustafa, Salah Abdelhameed (2000) "School administration in the light of contemporary administrative ideology" Riyadh, Dar-Almareekh for distribution
121. National Council of Teachers of Mathematics (2000) "Principles and standards for school mathematics". Reston, VA: Author
122. Ng, Pak & Chan, David (2008) "A comparative study of Singapore's school excellence model with Hong Kong's school-based management" *International Journal of Educational Management*, V.22, N.6
123. Nilsson , P. & Driel, J. (2010) "Teaching together and learning together – primary science student teachers' and their mentors' joint teaching and learning in the primary classroom" *Teaching and Teacher Education*, V.26, N.6
124. Nir, A. & Eyal, O. (2003) "School based management and the role conflict of the school superintendent" *Journal of Educational Administration*, V.41, N.5
125. Nishimura, M., Yamano, T. & Sasaoka, Y. (2008) "Impact of the universal primary education policy on educational attainment and private costs in rural Uganda" *International Journal of Educational Development*, V.28, N.3, March
126. Nor Shirin, M. (2004) "A comparative study of the cost of government and private secondary schools in Malaysia". PhD, Dissertation, School of Arts and Sciences in Columbia University. USA.
127. Nozadze, Giorgi & Romberg, Thomas (1997) "Active readiness method of teaching mathematics" *The Journal of Mathematical Behavior*, Volume 16, Issue 2
128. Obaidat, Osama Mohammed, & Mohammed, Asmaa Khalil (2009) "Tendency towards privatization of education in Jordan: reasons and expected results" *Educational Journal – Academic Publication Council, Kuwait University*, N.92, September 2009
129. Obied, William, Alshrqawi, Abdulfattah, Riyadh, Aamal & Alenaizi, Yousef (1998) "Educating & learning Mathematics at the Primary Stage" Kuwait – Alfalah Library

130. Papanastasiou, C. & Zembylas, M. (2006) "Job satisfaction variance among public and private kindergarten school teachers in Cyprus" *International Journal of Educational Research* V.43, N.3
131. Papanastasiou, C. (2008) "A residual analysis of effective schools and effective teaching in mathematics" *Studies in Educational Evaluation* V.24, N.1, March, p.24
132. Patrinos, H. (2002) "Private education provision and public finance: the Netherlands as a possible model" *Occasional paper, National Center for the Study of Privatization in Education, www.Nccps.com*
133. Peeters, Miranda A. G.; Tuijl, Harrie F. J. M.; Reymen, Isabelle M. M. J.; Rutte, Christer G. 2007. *The development of a design behavior questionnaire for multidisciplinary teams. Design studies, v. 28, N. 6 November, P. 623.*
134. Peterson, R., Brown, G. & Irving, S. (2010) "Secondary school students' conceptions of learning and their relationship to achievement" *Learning and Individual Differences, V.26, N.3, June*
135. Philipp, A., Thanheiser, E. & Clement, L. (2002) "The role of a children's mathematical thinking experience in the preparation of prospective elementary school teachers" *International Journal of Educational Research, V.37, N.2*
136. Popa, S. & Acedo, C. (2006) "Redefining the professional: Romanian secondary education teachers and the private tutoring system" *International Journal of Educational Development, V.26, N.1, January*
137. Powell, Arthur, Francisco, John & Maher, Carolyn (2003) "An analytical model for studying the development of learners' mathematical ideas and reasoning using videotape data" *The Journal of Mathematical Behavior, Volume 22, Issue 4*
138. Prakay, Forest & Stanford, Pevrly (2005) "The art of teaching: your future in the teaching profession" *Translated by Younis, Maysoon & Taleb, Mohammed – Palestine: Gazaa, Dar Al Ketaab al Jaamei for Publishing*
139. Qarqza, Mahmoud Abdelqader (2006) "My career as a teacher" *Lebanon, Beirut, Al-dar Alarabiya for Sciences*

140. Rastegar, Ahmad, Jahromi, Reza, Haghighi, Abdorahman & Akbari, Ahmad (2010) "The relation of epistemological beliefs and mathematics achievement: the mediating role of goals, mathematics self-efficacy and cognitive engagement" *Procedia-Social and Behavioral Sciences*, V.5.
141. Rayan, Fekri Hasan (2000) "Teaching: its objectives, foundations, methods, evaluation of its results and its applications. Egypt Cairo alam alkotob for publishing
142. Renzo, Roncagliolo Jones (2010) "Time to learn mathematics in public and private schools: understanding differences in aspect of the implemented curriculum in the Dominican Republic". Unpublished Ph.D. Dissertation, School of Education in the University at Albany, State University of New York
143. Rich, Yisreal (1993) "Educational goals of teachers in heterogeneous and homogeneous classes in elementary and junior high school" *Teaching and Teacher Education*, Volume 9, Issue 1, February
144. Ritter, Gary, Maranto, Robert, Buck, Stuart (2009) "Harnessing Private Incentives in Public Education". *Review of Public Personnel Administration*, September, V.29, N.3, p.249
145. Robyn Zevenbergen, Shelley Dole, Robert J. Wright (2004) "Teaching Mathematics in Primary Schools" Allen & Unwin. Place of Publication: Crows Nest, N.S.W
146. Rots, I., Aelterman, A. & Vlerick, P. (2007) "Teacher education graduates' teaching commitment and entrance into the teaching profession" *Teaching and Teacher Education*, V.23, N.5, July
147. Rouse, C. (1998) "Private school vouchers and student achievement: An evaluation of the Milwaukee Parental Choice Program" *Quarterly Journal of Economics*, cx III.
148. Saha, Bibhas & Saha, Baran (2009) Private Tutoring, School Education and Government Policy. *Review of Market Integration*, December, V.1, N.3, p.375
149. Saitis, C. & Saiti, A. (2004) "School libraries in Greece : A comparative study of public primary schools in rural and urban areas" *Library & Information Science Research*, V.26, N.2

150. Sardantakos, Stirors (1998) "Social Research" (London: Macmillan Press Ltd)
151. Sawatfa, Waleed (2010) "The effect of teaching physics in a direct inquiry method on students achievement & developing their higher-thinking skills in first grade of high school in KSA" *Educational Journal, Academic Publication Council, Kuwait University*, N.97, Folder 25
152. Sekaran, Uma (2003) "Research Methods for Business: A Skill-Building Approach" 4th ed, N.Y-: John Wiley and Sons
153. Sengul, Sare & Uner, Ilker (2010) "What is the impact of teaching Algebraic expressions and equations topic with concept cartoon on the students logical thinking abilities?" *Procedia-Social and Behavioral Sciences*, V.2, N.2
154. Smits, Niels & Vorst, C. M. (2007) Reducing the length of questionnaires through structurally incomplete designs: An illustration. *Learning and Individual Differences*, v. 17, N.1, p. 25
155. Soudien, Crain (2001) "Teacher responses to rationalization: transformation and adaptation in the western cape, South Africa" *International Journal of Educational Development*, V.21, N.1
156. Stecher, Brian; Hamilton Laura; Rayn, Gerry; Robyn, Abby; Lockwood, J. R. (2006) Using structured classroom vignettes to measure instructional practices in mathematics. *Educational Evaluation and Policy Analysis*, June, V.28, N.2, p.101
157. Stein, Mary Kay & Kaufman, Julia (2010) "Selecting and supporting the use of mathematics curricula at scale." *American Educational Research Journal*, September, V.47, N.3, p.663
158. Stephen, Stansfeld & Michael, Marmot (1992) "Deriving a survey measure of social support the reliability and validity of the close persons questionnaire". *Social Science & Medicine*, V.35, N.8, p.1027
159. Stockton, Catherine (1997) "A study of identified principal's leadership style, school climate, and parental involvement as perceived by teachers and parents in selected school

districts in Louisiana" Dissertation abstracts international, V.58-12, Northeast Louisiana University

160. Suffian, Harizon Binti & Rahman, Shafia (2010) "Teacher's choice and use of example in the teaching and learning of mathematics in primary school and their relations to teachers' pedagogical content knowledge" *Social and Behavioral Sciences V.8*
161. Tan, Saw Fen & Linn, Chap Sam (2010) "Effective Mathematics Lesson from the lenses of primary pupils: preliminary analysis" *Procedia-Social and Behavioral Sciences, V.8.*
162. Tawalbah, Hadi, Alsaraira, Basem, Alshamayla, Nisreen & Altarayra, Khaled (2010) "Methods of Teaching" *Jordan: Amman, Dar Almisaraa Publishing House*
163. Taweel, Hani Abdelrahman (2006) "Educational administration: concepts and prospects" *Jordan: Amman, Dar Wael for Publishing*
164. Tee, Pak & Chan, David (2008) "A comparative study of Singapore's school excellence model with Hong Kong's school-based management" *International Journal of Educational Management, V.22, N.6*
165. Tektas, Necla, Ozdemir, Sukru & Galo, Engul (2010) "Comparison of primary school maths programmes a case study for Cosova - Turkey" *Procedia-Social and Behavioral Sciences, V.2, N.2*
166. Tezer Murat & Aktunc, Emine (2010) "Teacher opinions in the implementation of the drama method in mathematics teaching" *Procedia-Social and Behavioral Sciences, V.2, N.2*
167. Thompson, John & Klenier, Brian (2005) "Effective Human Resources Management of School Districts" *Management Research News, V.28, N.2/3*
168. Tolba, Rajab Alsaeid (2008) "A comparative study between scholastic climate in public & private schools and its impact on the educational process at primary stage in Monofiya governorate" *A dissertation to obtain a master's degree in education , Essentials of Education Specialization , Arab Republic of Egypt , Cairo University , Institute of Educational Studies , Education Essentials Section*

169. Tooley, James, Dixon, Pauline, Stanfield James (2008) "Impact of free primary education in Kenya: A case study of private schools in Kibera". *Educational Management Administrative Leadership*, October, V.36, N.4, p.449
170. Trends in International Mathematics and Science Study TIMSS (2011): www.iea.nl/timss_2011.html
171. Tuckman, B. (2000) *Conducting Education Research*: Atlanta: Harcourt Brace. Jovanovich Inc., 4th ed
172. Vanhoof Jan, Petegem, Van peter, Verhoeven, Jef C, Buvens, Ina (2009) Linking the policymaking capacities of schools and the quality of school self- evaluations: the view of school leaders. *Educational Management Administration Leadership*, September, V.37, N.5, p.667
173. Vehovar, Vasja; Manfreda, Katja Lozar; Koren, Gasper; Hlebec, Valentine (2008) Measuring ego-centered social networks on the web: Questionnaire design issues. *Social Networks* v. 30, N. 3 July, p. 213
174. Wei, His Sheng, Williams, James Herbert, Chen, Jikang & Chang, Hsiu Yu (2010) "The effects of individual characteristics, teacher practice, and organizational factors on student bullying: A multilevel analysis of middle schools in Taiwan" *Children and Youth Services Review*, V.32, N.1, January
175. Westbrook, Jo, Shah, Nazneen, Durrani, Naureen, Tikly, Clare, Khan, Wazim and Dunne, Mairead (2009) "Becoming a teacher: Transitions from training to the classroom in the NWFP, Pakistan" *International Journal of Educational Development*, V.29, N.4
176. Wigfield, A. & Cambria, J. (2010) "Students' achievement values, goal orientations, and interest: Definitions, development and relations to achievement outcomes" *Developmental Review*, V.30, N.1, March
177. Winter, Paul and Morgenthal, Jayne (2002) "Principal Recruitment in a Reform Environment: Effects of school Achievement and School Level on Applicant Attraction to the Job." *Educational Administration Quarterly*, August, V.38, N.3, p.319

178. Wong, Evia (2003) "*Leadership style for school based management in Hong Kong*" *International Journal of Educational Management*, V.17, N.6
179. Xin, Yan Ping; Wiles, Ben; Lin, Yu-Ying. (2008). *Teaching conceptual Model – Based word problem story Grammar to Enhance Mathematics problem solving*. *The Journal of Special Education*, November, V.42, N.3, p.163
180. Zeleny, Milan (1980) "*Multiple objectives in mathematical programming: Letting the man in*" *Computers & Operations Research*, Volume 7, Issues 1-2

Appendix (A) Questionnaire

Dear Teacher,

I am in the process of preparing a PhD thesis entitled "**A comparative study of Kuwait's Government and Private Sector Primary Schools in terms of teaching methods and pupil achievement in mathematics**".

I aim to become acquainted with the methods used for teaching mathematics in government and private education in the fifth grade at primary stage and to identify the factors associated with these methods, which in turn affect students' achievement.

Given the importance of your opinions, I would be grateful if you could kindly indicate your point of view with regard to each of the statements in this questionnaire.

Any information or data obtained from you during this research will be treated confidentially. The statistical analysis will be performed using the SPSS computer package.

Thank you in anticipation for your cooperation and the time you spend in becoming a part of this research.

I: Abdul Rahman Al Duwailla.

E-mail:dwilah@hotmail.com

General data

1. School Type: ☐ Government sector ☐ Private sector
2. Name (optional):
3. Gender: ☐ Male ☐ Female
4. Age:
☐ 22: 30 years.
☐ 31: 40 years.
☐ 41: 50 years.
☐ Over 50.
5. Years of experience:
☐ 1- 5 years.
☐ 6 - 10 years.
☐ 11 - 15 years.
☐ More than 15 years.
6. Gender of the students in the class that I teach:
☐ Boys ☐ Girls
7. Educational qualifications:
☐ Diploma ☐ Bachelor ☐ Higher Diploma ☐ Master

First: Attributes and characteristics of mathematics teaching methods

Please tick (✓) the column that best represents your opinion with regard to each statement

No	Statement	Agree	Neutral	Disagree
1	I'm still looking for a better method of teaching mathematics.			
2	The teaching method focuses on increasing the students' awareness about the mathematical subjects.			
3	The method of teaching mathematics contributes to providing students with the concepts, the basics of numbers and figures, and with mathematics operations.			
4	The method of teaching mathematics aims to develop the students' positive attitudes towards about mathematics.			
5	I use different teaching methods when teaching mathematics.			
6	The method of teaching mathematics helps to build the thinking abilities of the students.			
7	The method of teaching builds a stimulating atmosphere for the students.			
8	I start a dialogue with the students about the mathematical topics.			
9	The method of teaching contains questions that are asked of the students when teaching.			
10	The method of teaching takes into account various principles of teaching and learning.			
11	The method of mathematics teaching considers transition from easy to difficult issues.			

No	Statement	Agree	Neutral	Disagree
12	The method of teaching focuses on achieving students' understanding of the subject.			
13	When I teach mathematics, I have clear steps to follow.			
14	The method of teaching mathematics focuses on providing new ideas .			
15	When teaching mathematics, I use different types of discussion with students.			
16	I plan for teaching mathematics before entering the classroom.			
17	When teaching mathematics, I allow students enough time to answer the questions.			
18	I use a method for teaching mathematics which fosters new behaviours in the students.			
19	I use a method that is based on clarification and explanation of the mathematical information.			
20	I give the students lots of questions and exercises.			

Second: Teacher's perception of student's achievement

Please tick (√) the column that best represents your opinion with regard to each statement

No	Statement	Agree	Neutral	Disagree
1	Most of the students have the desire and the ability to learn mathematics.			
2	There are a great number of students whose knowledge about mathematics has been developed day after day.			
3	There are a great number of students who have the necessary skills to read and interpret the mathematics topics.			
4	There are a great number of students who master mathematical operations.			
5	I spend a long time explaining the topics to students.			
6	Students achieve tangible completion that reflects on their behaviour according mathematical subjects.			
7	In many cases, students ask for further explanation of some subjects.			
8	Students need more time to accommodate mathematical issues.			
9	There is always a great disparity between the students' marks.			
10	I put a great deal of effort into explaining the lessons but without fruitful results.			

Third: Teachers' skills

Please tick (✓) the column that best represents your opinion with regard to each statement

No	Statement	Agree	Neutral	Disagree
1	I have the ability to discover individual differences between students concerning mathematical issues.			
2	I recognize the educational and behavioural issues for the students concerning mathematical subjects.			
3	I have the ability to use suitable evaluation methods.			
4	I can identify the capabilities, needs and interests of the students.			
5	I can use many different educational aids to teach mathematics.			
6	I can stimulate the students to learn mathematics.			
7	I take notice of briefings on all new matters in the field of mathematics teaching.			
8	I use different skills to communicate with the students inside class.			
9	I can determine the most suitable method for teaching mathematics and consider the individual differences of the students.			
10	I recognize the students' weaknesses in relation to learning mathematics.			

Fourth: The mathematics curriculum

Please tick (✓) the column that best represents your opinion on each statement

No	Statement	Agree	Neutral	Disagree
1	The goals of the mathematics curriculum are clear to me.			
2	The curriculum progresses from easy to difficult.			
3	The curriculum deals with topics which are attractive to students.			
4	The nature of the curriculum encourages investigation and questioning.			
5	The mathematics curriculum includes clear examples.			
6	The topics of the mathematics curriculum are suitable for the students.			
7	Students find the images, printing and typesetting of the textbooks attractive.			
8	Students find the curriculum hard to understand.			
9	I find it difficult to explain the curriculum to the students.			
10	The curriculum is suitable for the students at this level.			

Fifth: Components of the educational and scholastic environment

Please tick (✓) the column that best represents your opinion with regard to each statement

No	Statement	Agree	Neutral	Disagree
1	All teachers take part in the process of planning and arranging the work together with the school administration.			
2	There are clear criteria for evaluating school performance.			
3	Educational resources appropriate for the teaching process are available.			
4	The school administration encourages teachers to work harder.			
5	Supervisors work with inspectors to solve teachers' problems.			
6	All facilities related to the educational process are available at school.			
7	The school administration considers ongoing development of teachers' competencies.			
8	Good communications exist between principal and teachers.			
9	Teachers play a part in solving the school's problems.			
10	The style of school administration contributes to the lifting of teachers' morale.			

In your opinion, what are the obstacles that affect mathematics teaching methods and the students' achievements in grade five?

What are your suggestions for addressing these obstacles, developing the mathematics teaching methods, and raising students' achievements in grade five?

Appendix (B)
Mark lists for student achievements,
mathematics grade five,
at government and private schools

Student mark lists at government schools

For two schools; one for boys, one for girls

No	Boys' school (1 class)		No	Girls' school (1 class)	
	Student No.	Mark		Student No.	Mark
1	1	22	1	1	14
2	2	35	2	2	33
3	3	16	3	3	25
4	4	48	4	4	30
5	5	15	5	5	44
6	6	45	6	6	16
7	7	20	7	7	41
8	8	23	8	8	23
9	9	27	9	9	20
10	10	25	10	10	22
11	11	30	11	11	27
12	12	26	12	12	38
13	13	30	13	13	28
14	14	28	14	14	45
15	15	47	15	15	24
16	16	36	16	16	48
17	17	43	17	17	23

18	18	27	18	18	47
19	19	46	19	19	29
20	20	39	20	20	18
21	21	44	21	21	49
22	22	47	22	22	26
23	23	38	23	23	37
24	24	35	24	24	25
25	25	41	25	25	13
Total boys		25	Total girls		25

Student mark lists at private schools

For two classes at one private school; one class for boys, one class for girls

No	Boys' class		No	Girls' class	
	Student No.	Mark		Student No.	Mark
1	1	40	1	1	30
2	2	45	2	2	37
3	3	48	3	3	28
4	4	27	4	4	26
5	5	23	5	5	33
6	6	38	6	6	29
7	7	36	7	7	34
8	8	25	8	8	40
9	9	42	9	9	44
10	10	28	10	10	38
11	11	44	11	11	42
12	12	47	12	12	45
13	13	35	13	13	48
14	14	45	14	14	36
15	15	20	15	15	23
Total boys		15	Total girls		15

Appendix (C)

Study survey questions

Dear Teachers,

Please give your opinion on the following questions. The purpose of this survey is to find out your views on current mathematics teaching methods and on fifth grade students' achievement. Thanks in advance for your answers and your participation in this survey.

1- What do you think about the method of teaching mathematics to the fifth primary grade?

.....

.....

.....

.....

.....

.....

2- What is your opinion on the fifth primary grade students' achievement in mathematics?

.....

.....

.....

.....

.....

.....

- 3- Please give your opinion on the characteristics of the mathematics curriculum for primary grade five, its adequacy for this stage, and appropriateness to the nature of the students.

.....

.....

.....

.....

.....

.....

- 4- What is your opinion about the fifth primary grade mathematics teachers' skills?

.....

.....

.....

.....

.....

.....

- 5- Please give your opinion of the physical facilities and educational resources available at the school.

.....

.....

.....

.....

.....

.....

6- What are the obstacles affecting the fifth grade students' achievement in mathematics?

.....

.....

.....

.....

.....

.....

7- What are the obstacles affecting the method of mathematics teaching to the fifth grade?

.....

.....

.....

.....

.....

.....

8- What do you think about the school management?

.....

.....

.....

.....

.....

.....

9- Please give your opinion about the scholastic leadership types in the management of the education process and in teaching.

.....

.....

.....

.....

.....

.....

10- What do you think about the role and involvement of teachers in the planning of the educational and teaching process at the school?

.....

.....

.....

.....

.....

.....

11- What do you think about the method of evaluating the performance of the educational process, and that of mathematics teaching to the fifth grade at your school?

.....

.....

.....

.....

.....

.....

Appendix (D)

Jury Members who judged the Tools of the Study

- ❖ **Dr. Saud Al-Rashidi**
Prof. of Curriculum and instruction, Faculty of Education, Kuwait University.
- ❖ **Dr. Abdul-Raheem Al-Kandari**
Prof. of Curriculum and Instruction, Faculty of Education, Kuwait University.
- ❖ **Dr. Mohammed Taaleb**
Assistant Professor of Curriculum and Instruction, Faculty of Education,
Kuwait University.
- ❖ **Dr. Muadi Algmi**
Assoistant Prof. Curriculum and instruction, Faculty of Education, Kuwait
University.
- ❖ **Mr. Abdullah AL-Ali**
Mathematics Supervisor, Ministry of Education, Kuwait.
- ❖ **Mr. Mhmoud Shafiq**
Mathematics Supervisor, Ministry of Education, Kuwait.

Appendix (E)

**Copies of approvals received from
The authority of public and private sectors**

Ministry Of Education

The Public Administration For Private Education



وزارة التربية
الإدارة العامة للتعليم الخاص

Date : _____

Ref.: _____

التاريخ : ٢٨ / ٣ / ١٤٠١
الرقم : ١٤١ / ٥٤ / ١٤١

السادة المحترمين / أصحاب مدارس / العربية الأهلية و الثنائية اللغة
تحية طيبة وبعد...

الموضوع : تسهيل مهمة

.....

بالإشارة إلى الموضوع أعلاه، برجاء تسهيل مهمة الباحث / أ. عبد الرحمن عبد الله
الدويلة، محتوى دراسة (دراسة مقارنة مابين التعليم الخاص والعام في أساليب طرق تدريس
الرياضيات وتحصيل الطلاب في المرحلة الابتدائية).

برجاء تقديم كافة التسهيلات اللازمة له أثناء زيارته لمدرستكم مع الإحاطة بأنه لا
مانع لدى الإدارة العامة للتعليم الخاص من التعاون معه في هذا المجال.

مع خالص التحية...

مدير عام
الإدارة العامة للتعليم الخاص

محمد عبد الله الدويلة
مدير عام الإدارة العامة للتعليم الخاص

وزارة التربية
الإدارة العامة للتعليم الخاص


نسخة لكل من:

- الوكيل المساعد للتعليم الخاص
- مدير عام الإدارة العامة للتعليم الخاص
- مدير الشؤون التعليمية
- ملف لستر

٢١/٥٨

الرجوع وقت ١٩٥٠

التاريخ: ٢٥ / ٣ / ٢٠١٠



يرجى الإطلاع على محتوى الإستبانة المرفقة ؛ واتخاذ ما يلزم لتسهيل مهمة الباحث المذكور .

الوكيل المساعد للتعليم العام

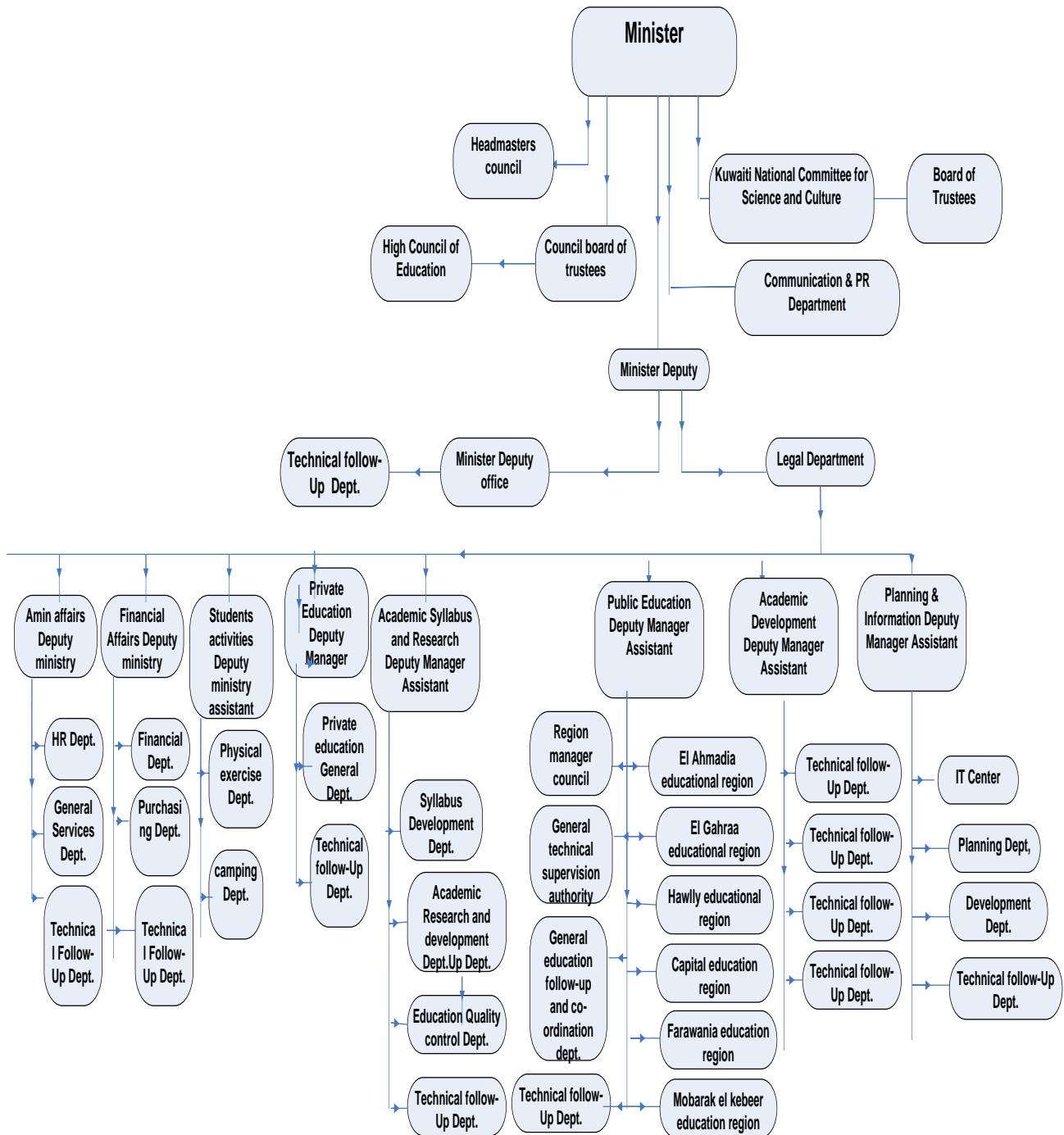
[illegible]

المادة 10 - **الوقت والمكان للمساعدة القانونية** -

A6477

Appendix (F)

Kuwait -Ministry of Education Organizational Structure



Source: Ministry of Education in Kuwait

