

FACTORS AFFECTING THE EFFICACY OF ICTs  
AS INSTRUCTIONAL TOOLS IN THE  
CLASSROOM:  
*A STUDY OF PRIMARY INDEPENDENT SCHOOLS IN QATAR*

Thesis Submitted for the degree of Doctor of Philosophy at  
the University of Leicester

By

NAFLA ABDULLA R. H. ALDOSARI  
Department of Education  
University of Leicester

November 2007

©By Nafla Abdulla Aldosari 2007

This thesis is copyright material and no quotation from it may be published without  
proper acknowledgement

UMI Number: U560957

All rights reserved

INFORMATION TO ALL USERS

The quality of this reproduction is dependent upon the quality of the copy submitted.

In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if material had to be removed, a note will indicate the deletion.



UMI U560957

Published by ProQuest LLC 2013. Copyright in the Dissertation held by the Author.  
Microform Edition © ProQuest LLC.

All rights reserved. This work is protected against  
unauthorized copying under Title 17, United States Code.



ProQuest LLC  
789 East Eisenhower Parkway  
P.O. Box 1346  
Ann Arbor, MI 48106-1346

## *Abstract*

*This study focuses on the use of information and communication technologies (ICTs) in primary independent school classrooms in the state of Qatar. It explores the integration of ICTs into classroom learning environments in a context of comprehensive educational reform programme that took place in a developing country. Although literature shows a growing body of evidence that suggests the importance of using ICTs as instructional tools in classrooms and their roles in raising standards and enhancing learning, it is well accepted that there are obstacles and challenges associated with their integration into teaching and learning practices, particularly in a developing country that witnesses a comprehensive reform programme for its educational system. Hence there is a need for further studies that could improve educators' understanding of those key factors that could affect the use of such technologies in classrooms in these contexts. In addition, while it is widely claimed that ICTs could play an important role in improving students learning skills and their educational achievements, there is a lack of a study that could examine such a claim in a developing country that is in a process of a radical change of its educational system and which used ICTs as one of its reforming enablers.*

*This study set out to fill this gap by exploring and investigating empirically the key factors that affect the use of ICTs in primary independent schools' classrooms, the impact of using such technologies on students attitude, the key learning skills that can be acquired or enhanced by the use of ICTs in primary independent schools' classrooms, and the type of relationship between these three aspects. The study builds a theory that provides both theoretical and practical insights into the efficacy of ICTs in primary independent schools' classrooms.*

*Following a comprehensive review of literature in the field, a framework for the efficient use of ICTs in classrooms is formulated. The framework is then applied to four real world case studies in Qatar, to establish an exhaustive overview of the ICTs usage in primary independent schools. It is then revised by using an interpretive case study approach, which is dependent on an iterative research cycle where triangulated data are extracted from 79 interviews, around 15 observations and around 96 documents.*

*A framework for the efficient use of ICTs in classrooms is developed which presents three different but related key aspects that surround the process of using ICTs in classrooms. It is assumed to be used as a tool to determine the road ahead for employing and using ICTs in classrooms. In particular, it is claimed that it would help educators in identifying key factors that affect the use of the ICT instructional tools, the main factors that affect students and teachers attitude towards the use of ICTs, the possible learning skills that could be enhanced or acquired due to the use of such technologies, and the dependent relationship between all these issues. In addition, it can be claimed that this study has made a novel contribution to the area of using ICTs in primary independent schools in Qatar and has expanded the boundaries of knowledge, especially for educators that are seeking to integrate ICTs into their teaching and learning practice.*

## ACKNOWLEDGEMENTS

First and foremost, I would like to express my deep and sincere gratitude to my supervisor, Dr Chris Comber, who I could not have done this without his encouragement, patience, constructive criticism, and insights support. Secondly, I would like to extend my sincere thanks to my second supervisor, Dr. Tony Lawson, for his valuable advice and support throughout this study.

I am grateful to the government of the State of Qatar for giving me this great chance to conduct and complete this research as well as for their financial support throughout this PhD study. My deepest thanks for the back-up received from my family, particularly my parents who have supported me during the last four years. Special thanks go to my husband who offered me his continuous support during the period of this study.

Above all, my greatest thanks and gratitude to my God the Almighty who gave me the strength and perseverance to endure this challenging task.

# ***DEDICATION***

*To my husband, Dr Rashid Ali Aldosari*

*and*

*My children*

# Table of Contents

<b>CHAPTER ONE: INTRODUCTION .....</b>	<b>1</b>
<b>1.1 INTRODUCTION.....</b>	<b>1</b>
<b>1.2 RESEARCH AIM AND OBJECTIVES .....</b>	<b>3</b>
<b>1.3 RESEARCH QUESTIONS .....</b>	<b>4</b>
<b>1.4 THE TERM ‘ICTS’ .....</b>	<b>5</b>
<b>1.5 STUDY BACKGROUND.....</b>	<b>7</b>
<b>1.6 SIGNIFICANCE OF THE STUDY.....</b>	<b>10</b>
<b>1.7 BACKGROUND OF THE RESEARCHER.....</b>	<b>12</b>
<b>1.8 ORGANISATION OF THE THESIS.....</b>	<b>13</b>
<b>CHAPTER TWO: LITERATURE REVIEW.....</b>	<b>17</b>
<b>2.1 INTRODUCTION.....</b>	<b>17</b>
<b>2.2 RATIONALE FOR THE USE OF ICTS IN CLASSROOMS.....</b>	<b>18</b>
<b>2.3 FACTORS AFFECTING SUCCESSFUL USE OF ICT.....</b>	<b>20</b>
2.3.1 TEACHER ATTITUDES.....	21
2.3.2 TEACHERS TRAINING .....	25
2.3.3 ICT COORDINATORS AND TECHNICAL SUPPORT .....	28
2.3.4 CLASSROOM ENVIRONMENT AND TYPES OF TECHNOLOGIES USED .....	32
<b>2.4 THE IMPACT OF USING ICT ON THE STUDENTS ATTITUDES .....</b>	<b>34</b>
<b>2.5 LEARNING SKILLS ACQUIRED BY THE USE OF ICT.....</b>	<b>38</b>
2.5.1 CREATIVITY .....	39
2.5.2 COLLABORATION AND TEAMWORK .....	41
2.5.3 CRITICAL THINKING AND PROBLEM SOLVING.....	43
<b>2.6 THE USE OF ICTS IN THE ARAB EDUCATIONAL SYSTEMS.....</b>	<b>46</b>
<b>2.7 DISCUSSION AND ASSESSMENT .....</b>	<b>49</b>
2.7.1 INITIAL RESEARCH FRAMEWORK .....	50
2.7.1.1 <i>Factors affecting ICTs usage in classrooms</i> .....	51
2.7.1.1.1 <i>Teacher-centred factors</i> .....	51
2.7.1.1.2 <i>Environmental factors</i> .....	55
2.7.1.1.3 <i>Technical factors</i> .....	58
2.7.1.2 <i>Student attitude towards the use of ICT</i> .....	58
2.7.1.3 <i>Learning skills</i> .....	59
2.7.2 <b>DISCUSSION AND ASSESSMENT SUMMARY .....</b>	<b>59</b>
<b>2.8 CHAPTER SUMMARY .....</b>	<b>62</b>

<b>4.8 MOON INDEPENDENT SCHOOL.....</b>	<b>115</b>
4.8.1 SCHOOL MISSION AND VISION .....	115
4.8.2 TEACHING METHODOLOGY .....	116
4.8.3 SCHOOL FACILITIES .....	116
4.8.4 MOON SCHOOL ASSESSMENT METHODOLOGY .....	117
<b>4.9 RESEARCH FOCUS .....</b>	<b>118</b>
<b>4.10 CHAPTER SUMMARY .....</b>	<b>121</b>

## **CHAPTER FIVE: DATA ANALYSIS .....122**

<b>5.1 INTRODUCTION.....</b>	<b>122</b>
<b>5.2 KEY FACTORS THAT AFFECT THE USE OF ICTS IN CLASSROOMS</b> .....	<b>123</b>
5.2.1 CULTURAL ISSUES .....	123
5.2.2 TEACHERS TRAINING .....	129
5.2.3 TECHNICAL SUPPORT .....	134
5.2.4 AVAILABILITY AND ACCESSIBILITY OF ICTs .....	137
5.2.5 WORKLOAD.....	141
5.2.6 TYPE OF TECHNOLOGY USED .....	143
5.2.7 TEACHERS ATTITUDE.....	147
5.2.8 STUDENTS' ATTITUDE.....	154
<b>5.3 KEY LEARNING SKILLS .....</b>	<b>164</b>
5.3.1 CREATIVITY .....	165
5.3.2 CRITICAL THINKING AND PROBLEM SOLVING.....	170
5.3.3 COLLABORATIVE LEARNING AND TEAMWORK .....	177
<b>5.4 SUMMARY.....</b>	<b>182</b>

## **CHAPTER SIX: DISCUSSION .....185**

<b>6.1 INTRODUCTION.....</b>	<b>185</b>
<b>6.2 ANSWERING THE RESEARCH SUB-QUESTIONS.....</b>	<b>186</b>
6.2.1 KEY INFLUENCING FACTORS .....	186
6.2.2 FACTORS AFFECTING STUDENTS' ATTITUDE .....	194
6.2.3 KEY LEARNING SKILLS .....	199
6.2.4 RELATIONSHIPS AMONG RESEARCH MAIN ASPECTS .....	201
<b>6.3 REVISED FRAMEWORK FOR EFFICACY OF ICTS IN CLASSROOMS</b> .....	<b>206</b>
<b>6.4 OTHER ASPECTS .....</b>	<b>211</b>
<b>6.5 SUMMARY.....</b>	<b>213</b>

## CHAPTER THREE: RESEARCH METHODOLOGY .....64

<b>3.1 INTRODUCTION.....</b>	<b>64</b>
<b>3.2 RESEARCH DESIGN .....</b>	<b>65</b>
3.2.1 RESEARCH STRATEGY.....	66
3.2.2 MULTIPLE CASE STUDIES .....	68
3.2.3 SITE SELECTION .....	70
3.2.4 DATA COLLECTION INSTRUMENTS .....	71
3.2.4.1 <i>Semi-structured interviews</i> .....	72
3.2.4.2 <i>Observations</i> .....	77
3.2.4.3 <i>Documentations</i> .....	82
3.2.5 DATA ANALYSIS .....	84
<b>3.3 RESEARCH QUALITY CRITERIA.....</b>	<b>88</b>
3.3.1 CREDIBILITY.....	89
3.3.2 TRANSFERABILITY CRITERION .....	91
3.3.3 DEPENDABILITY CRITERION.....	91
3.3.4 CONFIRMABILITY CRITERION.....	93
<b>3.4 ETHICAL CONSIDERATIONS.....</b>	<b>93</b>
<b>3.5 SUMMARY.....</b>	<b>95</b>

## CHAPTER FOUR: CASE STUDIES BACKGROUND .....96

<b>4.1 INTRODUCTION.....</b>	<b>96</b>
<b>4.2 THE STATE OF QATAR IN BRIEF.....</b>	<b>96</b>
<b>4.3 A BRIEF HISTORY OF THE EDUCATION SYSTEM .....</b>	<b>97</b>
<b>4.4 EDUCATION FOR A NEW ERA .....</b>	<b>99</b>
<b>4.5 SKY INDEPENDENT SCHOOL .....</b>	<b>103</b>
4.5.1 SCHOOL MISSION AND VISION .....	104
4.5.2 TEACHING METHODOLOGY .....	105
4.5.3 SCHOOL FACILITIES .....	106
4.5.4 SCHOOL ASSESSMENT METHODOLOGY .....	107
<b>4.6 SUN INDEPENDENT SCHOOL.....</b>	<b>108</b>
4.6.1 SCHOOL MISSION AND VISION .....	108
4.6.2 TEACHING METHODOLOGY .....	109
4.6.3 SCHOOL FACILITIES .....	109
4.6.4 SUN SCHOOL ASSESSMENT METHODOLOGY .....	110
<b>4.7 EARTH INDEPENDENT SCHOOL .....</b>	<b>111</b>
4.7.1 SCHOOL MISSION AND VISION .....	111
4.7.2 TEACHING METHODOLOGY .....	112
4.7.3 SCHOOL FACILITIES .....	113
4.7.4 EARTH SCHOOL ASSESSMENT METHODOLOGY .....	114

## CHAPTER SEVEN: IMPLICATIONS AND CONCLUSIONS 215

<b>7.1 INTRODUCTION.....</b>	<b>215</b>
<b>7.2 IMPLICATIONS FOR RESEARCH.....</b>	<b>216</b>
7.2.1 METHODOLOGICAL IMPLICATIONS .....	216
7.2.1.1 <i>Initial research framework.....</i>	216
7.2.1.2 <i>Triangulation.....</i>	217
7.2.1.3 <i>Interpretive case study strategy: lessons learned .....</i>	218
7.2.2 THEORETICAL IMPLICATIONS.....	225
7.2.2.1 <i>Key Factors affecting teachers attitude .....</i>	228
7.2.2.2 <i>Key Factors affecting students attitude.....</i>	229
7.2.2.3 <i>Theoretical framework for the efficacy of ICTs in classrooms .....</i>	230
<b>7.3 IMPLICATIONS FOR PRACTICE .....</b>	<b>231</b>
<b>7.4 LIMITATIONS AND FUTURE RESEARCH.....</b>	<b>232</b>
<b>7.5 CONCLUDING REMARKS.....</b>	<b>233</b>
<b>REFERENCES .....</b>	<b>236</b>

APPENDIX I: INTERVIEWS GUIDE

APPENDIX II: INTERVIEWS NOTES' SAMPLE

APPENDIX III: OBSERVATION SAMPLE

APPENDIX IV: DOCUMENTATIONS SAMPLE

APPENDIX V: THE USE OF NVIVO IN THE DATA ANALYSIS PROCESS

## *List of Tables*

Table 2.1: Possible definitions for the term “Critical Thinking”	44
Table 3.1 The main characteristics of the selected schools	71
Table 3.2: Respondents’ School and occupations	75
Table 3.3: Summary of the major collected documents	83
Table 3.4: Summary of the collected newspapers’ articles	84
Table 3.5: List of the visited websites	84
Table 3.6 Parallel criteria for judging interpretive research (adapted from Guba and Lincoln, 1989)	89
Table 4.1:A brief historical background about the education system in Qatar	98
Table 4.2: Overall numbers of schools, teachers and students; (SAS, p.1)	102
Table 4.3: Teachers’ gender; age, and average of Qatari teachers and their teaching experiences; (SAS, p.4 and 7.)	102
Table 4.4: Teachers’ educational qualifications; (SAS, p.5)	103
Table 4.5: Teachers’ overall level of satisfaction with the quality of computer facilities available; (SAS, p.5)	119
Table 4.6: Students overall level of satisfaction with computer access; (SAS, p.48)	120

## *List of Figures*

Figure 1.1: Thesis structure	16
Figure 2.1 - Technology acceptance model (Davis et al. 1989)	54
Figure 2.2: Research initial framework for effective ICTs usage in classrooms	60
Figure 3.1: Components of data analysis; interactive model; adapted from Miles and Huberman (1984, p. 23)	85
Figure 4.1: The use of cooperative strategy in the learning process at the Sky school	105
Figure 4.2: The use of the interactive whiteboard in classrooms	106
Figure 4.3: Example of cooperative leaning lessons	112
Figure 4.4: The use of computer labs in the Earth school	114
Figure 4.5: The use of smart room at the Moon school	117
Figure 5.1: Factors affecting teachers' attitude towards the use of ICTs in classrooms	154
Figure 5.2: Factors encouraging students' attitude towards the use of ICTs	162
Figure 6.1: The mutual influences among research main aspects	202
Figure 6.2: A triangulated framework for the efficacy of ICTs in classrooms (i.e. a revised version of the developed initial research framework in Chapter 2)	207

## *List of abbreviations*

CAS:	Computer Attitude Scale
CBT:	Computer-based technology
EFL:	English as a Foreign Language
EI:	Evaluation Institute
GCC:	Gulf Corporation Council
HHPW:	Her Highness Personal Website
ICTs:	Information and Communication Technologies
Ipark:	Internet park
ISs:	Independent Schools
IT:	Information Technology
IWBs:	Interactive whiteboards
K–12:	Kindergarten through grade 12
KGS:	Kids as Global Scientists
LAW:	Local Area Network
Med:	Master of Education
MOE:	The Ministry of Education
MOFA:	The Ministry of Foreign Affairs
NVivo:	A software that can be used to facilitate and structure the analysis of any collected qualitative data
PCs:	Personal Computers
RAT:	Reasoned Action Theory

SEC: The Supreme Education Council  
TAM: Technology Acceptance Model  
WAN: Wide Area Network

# CHAPTER ONE: INTRODUCTION

---

## 1.1 Introduction

It is widely accepted amongst scholars that the information and communication technologies (ICTs) created a context in which traditional education methods fare badly in comparison due to the significance role that ICTs can play in enhancing learning environments and in raising educational standards (Zakaria 2001, Harrison *et al.* 2002). Educators all over the world, particularly in the developed countries were encouraged by the rapid introduction of ICTs into many aspects of people's lives and used these technologies as an enabler (or facilitator) for their educational reform initiatives, specifically in enhancing their learning environment in classrooms. According to Wang and Woo (2007, p. 149) "*educators commonly agree that ICT has the potential to improve student learning outcomes and effectiveness if it is used properly*".

The key motivation for integrating ICTs into education is their ability to support students in their own constructive thinking, their flexibility in allowing students to transcend their learning limitations, and their capability in engaging students' cognitive operations that they may not have been capable of otherwise (Salomon, 1993, cited in Lim 2007, Becta 2005). This is also realised by the developing countries which tried to integrate ICTs with their educational reform programmes. For example, the education master plan for ICTs in Singapore was launched in April 1997 with the aim of ensuring that schools integrated ICTs in their curriculum so as to develop a culture of thinking, lifelong learning, and social responsibility (Lim 2007).

Another example is the first phase of the Jordanian educational reform initiative that was launched in the period (1989-1995) which used ICTs as one of its main reforming tools (Zeinab 2006).

However, while it is obvious that ICTs are having an increasing impact on schools, particularly their usage in classrooms, it is equally apparent that their potential for enabling new styles of learning is not yet being realised and still encountering problems (Britain and Liber 2004, Littlejohn 2004). This is due to many factors that affect the efficacy of these technologies in classrooms which still need further researches (Becta 2003). In addition, there is a lack of a study that explores the impact of using ICTs instructional tools on students' attitude in a context of an educational radical change that takes place in a developing country. Furthermore, the literature of ICTs in education showed the lack of a study that examines the key learning skills that could be acquired or enhanced by the use of ICTs in classrooms, in a developing country that is engaging in a comprehensive educational reform initiative. Moreover, the relationships between all these aspects need to be explored and investigated in the mentioned context.

Exploring all these aspects is necessary to respond to managerial concerns since there are many countries over the world currently investing in the use of ICTs in their education and might expect substantial improvement in their education systems outcomes and high returns from such investments. In other words, there is a pressing need for empirical research to investigate these aspects and fill the existing 'gap'. Therefore, this study intends to explore the key factors that affect the efficacy of ICTs in the primary ISs in the State of Qatar which is witnessing a radical educational reform initiative. In addition, the study aims to explore the impact of using ICTs on

students' attitude, to identify the key learning skills that might be acquired or enhanced by the use of such technologies in classrooms, and to examine the relationships between these three aspects.

## 1.2 Research aim and objectives

The aim of this study is to explore the main factors that affect the use of ICTs in the Qatari primary ISs classrooms, examine the impact of using ICTs on their students attitude, identify the key learning skills that might be acquired or enhanced by the ICTs in their classrooms, and to understand the relationships between all these aspects. This should lead to the development of a theoretical framework that deals with the efficacy of ICTs in the primary ISs classrooms, in the State of Qatar. This framework aims to enable and help Supreme Education Council (SEC) officials in Qatar (and those countries which have a similar context and circumstances) to have a rich picture about the use of ICTs in primary ISs classrooms and how to optimise such usage. In other words, it is meant to be a triangulated framework that informs a proper mechanism for the efficacy of ICTs in classrooms. This aim could be reached by achieving the following objectives:

1. To examine the efficacy of ICTs in the primary ISs classrooms. This is done in order to relate the framework developed later to the current practices of ICTs usage in primary ISs classrooms, in the State of Qatar. To achieve this objective there were four aspects that needed to be investigated:

- To identify the key factors that might affect the use of ICTs in classrooms.
- To examine the use of ICTs in classrooms on students' attitude.
- To explore the key learning skills that might be acquired or enhanced by the use of ICTs in classrooms.
- To examine the relationships between the above three aspects.

These four aspects were achieved by reviewing the literature of ICTs in education and by means of interpretive case study research.

2. To develop a framework that enables education officials (i.e. educators or/and stakeholders) to identify factors that can affect the efficient use of ICTs in classrooms and to determine the key aspects that might affect students' attitudes towards the implemented technologies and on their learning skills. This framework is also aimed at helping educators identify the relationships between the mentioned aspects (i.e. the type of the relationships between those key factors that can affect the use of ICTs in classrooms, the impact of using ICTs on students' attitude, and the main learning skills that could be achieved or improved by the use of ICTs in classrooms).

### 1.3 Research questions

This study aims to answer one main research question, which is:

Can we develop a framework that can help and guide ISs stakeholders to identify the key factors that affect the use of ICTs in primary ISs classrooms, to explore the impact of using of ICT instructional tools on primary ISs students attitudes, to

examine the main learning skills that can be acquired or enhanced by the use of ICTs in primary ISs classrooms, and to identify the type of the relationship between these three aspects?

This question can be divided into four sub-questions. These are listed below:

Q1: What are the key factors that can affect the use of ICT in primary ISs classrooms?

Q2: How does the use of ICTs affect primary ISs students' attitude?

Q3: What are the key learning skills that might be achieved or enhanced by the use of ICTs in primary ISs classrooms?

Q4: What is the type of the relationship between the factors that affect ICTs use in primary ISs classrooms, the impact of using ICTs in primary ISs classrooms on students' attitude, and the learning skills that might be acquired or enhanced by the use of ICTs in primary ISs classrooms?

#### 1.4 The term 'ICTs'

There is no agreed definition for the term 'ICTs' in the available literature. For example, Wang and Woo (2007, p. 149) stated that ICTs "*can be hardware (such as computers, digital cameras), software (such as Excel, discussion forums), or both. In the educational context, it mainly refers to various resources and tools (software) presented on the computer*". Whereas Taylor (2000, p. 4; cited Wang and Woo 2007, p.149) described ICT as "*a useful tool that enables us to link various learning communities together in new and different ways*". On the other hand, Heeks (2002)

tried to explain what the term means by discussing the difference between the two terms: “IT” and ICT. Heeks (2002, p.1) stated:

*Where before we talked simply of information technology (IT), we now talk of information and communication technology (ICT). This reflects the convergence of digital computing and telecommunications. Computers were largely focused on the processing of information, ICTs undertake both processing and communication of information.*

As a matter of fact the term “ICTs” encompasses more than computers. According to (Siraj-Blatchford and Siraj-Blatchford, 2003, p. 4), the term ICT can be defined as “anything which allows us to get information, to communicate with each other, or to have an effect on the environment using electronic or digital equipment”. In this study, the term is used to include the use of the following technologies in the ISs:

- Computers (including desktop, laptop, and handheld computers, other related devices);
- Interactive whiteboard and touch-panel screens
- Digital cameras and digital video cameras;
- Creativity and communication software and tools;
- Local Area Network (LAN), Wide Area Networks (WAN), internet, intranet and extranet;
- Simulated environments, and computer games;
- Videoconferencing technologies and closed-circuit television;
- Data projectors.

## 1.5 Study background

The leaders of Qatar commissioned the RAND Corporation, in 2001, to examine kindergarten through grade 12 (K–12) of the educational system in Qatar with the aim of recommending options for building a world-class system consistent with other Qatari initiatives for social and political change, such as wider opportunities for women (Dominic *et al.* 2007). Consequently, RAND started its initial study in 2001-02. The study reported several strengths in the existing educational systems as well as extensive weaknesses. Thus RAND developed three specific system-changing options and presented the developed option to Qatar leadership for discussion. These options include (Dominic *et al.* 2007, p. xix):

- (1) *A Modified Centralized Model, which upgraded the existing, centrally controlled system by adding or improving the basic elements;*
- (2) *A Charter School Model, which decentralized governance and encouraged variety through a set of schools independent of the Ministry and which allowed parents to choose whether to send their children to these schools; and*
- (3) *A Voucher Model, which offered parents school vouchers so that they could send their children to private schools and which sought to expand high-quality private schooling in Qatar.*

The first reform option was rejected due to its similarity to previous reform attempts of the past, which had produced some improvements but left most of the system unchanged, whereas the third option was ruled out in the favour of the second option which was described as lower risk than the second option. Thus, it was decided to proceed with the second option as it encourages parental choice, partially decentralize governance, and provide a new school model. This new school model was given a name, which is: the Independent Schools Model to “ *better communicate the model’s*

*principles to the public*” (Dominic *et al.* 2007, p. xix). The model was to be based on four principles: autonomy, accountability, variety, and choice. According to (Dominic *et al.* 2007, p. xix) *“The adoption of these particular principles was notable in a region where such principles are both rare and poorly understood”*.

To proceed further towards this direction (i.e. the second option), the State of Qatar launched a comprehensive educational reform initiative in November 2002 when His Highness the Emir of the State of Qatar, Sheikh Hamad Bin Khalifah Al-Thani, issued the decree number 37 regarding the creation of the Supreme Education Council (SEC) and the Education and Evaluation Institutes (HHPW4). The goal was to build a modern, world-class school system to provide Qatari children with a high quality education comparable to that offered in the best schools around the globe. The key elements of the reform initiative are: (1) establishing new government-funded Independent Schools (ISs) and (2) issuing annual student assessments and surveys to help monitor and improve student learning and school performance. As mentioned earlier, the reform initiative was based on four principles, specifically autonomy, accountability, variety and choice. The autonomy principle aims to encourage new ISs to be innovative and to improve student outcomes, whereas accountability ensures compliance and measures progress through national assessments. With respect to the variety principle, it is meant to encourage the establishment of different kinds of schools and instructional programs. The final principle is the choice, which allows parents to select the schooling option best suited to their children's needs (Chapter 4 gives more details about the context within which this study was taken place).

The variety principle is meant to diverse schooling options that would be offered by interested parties (i.e. ISs operators), since each Independent school would be free to specify its educational philosophy and operational plan (Dominic *et al.* 2007, p.59). In other words, the variety principle aims to open schools that can meet particular societal demands such as a school specializing in science and technology.

*Having a variety of approaches was especially important for the school system, because there were no approaches known to lead to outstanding student outcomes in Qatar. If the system included a variety of approaches, each school could be studied to determine what does and does not work well for Qatari students. (Dominic et al. 2007, p.59)*

Similar to the leadership of many other countries, Qatar leadership views education as the key to future economic, political, and social progress. However, the ability for any country to compete in the global economy and enable its citizens to take full advantage of technological advances relies on upgrading the quality of the schooling provided and ensuring that what is taught is aligned with national priorities and international developments (Dominic *et al.* 2007, p.1). One of the key aspects that Qatar took into consideration during its upgrading process of the quality of its schooling was to incorporate leaning technologies in the classrooms of ISs (Dominic *et al.* 2007).

Therefore, this study explored the type of ICTs that were implemented and the way that those technologies were used by primary ISs in the State of Qatar. This included identifying the key factors that could affect the use of ICTs in the ISs classrooms and what the impact of using these ICTs on the ISs students' attitude. In addition, it examined the main learning skills that acquired or enhanced by the use of these technologies in the ISs classrooms and investigated the type of the relationships

between these three aspects (i.e. the factors that affected the use of ICTs in classrooms, the students' attitude towards the use of the implemented technologies and the key learning skills that could be acquired or improved due to the use of these technologies).

Having said this, an interpretive case study strategy was used to investigate the above issues and to answer the research questions. The research strategy used in this study is a multiple cases study where four primary ISs were examined. The study used semi-structured interviews, direct observations, and documentation as primary sources of evidence with the aim of that the weaknesses in any single data collection method will be compensated by the counter-balancing strengths of another (Jick 1979) and reducing the chances of errors as well as misinterpretations (Duchon and Kaplan 1988; Stake 1994).

## 1.6 Significance of the study

It is essential for operators (i.e. ISs management) and teachers within ISs to be receptive to changes and to be able to adopt innovations in their instructional programmes, so they can achieve the anticipated benefits of change. Understanding the adoption and use of ICTs, and the support needed to incorporate them into the teaching and learning processes will help teachers, students, and the operators of ISs in using them more effectively and hence improving the learning outcomes. The findings of this study will contribute to the general knowledge base of research on change and educational reform programs by providing information about the diffusion of an important innovation in a Qatari context. In addition, the researcher presented

the research findings in a form of a framework that treats the adoption and the use of ICTs inside classrooms from three different but related aspects (i.e. the key factors that might affect the use of ICTs in ISs classrooms, the impact of using ICTs on ISs students' attitudes and the learning skills that might be achieved by using ICTs as instructional tool inside ISs classrooms). Furthermore, the framework showed the relationship between these three aspects (i.e. the impact of each aspect on the other two aspects). Moreover, it is hoped that the study findings will provide the SEC with contemporary data that will help in making policy decisions and applying educational strategies with greater certainty. Also findings are expected to provide the SEC with current data on ISs' use of ICTs, to facilitate change more effectively for the benefit of their students.

On the other hand, this research presents a number of significant contributions to the researched area. The major contribution this study makes is to develop a framework that can inform the efficacy of ICTs in primary classrooms in a developing country that is engaged in a comprehensive reform program. In particular, the framework enables educators to identify the key factors that might affect the use of ICT in classrooms, the impact of using ICTs on students' attitude, the key learning skills that could be acquired or enhanced by the use of ICTs in classrooms, and the type of relationship between all these three aspects. From the research methodology perspective, it can be said that there is an additional contribution of this study to knowledge of the field. The use of interpretive case study is found very helpful in providing a 'rich picture' and in-depth understanding of the use of ICTs in primary ISs classrooms. In other words, this study presented a number of lessons learned for

other researchers who might be interested in using this strategy in their area of interest.

## 1.7 Background of the researcher

The researcher is a female Qatari national with teaching qualifications and qualitative-based educational research experience. She has an interest in the development of education in her country in general, and in particular in the integration of ICTs into the newly adopted phenomena of ISs.

As an experienced teacher with previous research experience in the area of education, she conducted an 18 months qualitative research that led to the award of a successful Master of Education degree from the University of East Anglia, Norwich, UK. After the award of MEd she was offered the move to a teaching career in a higher education institute but preferred to carry on her school teaching. Her return to teaching as a researcher was intended to encourage more teachers to undertake action research and to investigate their own teaching to see the direct result of such teaching and its implications for learning and the lives of students.

When the latest education reform began to appear she, as many others, heard about ISs for the first time. As a teacher she was interested to see how the new project would help to develop the education of the nation. As a researcher, however, she wanted to examine closely the possibility of integrating newly adopted ICTs approaches in such schools and how this could help in achieving the aims of such schools.

The researcher is relying on her experience of living and working as a teacher in the State of Qatar and on many occasions there will be reflections on powerful childhood experiences as a pupil and as a teacher in Qatari schools. There will also be reflection on her role as a parent of pupils attending full-time schooling in the State of Qatar. The project will utilise qualitative research skills, developed in the field of education research in the State of Qatar, that led to a successful MEd research-based dissertation.

The researcher has direct professional and linguistic access to the Qatari culture and educational system. Consideration will be given to the role of the researcher in field work that could be complex and varied; because data is collected from one country in Arabic and presented in another country in English, translation is considered as one of the main methodological issues which the research explored and was given careful attention.

## 1.8 Organisation of the thesis

**Chapter one:** represents an introduction to the thesis. It sheds light on the research aim, objectives, research questions, the reasons behind undertaking this research and the significance of the study. In addition, it briefly highlights the organisation of the thesis.

**Chapter two:** reviews the ICTs literature in relation to education. Specifically, it reviews the literature that related to the rationale for the use of ICTs in classrooms,

the key factors that can affect the use of ICTs in classrooms, the impact of using ICTs on students attitude, and the major learning skills that might be acquired due to the use of ICT instructional tools in classrooms. In addition, it reviews educational reform initiatives literature that related to some of the developing countries (i.e. Arab countries, particularly Gulf Corporation Council (GCC) Countries). After the discussion and the assessment of the mentioned literature, the researcher proposed an initial research framework based on the gap identified in the literature.

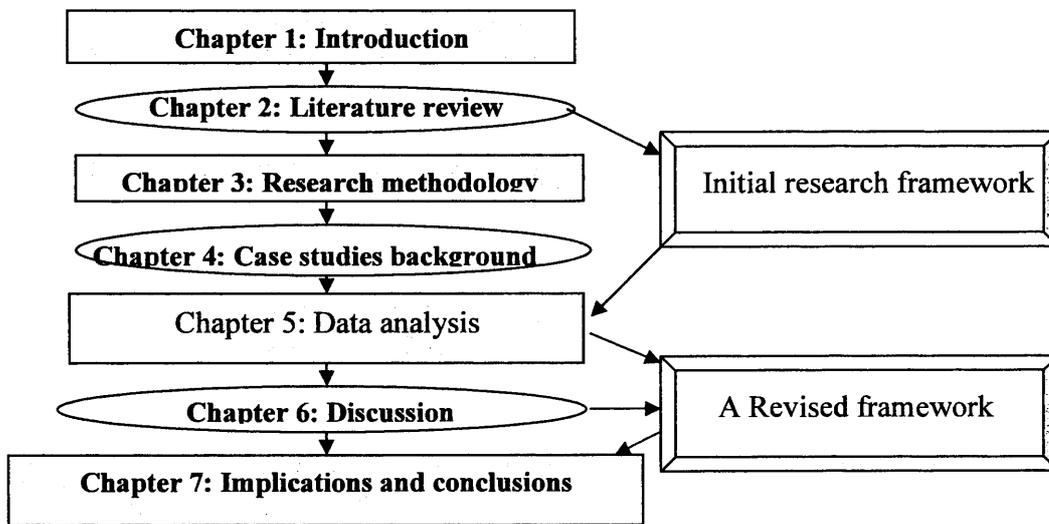
**Chapter three:** describes the research philosophy underpinning the study, explains the research strategy, and justifies the rationale behind its selection. Then, it discusses and presents the research design. After that, the chapter sheds light on the main criteria that was used to judge the quality of this study. Finally, it presents the ethical considerations that were taken into account during this research.

**Chapter four:** aims to give the reader an idea about the country where the selected case studies were conducted. In particular, it starts with a brief historical background about the State of Qatar and its educational system. Then, it gives the reader a clear idea about the selected case studies and their specificities. In particular, it explains the reform programme of Qatar educational system and explores the mission, vision, teaching methodologies, and available facilities of the case studies (i.e. the selected ISs). Finally, it briefly highlights the research focus with respect to the selected schools (i.e. case studies).

**Chapter five:** provides a descriptive and interpretive analysis of the practices that took place in the case studies site with regard to the use of ICTs in primary ISs classrooms in the State of Qatar. Specifically, the chapter analyses and discusses the field study findings that relate to factors affecting the use of ICTs in classrooms, the impact of using ICTs in primary ISs classroom on students' attitude, and the main learning skills that could be acquired or enhanced by the use of ICTs in classrooms. The data collected from the interviews, official documents, direct observations, and other secondary data sources (e.g. press releases and TV's interviews, etc) are structured and analysed in relation to the initial research framework established in Chapter 2. In other words, the chapter aims to use this framework to structure the data analysis process and at the same time test it with the analysed data which was collected from the case studies.

**Chapter six:** seeks to highlight and discuss the research findings and link them to the research objectives with the aim of making sure that findings really answered the research questions and satisfied the research objectives. In other words, the chapter brings findings analysed and discussed in Chapter 5 together and presents them in a form of a triangulated framework that answers the main research question. This triangulated framework is, in fact, a revised version of the initial research framework that was developed in Chapter 2. Specifically, it is a comprehensive framework for the efficient use of ICTs in primary ISs classrooms.

**Chapter seven:** discusses and concludes the final results of the research implications for research and practice. In addition, it highlights the study's limitations, and gives recommendations for future research. Figure 1.1 below shows an overview of this thesis structure.



*Figure 1.1: Thesis structure*

## CHAPTER TWO: LITERATURE REVIEW

---

### 2.1 Introduction

In line with the objectives of this study, this chapter offers a review of related literature. As stated in Chapter 1, this research is significant for the development of education in the State of Qatar as the country is going through a comprehensive education reform. Such reform in education is hoped to be accompanied by, and assisted with integrative technological reform. The literature showed that there are many scholars who believe in ICTs ability in supporting and promoting educational reform programmes, particularly in promoting the learning environment in classrooms. On the other hand, there are other authors who argue this suggestion and have doubts about it. For example, Abrami (2001, p.114) states: *“To date, there is much promise but less substance, especially long-term evidence, regarding the effective use of technology for learning”*. Therefore, this chapter aims to review the literature that related to the use of ICTs in education, particularly in classrooms by describing the ways in which ICTs use in schools impacts on learning, learning environments, students, teachers, and schools.

In addition, this review will seek to identify those factors that affect the use of ICTs in classrooms as well as the learning skills that might be acquired or enhanced by the use of such technologies. This review will also focus on the use of ICTs as educational technologies. In order to accomplish this, the review will seek to develop an initial research framework (i.e. conceptual framework) within which to address these concerns. In addition, the researcher aims to use this conceptual framework to

structure the data collection in the case studies sites as well as the data analysis processes of the collected data.

This chapter is composed of eight sections. The next section will shed light on the rationale for the use of ICTs in education. Then, Section 2.3 will focus on the key factors that affect successful use of ICTs in education, particularly in classrooms. After that, Section 2.4 will shift the focus to the impact of using ICTs on students' attitudes. Whereas the learning skills that might be acquired or enhanced by the use of ICTs in classrooms are discussed in Section 2.5. Section 2.6 will provide a brief background about the use of ICTs in the Arab educational systems, particular in the Gulf Cooperation Council (GCC) countries. Then, an assessment summary of the reviewed literature is presented in Section 2.7. In addition, Section 2.7 will assess the literature covered in this chapter and will identify the 'gap' that needs to be bridged by this study and finally will summarise the discussion in the form of an initial research framework shown in Figure 2.2. Finally, Section 2.8 will summarise this chapter.

## 2.2 Rationale for the use of ICTs in classrooms

*Much evidence indicates that technology has great potential to increase learners' motivation, link learners to various information sources, support collaborative learning, and allow teachers more time for facilitation in classrooms (Wang and Woo 2007, p. 149).*

Over the last three decades, computers have been increasingly used in teaching and learning at all levels. Rapid development in the areas of ICTs in recent years has made information ubiquitous, computers cheaper and more powerful, and has fuelled further development and changing the nature and practices in education (Wang and Woo

2007, Myint 2001). The literature of using ICTs in education showed that the major rationale for integrating ICT tools in schools' classrooms was more concerned with the need to use them to improve student learning (Welle-Strand, 1991). For example, Wang and Woo (2007, p. 151) suggested that *"Technology should be used not because it is available or it has been shown effective in some cases. It should be used to enable the process and enhance learning"*. Other commentators (e.g. Clark, 2001; Hung and Chen, 2001; Garrison and Anderson 2003) justified the use of ICTs in classrooms by their ability to encourage discussion and collaboration in classrooms, increase student involvement, and promote student achievement and satisfaction. In addition, Lim (2007, p.84) stated that the *"primary motivation for integrating ICT in education is this belief that it supports students in their own constructive thinking, allows them to transcend their cognitive limitations, and engages them in cognitive operations that they may not have been capable of otherwise"*. Moreover, Roblyer *et al.* (2004) mentioned that there are a number of reasons for rationalizing the use of technology in classrooms such as high motivation, unique instructional capabilities (e.g. helping students visualize data/problems or tracking learning progress), support for innovative instructional approaches (e.g. collaborative learning and problem-based learning), and increased teacher productivity as well as student knowledge construction.

On the other hand, there are many uncertainties regarding the mentioned benefits of technology and the changes that the adoption of technology necessitates due to many barriers such as the demand for technical support, pedagogical and instructional management issues, teacher professional development, network infrastructure, and costs of all components (Hunter, 1993). Hepp *et al.* (2004) also emphasised the

importance of having a pedagogical perspective during the integration of ICTs into teaching and learning processes, otherwise there will be a low-return investment. This is also suggested by other studies that emphasised the necessity of coupling ICTs with the pedagogical strategies that can engage students in higher-order thinking (e.g. Kearney and Treagust, 2001; Oliver and Hannafin, 2000). These issues and other are discussed further below.

### 2.3 Factors affecting successful use of ICT

Having explained the rationale behind the use of ICTs in classrooms, this section seeks to explore those factors that might affect the use of ICTs in general and particularly in classrooms as this is one of the main objectives of this research. The literature showed many factors which include, for instance, classroom environment and design issues, types of technologies used, teachers' commitment, teachers' ability to use ICT, the role of the ICT coordinator, IT technicians and other support agents such as the helpdesk. According to Sime and Priestleyw (2005, p.136) study, students identified a range of factors that they perceived as conditioning the successful use of ICTs in the classroom. They grouped that range of factors into three categories, specifically:

- (a) Physical factors, i.e. that refer to the provision of ICT resources in schools;*
- (b) Human factors, i.e. that refer to teachers' perceived attitudes towards ICT use, their ICT competence and specialised training;*
- (c) Cultural factors, i.e. that refer to the more general attitude promoted towards the use of ICT at school level and at the community level (Sime and Priestleyw 2005, p.136).*

In addition, Zhao *et al.* (2002) suggested that there are three factors, associated with the teacher, that contributed significantly to the success of classroom technology innovations which are technology proficiency, pedagogical compatibility, and social awareness. Moreover, other scholars mentioned other broad (i.e. general) factors such as the leadership, professional development, time, and evaluation (Wang and Woo 2007, Hoeny *et. al* 2004). Furthermore, Liu (2007) identified a number of factors that can affect the use of ICTs in classrooms; He stated:

*Many factors influence the application of technology in classrooms and determine its educational benefits, such as the pedagogical approach of teachers, technology used, infrastructure and support, training regarding technology application, teacher attitudes about educational technology, teacher classroom practices, classroom management skills, and so on (Liu 2007, p. 107-108).*

Bitner and Bitner (2002) also emphasised the crucial role of teachers in the success of integrating ICT in the learning and teaching practices. However, teachers' role can be affected by many factors. These factors and others are described below.

### **2.3.1 Teacher attitudes**

Previous studies have shown that the use of ICTs in classrooms depends upon teachers' attitude. Examining teachers' attitudes and their influence on behaviour is an important step towards understanding the psychosocial factors affecting teachers' use of ICTs in teaching and learning processes. One of the theories that was developed to understand individuals' behaviour is the Reasoned Action Theory (RAT). This theory was developed in the early 1970s by Ajzen and Fishbein to study human behaviour and develop appropriate interventions. RAT is simply a framework that aims explore the link between attitudes and behaviour. According to Ajzen and Fishbein (1980)

RAT suggests that the most important determinant of a person's behaviour is behavioural intent where the person's intention to perform a behaviour is a combination of his or her attitude toward performing the behaviour and subjective norms. However, before looking at what forms teachers' attitude towards the use of technology in teaching and learning, it is worth highlighting the meaning of 'attitude' in this study. Sayer and Jones (1985, p.25) defined the term as "*an acquired orientation towards or away from some object, person, group, event or idea*".

The literature is plentiful with studies that link the effectiveness use of ICTs tools in classrooms with teachers' attitude (e.g. Becker, 2000; Murphy, 2000; Braak, 2001; Earle, 2002; Kumar and Kumar, 2003). Teachers' attitude towards any innovative ideas or trends is no doubt will influence the teaching and learning processes as well as their students' attitude (Lim 2007). According to Rogers (1995), many factors contribute to whether an individual develops favourable or unfavourable attitudes toward an innovation, and hence either adopts or rejects that innovation. Since teachers are assumed to be major stakeholders in making such adoption decisions with respect to those innovations that are designed for educational systems (Spiegel, 2001), it is necessary to transform their attitude towards the incorporation of technology in their instructional programmes. Teachers, according to Sime and Priestleyw (2005), are perceived by students as the main catalyst in implementing and promoting the purposeful use of ICTs in their classes. More than this, teachers' attitudes towards the use of ICTs in classrooms are thought to influence not only the acceptance of computers, but also future behaviours, such as using those ICTs as professional tools in classrooms instructions (Kumar and Kumar, 2003; Earle, 2002; Braak, 2001).

Lawson and Comber (1999) compared institutions that successfully integrated ICTs during the project of integrating the superhighway technology in schools in the UK and found that teachers' attitudes prior to the innovation to be one of four personnel factors which were important dimensions of the integrative school. The other three were the role of the ICT coordinator, the attitude of senior management and the existence of adequate support and training.

One of the important factors that can minimise the negative teachers' attitude towards the use of ICTs in classrooms is the launching of some awareness programmes that inform teachers of the benefits of using such technologies in classrooms. In other words, although a significant percentage of educators have always felt that computers could support and enhance learning opportunities in classrooms (Yildirim, 2000), teachers still need to understand why should they care and what they can benefit. Peters and Lankshear (1996) in John and Sutherland (2004, p.107) point out:

*Teachers need to recognise that the traditional designated educational spaces—the textbook, the classroom, the curriculum and the school—need no longer be viewed as enclosed institutional domains. Instead the digital text, used skilfully, can create the conditions where time and energy are released, enabling more creative teaching to be brought to the processes of learning and understanding.*

Other factors that might affect teachers attitude towards the use of ICTs in classrooms include their age and gender. These two factors were proven by some studies which linked teachers' attitude towards the use of technologies in classrooms with their age and gender. For example, Hung and Hsu (2007) found that the teachers' attitude was significantly correlated with their age and seniority. They stated: "*The older and more senior teachers generally held a less positive attitude toward computers*" (Hung and Hsu 2007, p. 233). With respect to the use of computer-based technology (CBT), they

found that: *“male teachers in general used more CBT [computer-based technology] in their instructional strategies than did female teachers* (Hung and Hsu 2007, p. 233).

Moreover, students' attitude towards the use of technologies in classrooms is another important factor that could be affecting the teachers' attitudes. Such attitude and its implication on the teaching process (on students' behaviour and acceptance for example) should not be ignored (this issue is discussed further below). Garcia (2001) strongly recommended that when using technology in the classroom, teachers should take some time in assessing students' attitudes toward technology prior to the structuring of instruction and its implementation in the classroom sessions. This approach is appropriate in that it ensures that the students will have maximum gains in, utilizing technology as a tool for learning. Furthermore, education professionals will be given the chance to create an environment that can be conducive to the learners (Garcia, 2001).

In summary, the purpose of the above discussion was not only to examine teachers' attitude towards or against the use of technologies in classroom, but to emphasise the importance of such attitudes for the success and effectiveness of the use of ICTs tools in classrooms. However, it is worth highlighting that while several studies have addressed the relationship between teacher attitudes and effective use of ICT in the classroom, few have investigated this phenomenon in the Arab world (e.g. Al-Asmari, 2005; Sadik, 2005; Al-Ammari, 2004; Al-Oteawi, 2002), and fewer still have looked at attitudes towards ICTs among Middle Eastern teachers (e.g. Albirini, 2004), particularly in a developing country that is witnessing a comprehensive educational reform initiative. Teachers' attitudes towards the use of ICT in classroom can have an

affect on her or his commitment to use, apply, and make the most of ICT in teaching and learning practices. Having positive teachers' attitude is necessary as this will help in changing his or her role accordingly from information giver to facilitator (or mediator) to the students (Dyrli and Kinnaman, 1994).

### **2.3.2 Teachers training**

*Students tended to reflect on the teachers' personal attributes as representing the main barrier to innovative ICT use. Such attributes include teachers' attitudes towards the role of ICT in schools and their own skills and confidence in using ICT as a tool for teaching. Students often related teachers' attitudes to their own experience of using ICT. Some students expressed the view that they would be reluctant to risk a lesson by using a tool with which they were not familiar. Others were less sympathetic, believing that failure to use ICT in class deprives children of an important skill for life. (Sime and Priestleyw 2005, p.136-137)*

The literature showed that teachers' training is an essential component of ICTs operational policy, particularly if the use of those ICTs is connected with educational reform initiatives. The introduction of technologies in teaching and learning processes added an additional load to teachers and made their job one of the most challenging jobs since knowledge is expanding rapidly and modern technologies require teachers to learn how to use such technologies in their teaching practices.

*To use these tools effectively and efficiently, teachers need visions of the technologies' potential, opportunities to apply them, training and just-in-time support, and time to experiment (Jung 2005, p.94).*

Teachers' training, particularly those focuses on classroom practices, was found as a major element to educational reform initiatives since teachers need to acquire ICTs operational skills, especially in the early phases of ICTs introduction (Bransford *et al.*

2005; Fishman and Davis 2006). Teachers need to be engaged in continuous training and professional development programs as technologies are changing rapidly. Thus, the more the use of ICTs progresses, the more teachers need advanced skills in how to integrate those ICTs into their curriculum and into everyday classroom practice. Having achieved the required training and professional development, teachers can be then informed and confident in their use of new technologies (Bowes, 2003).

Moreover, it is believed that there should be a whole-school approach for integrating ICTs in the teaching and learning process should educators seek to achieve effective ICTs usage in classrooms (McCormick 1991). However, such an approach requires the application of both macro (top down) and micro (bottom up) strategies during the implementation of ICTs and the professional development of teachers (Davis *et al*, 1992). According to Sime and Priestleyw (2005, p.137) study: *“many students considered that the ways in which the school organised the use of ICT influenced its micro-use at the class level. Some schools were thought to promote ICT use through strategies such as encouraging teachers’ computer use, providing teachers with organised opportunities for training, giving them opportunities to exchange ideas about integrated ICT use and providing a support teacher or technician. Students thought that, in this kind of environment, even the most reluctant teachers were more likely to attempt to learn to use ICT”*. Whether it is constructed as a survival or a change, what matters is teachers acquire the necessary knowledge and information, as well as mastering skills needed to make maximum use of the technology applied in their classrooms.

Furthermore, teachers' commitment to learning the know-how, using and applying technologies in classrooms is essential to make the most of the experience. One may argue that for teachers to be committed to the use of ICTs they need to see the benefits of ICTs and how that helps them to develop their profession. Hung (2005), for example, claims that ICTs can provide more flexible and effective ways for professional development for teachers, improve pre- and in-service teacher training, and connect teachers to the global teacher community. Hung (2005, p.94) then stresses: *"There has been increasing evidence that ICT may be able to provide more flexible and effective ways for lifelong professional development for today's teachers."*

There is no doubt that teachers' training (whether pre-service teacher training or in-service teacher training) can influence the effectiveness of any ICTs programme. Selinger's view (2001; cited in John and Sutherland 2004, p.106) suggests that *"once teachers' expertise with the technology is balanced with the subject teaching, they may show increased levels of motivation and use regarding ICT"*. In addition, the literature is plentiful with studies that suggest that the lack of training is a potential source for teachers' low levels of confidence and negative attitudes towards the use of ICTs in classrooms (e.g. Cox *et al.* 1988; Kumar and Kumar, 2003).

In a study published by John and Sutherland (2004, p.101), the evidence suggests that a number of tensions surface when subject teachers engage with ICTs in their classrooms, and one of those tensions described by Selinger (2001) is the tension between teaching about and teaching through ICTs. In addition, John and Sutherland (2004, p. 106) argued that evidence from a collection of papers suggested that the use

of ICTs is being embraced but not imposed and this is in part due to the teachers' genuine desire to move away from oversimplified debates and instead concentrate on the creation of rich environments in which their students engage their minds well. Training teachers to achieve something that benefits students and education is in demand, but training teachers to achieve something that they desire is also worthwhile. *"A well-designed teacher training program is essential to meet the demand of today's teachers who want to learn how to use ICT effectively for their teaching"* (Jung 2005, p.100).

### **2.3.3 ICT Coordinators and technical support**

The ICT coordinator plays an important role in the effectiveness of any given ICT school plan. However, before discussing the effect of this factor, it is worth highlighting the ICT coordinator's role. Krikman (2000, p.47) reported that *"ICT coordinators may work at improving the background conditions (fertility of the soil) and if conditions are favourable may take an initiative (plant seeds) to gain an innovative decision"*. It has been also found that schools and educational districts requirements vary according to the nature, size, and type of the school but, in general, the ICT coordinator's role include the following<sup>1</sup>:

1. Develops and implements the technology education program of the district.
2. Cooperates with other instructional leaders to determine appropriate use of technology for instruction in various subject areas.
3. Recommends the purchase of material for the implementation and improvement of technology instruction in the district.

---

<sup>1</sup> Information retrieved on August 2005 from <http://www.spart5.k12.sc.us/Technology/schooltechcoordinator.htm>

4. Coordinates the distribution of computer hardware, software, and peripherals in the school.
5. Maintains an inventory of computer equipment and peripherals and catalog of software in the school and district databases.
6. Reviews and evaluates new commercial software as it is developed and communicates such evaluation to the instructional leaders of the district.
7. Provides staff development in the use of the technology as an instructional tool.
8. Works with curriculum committees to develop or procure technology programs to meet instructional objectives.
9. Represents the district technology education program to the public through computer workshops and other presentations.
10. Evaluates on an annual basis the overall technology education program of the school, and as a member of the technology team makes resultant recommendations regarding the overall program to the superintendent.
11. Manages the computerized report card system.
12. Coordinates the student computer labs.
13. Develops a yearly budget for school and district technology expenditures.
14. Responsible for such tasks and services as: daily upkeep and administration of the network and interconnectivity infrastructure; daily upkeep and administration of the computing hardware and software elements; hardware and software troubleshooting and repair; data backup and recovery; hardware and software upgrading; hardware and software inventory records; and other general maintenance.
15. Assumes any other relevant duties as assigned by the principal.

Based on the above responsibilities and duties, the ICT coordinator could be perceived as a change agent (Kirkman 2000). “The most significant role of the change agent is to act as an interface between the adopters of the innovation and those with a vested interest in seeing the change occur: the stakeholders” (Dalton, 1989, p.24). However, Siegel (1995) warned that “While ‘nuts and bolts’ training on equipment is obviously necessary, most experienced technology trainers argue that staff development has to move beyond this rudimentary stage to have any real effect” (Siegel, 1995, p.44-45).

Lawson and Comber (1999) found the ICT coordinator to be one of four personnel factors which were important dimensions of the integrative school. In addition, the findings of a study by Fahraeus, (2004, p.137) stressed that “*technology can not be used without local support*”. The findings also stressed that the use of technology in classrooms as expansive-learning activity is bound to meet some technical problems. Not only does the hardware and software to be there; students also need to know how to use it that demands some local support. This introduces a new role in the community: ICT support (p.137). This is where the ICT coordinator comes. An ICT coordinator who knows how to facilitate support that is required to make maximum use of ICT in classroom is essential.

Furthermore, the establishment of technical support service is essential for ICT to achieve effective learning. Such service is sometimes referred to in schools as the ICT helpdesk. Other forms of technical support than the helpdesk staff are also required such as the IT technicians whose main responsibility would be trouble shooting and

one-to-one student support. Adequate support and training were factors that found to important dimension of integrative schools (Lawson and Comber 1999).

According to Earle (2002) there are many factors that could hinder or promote the use of technologies in a classroom which could be classified into two classifications (or categories): these are first-order and second-order barriers. First-order category includes some certain barriers such as access, time, support, resources, and training. Whereas second-order category consist of some other barriers such as attitudes, beliefs, practices, and resistance. Earle (2002) emphasized that the second-order barriers are more difficult to change, as overcoming them requires prolonged use of technology rather than a one-day workshop. He also pointed out that teachers could overcome such second-order factors by, for instance, observing technology, reflecting and discussing their evolving ideas, and collaboration with others colleagues.

According to Bitner and Bitner, (2002) it is the skill and attitude of the teacher that can determine the effectiveness of technology integration into the curriculum. Once the teachers develop skills through ongoing training, they could begin to find ways to integrate technology into their curriculum and demonstrate its use to their students and colleagues. If learning was the momentum that led the use of ICTs in classrooms, teachers and students could be partners in the learning process, altering traditional paradigms of the teacher providing wisdom and the student absorbing knowledge.

### 2.3.4 Classroom environment and types of technologies used

Classroom environment in schools basically involve one or more adult teachers connected with a number of students, usually in well-defined physical settings. Teachers and students interact and form a variety of relationships, creating what Salomon (1994, p. 80) calls “*a system of interrelated factors that jointly affect learning in interaction with (but separately from) relevant individual and cultural differences*”. It is important for educators to be more focused on the learners’ environment as it affects the amount of learning that occurs as well as the learners’ level of satisfaction with the course. Sime and Priestleyw (2005, p.136), for instance, highlighted the difficulties encountered by teachers in some schools, “*where the number of computers was insufficient, the computers were old, difficult to operate and crashed frequently, generating constant disturbance during classes*”. This perspective was also confirmed by Bracewell *et al.* (1998) when they highlighted the significant of ratio of computers-to students since this can affect the size of learning groups that can be formed.

Furthermore, Chung and Ngan (2002) drew the attention to infrastructural barriers where there are very limited spaces for accommodating computers and related peripherals in computer rooms, classrooms and staff room. It is not just good working and updated computers that are needed in order to make the most of ICT in teaching and learning, it is how such equipments are useable and useful in the teaching and learning process. Miller (2005, p.4) offered a definition of usability as “*the extent to which an application is learnable and allows users to accomplish specified goals efficiently, effectively, and with a high degree of satisfaction*”. He argued, however,

that an additional component that should be added to this definition is usefulness; that is, *“a highly usable application will not be embraced by users if it fails to contain content that is relevant and meaningful to them”*. Moreover, Berg (2003) warned that in order to design an ICTs suitable classroom environment the designer must understand the theoretical foundations for the design. With regard to the types of technologies that might be used, there are many types of technologies that are now used in classrooms worldwide.

Other studies tried to highlight either implicitly or explicitly the impact of the type of technology introduced on the learning and teaching processes. For example, Hall and Higgins (2005, p. 102) conducted a study that aimed to seek the impact of the interactive whiteboards (IWBs) technology on the students' attitudes. They found that *“Students were very enthusiastic about particular aspects of IWBs, such as their versatility in the classroom, multimedia capabilities and the fun and enjoyment they brought to learning”*. However, they also reported some problems that affected their usage of this technology (i.e. IWBs) such as technical problems, teacher and students' information and communication technology skills and students' lack of access to the technology as negative aspects.

Another example is the study of Irvine and Williams (2002, p.317) which focused on the impact of the internet on the students' attitude. Their results suggested that most students are very positive towards the use of the Internet. *“Almost all felt that it would be a useful tool in education, with over two-thirds hailing its use as an essential skills”* (Williams 2002, p.317). Nevertheless, there were a number of problems that were highlighted. These problems include inadequate training, limited facilities and

lack of government support. The interviewees also expressed their concern “*over the dominance of the Internet when other information resources, such as books and CD ROMs, may be more appropriate*” (Williams 2002, p.317).

## 2.4 The impact of using ICT on the students attitudes

Students’ reaction and behaviour towards technology is tricky to examine. Findings of a study in 2001 conducted by Daley *et al.* (2001) indicated that students’ attitude and perceptions of technology could be influenced by their ability to acquire and integrate knowledge, extend and refine knowledge, and use knowledge meaningfully (Daley *et al* 2001, p.127). In addition, Coggins (1998) stressed that Learners’ perceptions about implementing technologies and their ability to learn using them have been shown to be key determinants in predicting student motivation and success in traditional classrooms. Furthermore, Despotakis *et al.* (2007) interviewed students in a study that aimed to explore factors which could affect students’ attitude towards the implemented technologies in their school. They found that there are several factors that could affect the students’ attitude towards the implemented technologies; specifically they stated:

*Interview transcripts revealed that students’ attitudes were influenced by several factors, such as the nature of the computer application to be learnt, students’ prior knowledge of that application, their prior learning practices, narrator’s characteristics, simulated practice options and the procedural segmentation of the presentation.* (Despotakis *et al.* 2007, p. 196)

As it can be noted from the quote above, Despotakis *et al.* (2007) reported five factors that can affect students’ attitude towards the use of the implemented technologies.

Other researchers suggested other factors such as cultural issues, which cannot be fostered or installed (Schein 1996).

On the other hand, there is a question that is forcing itself here: Does the use of ICT in teaching have an effect on students' attitudes? If so, is such effect positive or negative? Generally arguments in support of technology would suggest that by merely using technology student attitudes would be more positive (Farnsworth *et al.* 2002). Mistler-Jackson and Songer (2000) conducted a study with the aim of exploring the impact of a particular technology-rich program on students' motivation level with respect to learning science and the use of technology. Their study involved sixth-grade students who participated in what was so-called Kids as Global Scientists (KGS) project which was basically an inquiry-based program that used web applications to study weather topics.

The results of their study showed that programs like KGS were found very useful in providing valuable motivational and learning chances for students. The authors concluded that attitudes like student engagement and motivation might affect the quality and the nature of the students' understandings. Furthermore, Garcia (2001) argued that students' attitudes toward the use of technology in instruction are thought to influence not only the acceptance of this medium of instruction, but also future behaviours in the learning process. She stressed that for this reason, the promotion and maintenance of positive attitudes toward such means of instruction is of paramount importance. She added that negative attitudes must not be allowed to limit the knowledge and creativity of learners, nor anxiety to interfere with the learning process. However, Rossett and Schafer (2003) suggested that the use of technology

can lead to learners taking control of their learning and that can carry the potential risk of terminating the experience before they master the skills required or the training task.

Directing students attitudes towards ICT in classroom should be seen not only for its effect on using and applying ICT in classrooms, but it could be used as means to change societal attitude towards the use of ICTs in schools. One can argue that if we wish to change the attitude of a given society, we should start from the children, as they are the ones who are more likely to achieve that positive approach and carry it to the coming generations. Schools can play a role to that effect (Gaad 1998: p.405).

The results of a study undertaken by Handzic and Tolhurst (2002) indicated that interaction had an important positive impact on students learning over time. Specifically, they mentioned that *“Interactive learners were found to make significantly smaller decision errors over time than during the earlier stages of their decision task. This was not true for their non-interactive counterparts. The study also found a significant positive effect of interaction on learners’ overall decision accuracy”* (Handzic and Tolhurst 2002, p.113). Generally, their study emphasised the importance of considering interactive learning environment in response to environment pressures for faster and more effective learning and the importance of such environment in giving positive students’ attitude towards the use of the implemented technologies.

Furthermore, Storey *et al.* (2002) conducted a study with the aim of discovering the impact of the usability of the implemented technologies on students’ attitude. In

particular their study involved examining the impact of “*navigation, customization, student management and content creation as well as students' rating of tool features such as the 'online quiz' and 'assignment'*” on students' attitude (p. 91). Their study recommended the importance of taking into account the usability issues particularly in the choice of web-based learning tools and recognition of the situatedness of students and educators within real life contexts (Storey *et al.* 2002, p.91).

Students' attitude can be affected by other technological factors such as the type of the tools used in their classrooms. Liu (2007, p. 118) reported that the “*student-centered features of wireless technology, and the case students' expectations of using it, gave most students positive attitudes toward learning in a wireless learning environment when the wireless environment was initially introduced to the case class*”. However, Liu (2007) highlighted the importance of providing students with chances to operate their own devices, express their ideas, and implement mathematical experiments, otherwise they might be disappointed which will then cause their attitudes toward learning to gradually change from positive to negative. Having negative students' attitude will lead to “*increasingly inappropriate class behavior, such as decreased attention and interest during the teacher's lectures, and a failure to hand in assignments on time. This inappropriate behavior negatively affected the case teacher's teaching mood, and hence his instructional behavior*” (Liu 2007, 118).

To summarise this section, it is clear from the above discussion that it is essential to have positive students' attitude towards the use of the implemented technologies in their classrooms as this will help to best utilise those technologies and to achieve the

anticipated objectives. The section also reported some factors that were found in the literature as key issues that can negatively affect on the students' attitude towards the use and acceptance of the ICTs instructional tools. The literature is, in fact, plentiful with many studies that examined students' attitude towards that use of ICTs tools in classrooms. However, there is a need for further studies that highlight the relationship between the factors that might affect students attitude towards the implemented technologies and the factors that affect the use of ICTs in classrooms in general as well as the relationship between these issues and the acquired learning skills due to the use of such technologies. This is particularly true for developing countries that are witnessing radical changes in their educational systems.

## 2.5 Learning skills acquired by the use of ICT

For many years, educators tried to integrate ICTs with their educational systems with many goals and intentions in mind. However, one of the key objectives of integrating ICTs with educational systems all over the world is to create more effective settings for learning (Gan and Zhu 2007). In other words, with the introduction of ICTs educators want to help students to become self-directed learners capable of learning new things and adopt to an increasingly dynamic, and also complex, work situation (Nulden 2001).

Furthermore, the focus of education, in the presence of ICTs, has changed from traditional education that aims to enhance knowledge in the knowledge building approach to the construction and advancement of collective knowledge as well as to the interactive and collaborative learning (Gan and Zhu 2007, p.206). This kind of

shift in education was associated with change in roles and responsibilities of educators (e.g. teachers) with respect to the teaching and learning processes (Nulden 2001, p.363). In addition, it positively affected the type of learning skills that might be acquired should educators best utilise the available technologies and integrate them with their educational systems. Based on an extensive review of related literature, there are three main categories that cover most of the acquired skills due the use of ICTs in classrooms. These three key skills are described and reviewed below.

### **2.5.1 Creativity**

Creativity is a learning skill that was argued from the beginning to be affected and enhanced by the use of ICT in teaching and learning. It refers to the skills and attitudes needed for generating ideas and products that are often described as novel, high in quality, and which allows to transfer and extend learning skills and thoughts into new arenas within a chosen field (Sternberg 2005). However, Sawyer (2006) argues against placing a too much emphasis on being novel. He believes that *“There is no such thing as a completely novel work. To explain creativity, we have to examine the balance of imitation and innovation, and the key role played by convention and tradition”* (Sawyer 2006, p.24-25).

Creativity has been defined in a number of different contexts. Boden (2001: 95), for example, defined creativity as *“the ability to come up with new ideas that are surprising yet intelligible, and also valuable in some way.”* Whereas Hwang *et. al* (2007, 193) defined it as a *“means the cognitive skill of proposing a solution to a problem or making something useful or novel from ordinary”*. Furthermore, Sawyer

(2006, p. 74) mentioned that creativity does not occur in magical moments of insight, but it is a result (i.e. acquired learning skills) that is achieved *“from long periods of hard work that involve many small mini-insights, and these mini-insights are organized and combined by the conscious mind of the creator”*.

With respect to the relationship between the use of ICTs in classrooms and creativity, the literature showed that the use of ICTs could affect and enhance students creativity. For example, research conducted by Jones and Jones (2005) revealed that students felt that the use of a web-based course management software had improved their learning and creative skills. In addition, Allegra *et al.* (2001, p.52) confirmed the importance role that hypertext can play in improving students creativity as such technology can provide a way for students *“to be creative and express themselves, developing a strong sense of pride in what they have created”*. Furthermore, Yang *et al.* (2005, p.214) conducted a study that aimed to report the development and evaluation of web-based interactive writing environment designed for elementary school students. Their study findings revealed that students *“can improve their writing skills by participating in the writing environment, submitting many essays, interacting with other students online and reviewing other essays”*. Moreover, a study, which was conducted by Hwang *et. al* (2007) with the aim of exploring student multiple representation skills and creativity in solving mathematical problems when supported by a multimedia whiteboard system, concluded that elaboration ability in creativity is a critical factor that affects student’s multiple representation skills.

To summarise this section, it is worth highlighting the significant role that the use of ICTs in classroom can play in promoting students’ creativity. The literature is

plentiful with many studies and examples that advocate this argument. In other words, the literature of ICTs in education showed that the use of ICTs could promote and extend creativity where there is understanding of, and opportunities for, the variety of creative processes in which learners can engage. However, *“Key issues to be discussed by those interested in creativity in education include the understandings of ‘creativity’; the features of ICT which enable learners to be creative; the creative activities which are already going on and the contexts in which learners can realise their creative potential”* (Avril 2002, p.2).

### **2.5.2 Collaboration and teamwork**

Collaboration and teamwork are key learning skills that are also affected by the use of ICTs instructional tools in classrooms. Collaboration (or collaborative learning) is an educational approach to teaching and learning where groups of students are working together to *“solve a problem, complete a task, or create a product in which discussion, communication and collaboration take place among students, and between a teacher and students, with the network providing a collaborative learning environment”* (Gan and Zhu 2007, p.216). Using such approach in teaching and learning aims to help students to cultivate a positive learning attitude, collaborative spirit and interpersonal relationships, and acquire some higher level cognitive skills (Gan and Zhu 2007, p.216). This was confirmed by Wells and Claxton (2002, p.7) when they stated that successful learning *“takes place through active participation in purposeful, collaborative activity.”* In a study by Fahraeus (2004) that was designed to find out how students take advantage of technology for their communication with teachers and peer students, and in particular whether and how they learn by collaboration. It was revealed that the use of technology in classrooms actually

encourages and enhances collaborative learning. In addition, Allegra *et al.* (2001, p.52) argued that *“the hypertext production exemplifies team work more than individual effort, stimulating the development of complex project skills: learning how to organize, and how to tackle and complete a project; of multi perspective reflection: comparing comments, evaluating a problem from different points of view”*.

The reviewed literature left no doubt that ICT is a key successful factor in improving and enhancing collaborative learning approach which looks upon teachers and students as learning resources and an environment where students put knowledge building principles into practice through interaction and collaboration, and hence presents the essence of constructivism (Gan and Zhu 2007). Gan and Zhu (2007) emphasised that in order to make collaborative learning successful and maximize learning outcomes there are some key components of cooperation that must be considered; these are: positive interdependence; face-to-face interaction; individual and group accountability; interpersonal and small group skills; and group processing.

In summary, collaborative learning is considered an active process that may lead to deep understanding from the students, to development of skills of critical thinking, to communication, coordination and conscious knowledge construction mechanisms (Dillenbourg, 1999). Komis *et al.* (2002) found a direct effect of the use of ICTs on group synthesis, task control, content of communication, and roles of students. ICTs provide many opportunities for students to work collaboratively and increase instructional effectiveness and efficiency, as well as positive social interactions (Johnson *et al.* 1986; Schlechter, 1990). In addition, Drenoyianni and Selwood (1998) found that most of their interviewees (i.e. teachers) advocate that computer use

encourages collaborative learning (72.9%), individualized learning (59.4%), motivates pupils (72.9%) and serves as an aid in presenting new concepts, information, problems and situations (64.8%) as well as improving basic skills and concepts (59.4%).

### **2.5.3 Critical thinking and problem solving**

Critical thinking and problem solving are two other skills that could be enhanced by the use of ICTs in classrooms. As the study conducted by Drenoyianni and Selwood (1998) found that the most frequently mentioned academic goal of using ICTs in classrooms was developing learning strategies and problem solving abilities (89.1%). Then the target of developing basic skills and concepts was the second goal (35.1%) and finally developing social skills (24.3%) came as a third objective. However, it is worth highlighting that there is no agreement amongst scholars with respect to the definition of critical thinking and problem solving, and it has changed somewhat over the past decade (Huitt,1998).

With regard to the term ‘Critical thinking’, it is a term that might be used to indicate a desire to teach the processes of thinking and learning that can be applied in a wide range of real-life contexts. Whereas the term of “problem solving” is found in many studies as part of (or as a result of) the thinking process itself. In other words, it always comes under the general definition of the critical thinking term. Table 2.1 lists the possible definitions for the term “critical thinking”. However, it is worth mentioning that there are some other scholars who suggest that critical thinking, problem solving, and creativity should be viewed as being part of higher order

thinking skills and not mutually exclusive. For example, the following quote was written by Walters (1990, pp. 456-457) and it explains the dynamic relationship between critical thinking, problem solving, and creative thinking:

“Logical inference, critical analysis, and problem solving are fundamental qualities of good thinking, but only if they are complemented by the cognitive functions of imagination, insight and intuition-essential components of the pattern of discovery. The latter serve as necessary conditions for innovative speculations, intellectual and artistic creativity, and the discovery of alternative conceptual paradigms and problems. They facilitate flexibility and adaptability of new ideas as well as novel situations and are thereby essential to the nurturing of responsible, free, and reflective adults and citizens”.

**Table 2.1: Possible definitions for the term “Critical Thinking”**

<b>Critical thinking definition</b>	<b>Authors</b>
<i>...the ability to analyse facts, generate and organize ideas, defend opinions, make comparisons, draw inferences, evaluate arguments and solve problems</i>	(Chance,1986, p. 6)
<i>...a way of reasoning that demands adequate support for one's beliefs and an unwillingness to be persuaded unless support is forthcoming</i>	(Tama, 1989, p. 64)
<i>...involving analytical thinking for the purpose of evaluating what is read</i>	(Hickey, 1990, p. 175);
<i>a conscious and deliberate process which is used to interpret or evaluate information and experiences with a set of reflective attitudes and abilities that guide thoughtful beliefs and actions</i>	(Mertes,1991, p.24);
<i>...active, systematic process of understanding and evaluating arguments. An argument provides an assertion about the properties of some object or the relationship between two or more objects and evidence to support or refute the assertion. Critical thinkers acknowledge that there is no single correct way to understand and evaluate arguments and that all attempts are not necessarily successful</i>	(Mayer and Goodchild, 1990, p. 4);
<i>Reasonable reflective thinking focused on deciding what to believe or do</i>	(Ennis, 1992).
<i>The disciplined mental activity of evaluating arguments or propositions and making judgments that can guide the development of beliefs and taking action</i>	Huitt (1998, p.2)

It is claimed that critical thinking skills could be enhanced by the use of ICT. The reason for this claim is that technology has changed or altered how people access, gather, analyse, present, transmit, and simulate information (See 1994, p. 30). In addition, much of the current interest in enhancing teaching and critical thinking skills is driven by technological changes that are perceived as essential for preparing what many refer to as the global citizen (Wegerif, 2002). It has been suggested that advanced technological development must occur in schools and educational institutions which seek to prepare their students for a competitive global marketplace (Dooley 1999, p.35). However, some scholars argue that using technology does not, by itself, lead to transferable critical thinking skills since the success of the activity depends on how the technology is used which also depends on the role of teachers inside the classrooms.

To conclude this section (i.e. Section 2.5), it can be said that there are some learning skills that can be acquired or enhanced by the use of ICT instructional tools in classrooms. These learning skills were classified into three categories, namely creativity, collaborative learning (or/and teamwork), and critical thinking and problem solving. These skills will be further examined in the context of a comprehensive education reform programme that took place in a developing country with the aim of further examining and exploring the relationship between these learning skills and the use of ICTs instructional tools in classrooms. In addition, there might be other learning skills that will be discussed in a such reform context. Finally, this review also aims to explore the relationship (if any) between the use of ICTs in classrooms and the acquired or enhanced learning skills.

## 2.6 The use of ICTs in the Arab educational systems

This section aims to shed light on those studies that were conducted in the Arab countries, particularly in the GCC countries which examined the use of ICTs in their educational systems in the past few years. As a matter of fact, there are few studies that took place in the past few years with regard to the impact of using ICTs in the educational systems of the Arab countries, particularly the GCC countries (e.g. Al-Asmari, 2005; Sadik (2005); Al-Ammari, 2004; Albirini (2004); Al-Kahtani, 2001). For example, Al-Ammari (2004) conducted a study with the aim of investigating Qatari female teachers' perceptions with respect to the use of computers in their teaching practices, and exploring the correlation between their perceptions and computer training as well as computer lab use. His study's findings revealed that the Qatari female teachers placed a high value on computer usage in their teaching processes. In other words, female teachers saw the use of computer in education as a useful educational tool for both teachers and students. Nevertheless, his study's results showed many internal barriers (e.g. a lack of manuals, limited number of labs, lack of time, lack of incentives for using computers, limited proficiency in the English language, and the high cost of hardware and software) and external ones (e.g. personal factors, such as a teacher's lack of knowledge and competence, fear of computers, and lack of confidence) were encountered by the female teachers during the implementation and the use of computers in education.

Furthermore, Albirini (2004) carried out a study to investigate the Syrian EFL (English as a Foreign Language) teachers' attitudes towards the use of ICT as well as the relationship between their attitudes and computer attributes, cultural perceptions,

computer competence, and computer access. His study also covered the exploration of the relationship between teachers' attitudes towards the use of ICT and some other demographic variables such as age, gender, income, school location, teacher qualification, teaching experience, computer training, and teaching method.

His study results revealed that Syrian EFL teachers had positive attitudes towards the use of ICT in their teaching practices. Teachers, as reported by Albirini (2004), demonstrated neutral perceptions in terms of cultural relevance of ICT to the Syrian society and schools although they expressed their concern about the improper materials found on the Internet. Teachers also expressed their concern about low levels of computer competence, computer access, and limited in-service training. Albirini (2004) recommended that there should be more professional development workshops with respect to computer training and emphasised the importance of building a more comprehensive and updated infrastructure with the aim of ensuring teachers' access to computers in schools.

Moreover, Al-Kahtani (2001) used the triangulated data collection method in his study that was conducted in the EFL departments of four universities in Saudi Arabia a study with the aim of exploring the current status of CALL (i.e. a program that can be used by teachers to support their reading classes and train students to use reading strategies) in the studied EFL departments. He found that most of the hardware in these universities was out of date, although most faculty demonstrated positive attitude towards the use of CALL in EFL instruction. His study also showed that there were some factors that affected the use of ICT such as lack of Internet connectivity, lack of adequate software and networks, and limited access to computers by the

students which consequently hindered the faculty's integration of CALL in their teaching.

Another study carried out by Al-Asmari (2005) examined the use of the Internet by EFL teachers in four Saudi Arabian colleges of technology. In particular, the study aimed to investigate some of the demographic variables such as teachers' experience with regard to the use of ICTs, training issues, technology access issues, and teacher perceptions with respect to the use of the Internet. His findings pointed out that the Internet is used mainly by the EFL teachers for personal aspects rather than instructional purposes. However, his study findings also revealed positive perceptions of the value of using the Internet amongst EFL teachers although they demonstrated low levels of competency in computer skills. With regard to the access aspects to the available technologies, Al-Asmari (2005) found that teachers had limited access to the Internet.

Sadik (2005) also conducted a study to examine the attitude of Egyptian teachers' towards the use of computers and to explore the various factors that might affect their attitudes and use of the available technologies and in particular to validate an Arabic version of the Computer Attitude Scale (CAS). His study's findings demonstrated that most teachers showed positive attitudes towards the use of the available technologies. In addition, the study showed that there is a clear relationship between some of the demographic variables such as gender, computer experience, and the teachers' attitudes towards computers. For example, his study revealed that female teachers demonstrated less positive attitudes than males, and that teachers with more computer experience demonstrated more positive attitudes toward computers than less

experienced teachers. The study also reported a relationship between some variables, such as the frequency of computer use, computer training, years of teaching, and attitudes towards the personal use of computers, and teacher attitudes towards the use of computers. In other words, the study showed that teachers who use computers frequently, are trained well on how to use computers, have good teaching experience, and have positive attitudes towards their personal use of computers also have positive attitudes towards the use of computers in schooling.

## 2.7 Discussion and assessment

The above review of the literature was set out to examine three main aspects, specifically the factors that can affect the use of ICTs in classrooms, the impact of the use of ICTs on students' attitude and the some cognitive skills that might be acquired due to the use of ICTs in classrooms. Based on the above review, it is clear that the use of ICTs in teaching and learning is not a luxury in schools, it is perceived as a must. However, for such use to be effective and to enhance learning, many factors need to be considered. Dooley (1999, p.43) argued that although *"We have made great strides in recent years in the diffusion of computers as instructional/learning tools. But, the biggest challenge remains. The institution we call "school" must change truly to embed ubiquitous educational technology"*. Although, the literature of using ICTs in education presented many issues that can affect successful usage of ICTs in classrooms, there is a lack of a study that classifies those issues, highlights key factors, and makes them clear for educators to be considered in their leaning and teaching strategies. In addition, there is a lack of studies that can clearly highlight the relationship between these factors and the learning skills that might be acquired by the

use of ICTs in classrooms as well as between these two aspects and students' attitudes. In other words, there is a lack of a study that links those three aspects and shows the effect of them on each other. Most importantly, to the best of the researcher's knowledge, there is no study that shows the role of ICTs and its related issues (i.e. the mentioned three aspects) in an educational reform context, particularly in a developing country. Therefore, this research is to bridge this 'gap'. To be more specific, this 'gap' is represented by an initial theoretical research framework that is developed by the researcher based on the above literature review. The following sections will explain how this research framework is formulated whereas Figure 2.2 shows the main aspects of the developed framework in a graphical way.

### **2.7.1 Initial research framework**

In this section, the researcher seeks to develop an initial research framework which will be used to structure the data collection and data analysis processes in this study. The framework is based on synthesis of different suggestions found in the literature discussed above. This initial framework, as shown in Figure 2.2, represents three aspects that this study aims to examine, namely the main factors that might affect the use of ICTs in classrooms, the impact of the use ICTs on students' attitudes and the learning skills that might be acquired or enhanced by the use of ICTs in classrooms. In addition, this initial framework seeks to identify the effect of each aspect on the other two aspects as well as the role of those three aspects in promoting the use of ICT in an educational reform context. The three main aspects of the initial framework are described and discussed below.

### **2.7.1.1 Factors affecting ICTs usage in classrooms**

This section highlights those issues that were found necessary in the literature to be considered in order to give effective usage of ICTs in classrooms. The initial framework classifies these issues (or conditions necessary for effective usage of ICT in classrooms) into three main categories, namely teacher-centred factors, environmental factors and technical factors. These factors are described below.

#### ***2.7.1.1.1 Teacher-centred factors***

This section deals with those factors that related to teachers. These factors are categorized into three main factors, specifically teacher training, teachers' attitude, and teacher involvement. According to the literature reviewed, each of these factors has its own effect positively or negatively on the use of the introduced technology. Thus, this study intends to examine these factors and their effect, particularly in the context of a reform programme.

##### ***Teachers training***

This factor is discussed in section 2.3.2 above. The literature highlighted the importance of the teacher's role during computer use. Some studies indicated that most teachers did not know how and when to intervene and guide pupils (Cox *et al.*, 1988; Hall and Rhodes in Beynon, 1991). Whereas other studies recognized the existence of a particular group of teachers, who were aware of how crucial their role could be in the implementation of computer activities and knew where, when and how

they should provide support (Eaton and Olson, 1986; Olson, 1988). In addition, the literature showed that there are many studies which have shown that teachers are “*not given to questioning their professional practice*” (Underwood, 1997). In other words, it was found that most of teachers do not expect to need much further training after their initial training, hence do not take the initiative to improve their practice and learn new skills. Another example from the literature is Desforges (1995) study, which focused on the shift from beginner to expert teachers. The study showed that most teachers are perfectly satisfied with their current practices and did not see any need to change or question their current professional practice (Cox *et. al* 1999b). Therefore, a considerable effort from teachers’ side is necessary to allow the possibilities of restructuring knowledge (i.e. about teaching and learning) should they seek to make changes to their professional practice Desforges (1995). Otherwise, they may not accept the use of ICT in their teaching.

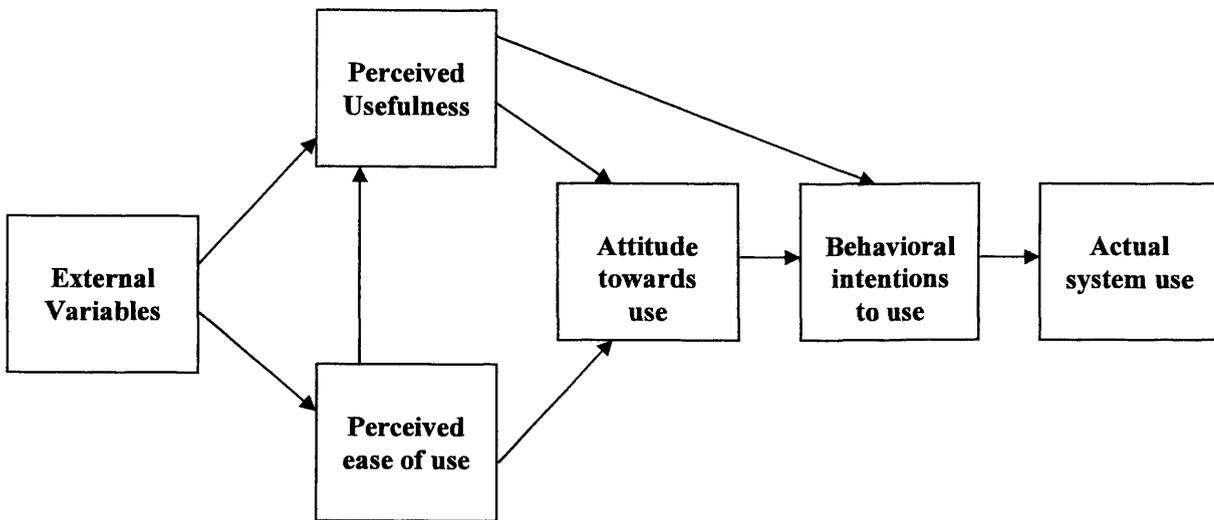
Furthermore, other studies such as (Cox *et al*, 1988) showed that until recently the majority of training courses offered for teachers in the UK have focused on the technical aspects of ICT with little training about the pedagogical practices required and how to incorporate ICT in the curriculum. Cox *et al.* (1998) emphasised that teachers who have gone on longer courses (spread over a year), have had the time to practice in between sessions back in schools and have had the time to gain enough expertise and knowledge to be able to continue to use them within their curricula.

In summary, this study seeks to examine the impact of teachers training aspects on teachers’ attitude and hence their usage level of the available technologies as well as on students’ attitude towards such technologies. In other words, the study should

explore the relationship between teachers' training aspects and their attitude and to examine the final impact of such issues on the usage level of ICTs tools in classrooms and on the students' attitude towards the use of ICTs instructional tools. Examining such issues in a developing country that is engaged in a comprehensive reform program is expected to be an added value to the body of knowledge.

### *Teachers' attitude*

Section 2.3.1 has shed light on this issue. Teachers' attitude is an important factor that can positively or negatively affect on the use of ICTs in classrooms. Davis *et al*, (1989) developed the theory of "*action relating to reasons*" (Technology Acceptance Model or TAM) based on the work of Fishbein and Ajzen (in Davis *et al*, 1989) to investigate the reasons why some people use computers and their attitudes towards them (Cox *et. al* 1999b). Figure 2.1 illustrates their model. It links the perceived ease of use and usefulness with attitude towards using ICT and actual system use. Their model was tested with 107 adult users, who had been using a managerial system for 14 weeks. The results showed that people's computer use was predicted by users' intentions to use it and that perceived usefulness was also strongly linked to these intentions.



*Figure 2.1 - Technology acceptance model (Davis et al. 1989)*

Figure 2.1 starts with what Davis *et al.* (1989) called the external issues (i.e. variables). The external issues are those factors that influence on teachers and are beyond their direct control such as the requirements of a national curriculum or national guidelines, the changes in society with the rapid growth in the uses of the internet and ICT in general, school policies on using ICT, opinions of colleagues, and pressure from parents and pupils. In addition, the figure shows that if teachers perceive ICT to be useful to them, to their teaching and to their pupils' learning then they are more likely to have a positive attitude about the use of ICT in the classroom. In other words, the TAM indicates that the more positive the responses to the perceived usefulness and perceived ease of use, the more positive the attitudes of teachers will be to the use of ICT and the more likely they will be able to use ICT in their teaching. Thus, this study will seek to investigate the reliability of this model through the intended case studies.

### ***Teacher involvement***

This factor is related to the involvement of teachers in the changes that take place in their educational systems and making them aware of the objectives of these changes. Changes in this case involve the introduction of new technology in the learning and teaching processes, particularly in an educational reform context.

In a study of projects to promote educational changes in America, Canada and the UK, Fullan (1991) found that one of the most fundamental problems in education reform is that people do not have a clear and coherent sense of the reasons for changes in their education system, and what and how to proceed with these changes. From the IS perspective, many commentators have argued that there is a positive relationship between perceived user involvement and the degree of satisfaction with the implemented systems (Hunton *and* Beeler., 1997; McKeen *et al.*, 1994; Hornby *et al.*, 1992). Therefore, it is worth investigating the impact of such factors on teachers' attitude towards the use of ICTs in a context of comprehensive reform initiative.

#### ***2.7.1.1.2 Environmental factors***

This section deals with those environmental factors that might affect the use of ICT in classrooms. This category involves three key factors, namely classroom design and type of technology used, stakeholders' commitment and cooperation, and cultural issues. These factors are described below.

### ***Classroom design and type of technology used***

This factor includes the number and type of technologies used in classrooms as well as how the used technologies are organised and used by students. Drenoyianni and Selwood (1998) study reported that the most frequently used piece of software is the word processor (95.1%), followed by the use of graphics packages (85.3%) and software concerned with information handling, such as databases (63.4%) and multimedia encyclopaedia (58.5%). In addition, this category involves barriers that are related to ICTs integration such as accessibility and infrastructure, locations of wiring drops, the placement of computers in centralized labs verses placement of computer pods in classrooms. For example, placing computers in centralized labs may provide students with equitable and efficient exposure to technology but severely limit the technology's accessibility for classroom instruction (Loveless, 1996). Furthermore, labs might not give teachers the flexibility of deciding when technology should be incorporated into instruction and may send the message to students that computers are not central to learning or the activities in their classrooms. On the other hand, physical limitations of the classroom including size and location of desks, often limit choices of room arrangement and do not provide the space that is necessary to add pods of computers to be used as technology centres. This study aims also to investigate the effect of such factors on the efficient use of ICTs tools in classrooms.

### ***Stakeholders' commitment and cooperation***

Officials' commitment and cooperation is an important issue in bringing and adopting new innovation in schools. This commitment and cooperation help in engaging the

whole school in a democratic process of planning change (Fullan 1991). There is no doubt that the role of the teacher is crucial to the success of using integrating ICTs in the teaching and learning processes but the success of programs also depends highly on a support system (Bitner and Bitner, 2002). This means that all the related stakeholders (e.g. operators, technicians, administrators and peers) should commit and assist when needed since this will help to successfully integrate technologies in the teaching and learning processes. The absence of such assistance, commitment and cooperation will for sure affect the introduction and the use of such innovation (i.e. ICT instructional programmes).

### ***Cultural issues***

Cultural issues are those ideas, beliefs and values that are developed to give meaning to the behaviours of groups and individuals (Maxwell and Thomas, 1991). Cultural issues have also been defined as the social dimension that is concerned with belief systems, values, cognitive structures and meaning (Anderson, 1982). Improving the educational outcomes requires changing those beliefs and values throughout the schools (Harris, 2001; Fullan, 1993; Glickman, 1992). Teachers are required to develop new beliefs, attitudes and values about ICT instructional tools that will lead to change in classroom practice and improved student educational outcomes (Halsall, 1998).

The implementation of school improvement programmes such as ICT programmes does not necessarily lead to improved student learning (Lingard, 2001; Newmann and Associates, 1996; Newmann and Wehlage, 1993). Nevertheless, once focus of the

change process is shifted to individual teachers and the classrooms, improvements in student learning are more likely to be effected. In other words, ICTs implementation should be associated with a focus on changing classroom cultures of teaching and learning. In addition, it is essential to focus on changing other general cultural issues, undesired customs, and unwanted habits. This research seeks to investigate these issues and their impact on the success implementation and use of ICT tools in classrooms.

#### ***2.7.1.1.3 Technical factors***

This section deals with those technical issues that might affect the usage of the ICT in classrooms. According to Drenoyianni and Selwood (1998) study, the most frequently mentioned problems that teachers faced when using computers in their classrooms, were either of a technical nature (83.7%), classroom management issues (54%) or in particular referred to their need for assistance in the classroom, and the lack of personal competence (54%). These technical problems highlight the importance of the role of the ICT coordinator (Lawson and Comber 1999) or the helpdesk people. One of the objectives of this study is to explore such role and its effect on the use of the ICT tools in classrooms.

#### **2.7.1.2 Student attitude towards the use of ICT**

The impact of the use of ICTs in classrooms on the student attitudes was discussed in Section 2.4. One of the objectives of this study is to examine the effect of the

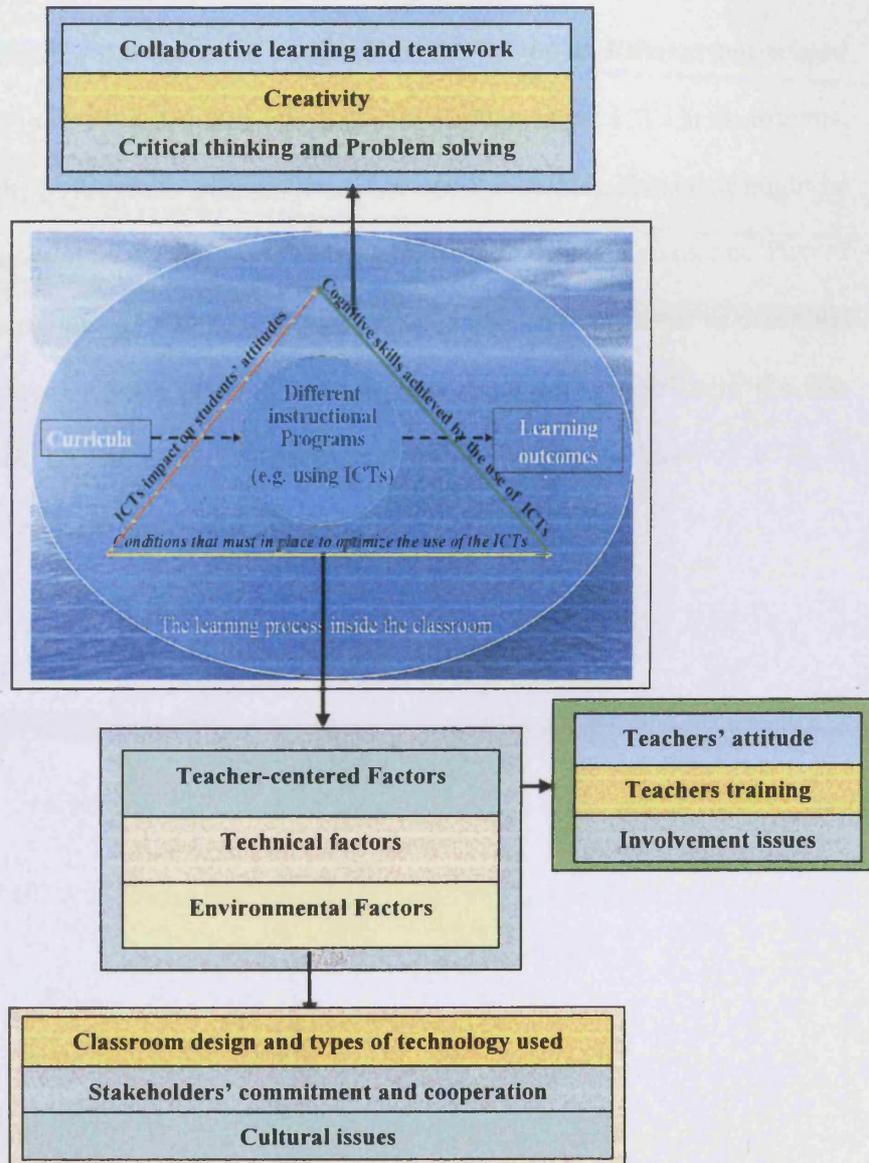
introduction and the use of the ICTs inside classrooms on students' attitudes and their mutual influences in an educational reform context.

### **2.7.1.3 Learning skills**

Learning skills (i.e. learning experiences) that can be acquired as a result of using and integrating ICTs in classrooms were discussed in Section 2.5. Three main categories of learning skills were discussed, namely creativity, teamwork and collaborative learning, and critical thinking and problem solving skills. This study also seeks to explore these skills and others that might be achieved by using ICTs in classrooms.

### **2.7.2 Discussion and assessment summary**

Figure 2.2 below illustrates the initial framework that is formulated by the researcher based on the above discussion. It classifies issues that needed to be examined and explored in this study into three main dimensions, particularly the factors that affect the use of ICTs in classrooms, the impact of the used technologies on students' attitude and the learning skills that might be achieved or improved by the use of ICTs. In addition, it divides those factors that might affect the use of ICT instructional tools in classrooms into three main groups, specifically teacher-centred factors, technical factors and environmental factors. Teacher-centred factors and environmental factors were classified further into subcategories. Furthermore, it categorises those learning skills that might be achieved or enhanced by the use of ICTs in classrooms into three subcategories, namely collaboration and teamwork, creativity, and critical thinking and problem solving skills.



*Figure 2.2: Research initial framework for effective ICTs usage in classrooms*

As shown in Figure 2.2, the framework is composed of the learning environment (i.e. the big circle) which includes curricula that need to be taught, instructional programs that can be used in order to transfer knowledge to students, and the learning outcomes. As it can be noted, the focus of the study is on the inside circle (i.e. the instructional programs that can be used inside classrooms), specifically the use of ICTs as

instructional programs inside classrooms. As mentioned earlier, Figure 2.2 also shows that the adoption and the use of ICTs is surrounded by three different but related aspects, namely the factors that affect the use of the implemented ICTs in classrooms, the impact of the ICTs on the students' attitudes and the learning skills that might be achieved or enhanced by the use of ICT instructional tools inside classrooms. Two of these three aspects (or categories) are further divided into more elements as described above. To be more specific, this research is concerned with the triangle (i.e. the mentioned three aspects) and the circle that is inside (i.e. the use of ICTs in classrooms) the triangle shown in Figure 2.2.

## 2.8 Chapter summary

This chapter reviewed the literature about the use of ICTs in education and discussed a range of issues relating to the uptake of ICTs in teaching and learning practices. The chapter started with explaining the rationale for the use of ICTs in education and then by reviewing literature that related to those issues that might affect the use of ICTs in classrooms. It was found that there are some factors that were already examined by scholars and were found as real obstacles that can restrict the benefits of using ICT instructional tools in classrooms. These factors include teachers' attitude, teachers' training, teachers' involvement, ICT coordinators and technical support, and classroom environment and the type of technologies used. However, these factors were examined by different studies and there was not any evidence which shows that these issues were studied under one research umbrella or in a context of an educational reform programme. In addition, most of these factors were investigated in the West, which has its own specificity, or in the developed countries that might not face other factors that may be faced in the developing countries. Therefore, this research aims to examine these issues in a context of a comprehensive educational reform imitative and explore other new factors that might emerge from the intended practical study.

After that, light was shed on the literature that relates to the impact of the use of ICTs on students' attitudes. As a matter of fact, the students' attitudes were examined and investigated by many studies, each of which presented its own findings and suggested its own recommendation but according to different contexts. Yet, none of these studies were conducted in a developing country that under a context of an educational

reform process. In addition, there is a lack of a study that categorise those factors that might affect students' attitude towards the use of ICTs tools in classrooms.

Then, the learning skills or cognitive skills that might be acquired or improved by the use of such ICTs in classrooms were investigated. Although the literature showed some studies that confirmed the benefits of using ICTs in education in general, there was a lack of a study that tackles those benefits of using ICTs in an educational reform context, particularly in a developing country. Most importantly, the literature showed that there is a lack of a study that links these three dimensions to each other and investigates the effect of each dimension on the other two dimensions as well as explores the possible mutual influences between those three issues. Therefore, an initial research framework was formulated based on a synthesis of the available literature discussed above. The aim of developing this initial framework is to structure the data collection and data analysis processes. This framework is intended to be examined by the data that will be collected and then it can be refined accordingly. In other words, the study will explore and examine those issues involved in this initial framework during the collection process of the case studies data and then the framework will be used to structure the data analysis and finally will be revised by the analysed data. Therefore, at the end of this study the revised framework might be similar or different from this initial and theoretical framework. The revised framework will be presented in Chapter 6.

## CHAPTER THREE: RESEARCH METHODOLOGY

---

### 3.1 Introduction

This chapter describes the research strategy and the methodological steps that were used in carrying out this study. Research methodology is a strategy of inquiry which moves from underlying philosophical assumptions, to research design and data collection (Myers *et. al*, 1999). The literature shows that there are two main methods, specifically quantitative and qualitative and there is an extensive body of literature on research methodologies, specifically which methodology should be used for any specific topic. Furthermore, there is an ongoing and extensive debate about the relative values of qualitative and quantitative research methods (Donmoyer 1996; Moss, 1996; Patton, 1990).

On the other hand, there are other researchers who have emphasized that qualitative and quantitative research methodologies do not, in fact, exist at opposite ends of the research methodology spectrum although their styles seem to contrast (Howe, 1988; Wickens, 1999). They have advocated that both compliment each other and have emphasized that it is possible to use both approaches in the same research topic. It is all about the nature of the study subject as it can promote the adoption of a combination approach utilizing quantitative and qualitative techniques (Howe, 1988; Wickens, 1999). It was also argued that neither should be viewed as exclusive and that it is acceptable for a single study to utilize both approaches. Strauss and Corbin (1990) state that the differences between using the two methods are not as precise as

was previously believed and that it is no longer uncommon for researchers to use a plurality of methods. A combination of data collection methods can also be used in order to provide researchers with additional opportunities to observe a group of research subjects and take advantage of using more than one measuring device (Gable, 1994; Kaplan and Duchon, 1988; Lee, 1991).

This research is qualitative as it does not depend on numbers and figures, but mainly on analysis of qualitative data, such as interviews, direct observation data, exploring, understanding and explaining social phenomena. The motivation for pursuing qualitative research, as opposed to quantitative research, comes from the observation that a qualitative approach was more beneficial to the area of this study given the descriptions of qualitative and quantitative methods found within the literature. Qualitative approach, as described in the literature, focuses upon the social reality of individuals, groups and cultures. It is very useful in the exploration of behaviour and of the perspectives and experiences of people studied. Within the qualitative approach there are four methods of research design and data collection available; namely action research, ethnography, grounded theory and case study. The researcher used the case study approach as a strategy for this study. The reason for this selection is explained below in more detail.

### 3.2 Research design

To achieve the objectives of this study, a staged empirical research methodology was used. This section explains the research stages that were followed throughout this study.

### 3.2.1 Research strategy

The interpretive case study approach is used as the research strategy for this study. This is because ICTs are used in the ISs, in Qatar, in a context of comprehensive educational reform programme where the researcher has no control over the reform events. According to Yin (1994, p. 1 & 13) case study is the preferred technique when the researcher has no or little, control over the events and when the inquiry is into a contemporary phenomenon within its real-life context, especially when the boundaries between them are not clear. The researcher wanted to investigate the factors that might promote ICTs usage, explore ICTs impact on students attitude and examine the key learning skills that might be acquired by using those technologies in their real-life context (i.e. in a context of that comprehensive reform programme).

Case study approach is defined as “*an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident*” (Yin 1994, p. 13). Although similar to field studies, which also examine phenomena in their natural context, case studies differ in that the case researcher has less prior knowledge of constructs and variables (Benbasat *et al.*, 1987) which, indeed, reflected the same situation in this study. In other words, although the researcher has more than 12 years experience in teaching, she does not have enough knowledge in ICTs and their use in teaching and learning processes so case study approach helped her to understand the researched subject in depth. Another reason for the adoption of the case study approach is the novelty of the ISs concept in Qatar (and the comprehensive change

that is taking place to the education system in Qatar), since the method is particularly appropriate for problems where research and theory are in their early, formative stage, as in the ISs case (Benbasat *et al.*, 1987; Eisenhardt, 1989; Yin, 1994). In addition, case studies have a strong tradition of description and theory building because of their inductive characteristics (Irani *et al.* 1999) which enabled the researcher to build her theory through a thick description of the case studies findings.

Ontologically, the researcher considered the use of ICTs in an educational reform context is a complex process that takes place within an organizational context and which influences and is influenced by the context over time. The use of ICTs in education, particularly in the educational reform programmes, is an interactive medium that might become deeply embedded in social practice within a specific organizational context. Therefore, the researcher was in need to adopt a methodology that would allow sense making of this complex social reality in the light of the inherent influences of ICTs. Case study methodology is appropriate when the issue to be studied is not easily distinguished from its context, and there are more variables of interest than projected data points (Stake, 1995).

The interpretive research method usually seeks to understand phenomena through the meanings that people assign to them and aims at “*producing an understanding of the context of the information system, and the process whereby the information system influences and is influenced by the context*” (Walsham 1997, p.4-5). Thus, the researcher used this method as it enabled her to interpret the subjectively constructed meanings and behaviour of actors pertaining to issues under the study. In doing so, the researcher endeavoured to explore the use of ICTs in an educational reform context

and to identify the main factors that can promote and enhance the effectiveness of using ICTs in the teaching and learning processes. In addition, she wanted to explore and understand the impact of using such technologies on students' attitudes as well as determining the key cognitive skills that might be enhanced or acquired by using those technologies. Furthermore, she tried to explore the relationship between these issues and their mutual influences. Therefore, it was very important to gain an in-depth understanding of the use of ICTs in the ISs at the primary level through the meanings that education stakeholders, particular teachers assign to them.

The epistemological posture adopted by the researcher was one that allowed sense to be made of this complex social reality in the light of the inherent influences of ICTs. Consequently, examining only the objective facts surrounding technologies themselves would be insufficient (as in a pure positivist fashion). In the spirit of the interpretivist school, the researcher's approach throughout the study was also to explore the mutual influences between the aspects under the study (i.e. the factors that can promote the use of ICTs in the teaching and learning process, their impact on students attitude and the key learning skills that might be acquired as a result of using those technologies). Specifically, the researcher intended to use an interpretive case study approach as she saw that the reality is socially constructed.

---

### **3.2.2 Multiple case studies**

Eisenhardt (1989) suggest that case studies can involve either single or multiple cases as well as numerous levels of analysis but the method works well when data are collected from multiple sources of evidence, with data converging through

triangulation (Lincoln and Guba, 1985). The decision between a single case and multiple-case studies design approach is one that remains within the same methodological framework, and is simply a choice of research design (Yin, 1994; Irani *et al.*, 1999). While a single case study is one in which a single research object or research event is used, a multiple case study is one in which several cases are compiled with the intent of logically replicating the observations (Yin, 1994).

Given the research objectives and research questions, multiple case studies approach is deemed the appropriate strategy for this study. This will require the examination of several cases, some with similar outcomes and others with different outcomes with the aim of understanding the factors that lead to these similar or dissimilar outcomes. Using this approach also increases the probabilities of generalising knowledge rather than understanding the idiosyncrasies of the particular case (Stake, 1995; Yin, 1994). In addition, using more than one case increased the chances of gaining interesting findings, enabled the study of variations in the phenomena between different settings and enabled comparison between the different cases which helped to identify important findings specific to each context. These arguments have formed the basis for the selection of multiple cases in the study.

In this study, the researcher examined the research questions by exploring four case studies (i.e. four ISs, at the primarily level). Two of these ISs were using ICTs explicitly as one of their key instructional programmes and two were using ICTs at a lower level. These four schools are part of a comprehensive reform programme which is supervised by the Supreme Education Council (SEC). Therefore, the study used the case study approach to gather data in an exploratory way using constant comparison

(Strauss and Corbin, 1998, p. 67), to build theory using several site visits and interviews, and to understand the perspectives of those involved. An iterative approach was used in a cyclic process of theory construction (Perry *et al.* 1998, p. 1955) and was returned to the field for validation or re-construction. The reasons for selecting those four schools are described below.

### **3.2.3 Site selection**

The case studies were conducted in Qatar for three reasons. First, the use of ICTs was taking place in Qatar in a comprehensive educational reform context. Secondly, case studies were conducted there so as to overcome any problems related to the access issues. *“Unless you are already known in the organisation or the industry, you are likely to be in the position of 'cold calling' the organisation.”* (Hartley, 1994, p. 216). Thirdly, one of the objectives of this research is to share the findings with the SEC with the aim of helping the SEC to assess the efficiency of using ICTs in teaching and learning processes, to identify factors that affect its usage in classrooms, and to examine its impact on students' attitude.

This research was applied on the ISs, at the primary level. There are many reasons behind this decision. First, it was impossible for the researcher to conduct the study on the entire ISs given the time and resources available. Secondly, the majority of the established ISs were primary schools, particularly at the start of this research. Thirdly, the use of ICTs in ISs classrooms is out of the mission, vision and plan of some of the established ISs. As mentioned earlier, four primary ISs were chosen. Two of them

were for boys and two for girls. Table 3.1 lists some information about the selected schools (Chapter 4 give more details about these schools).

*Table 3.1 The main characteristics of the selected schools*

School name	Establishment Year	Gender	Gender Served	Enrolment	Language used
The Sky School	2004	Boys	1-5	562	Arabic & English
The Sun School	2004	Girls	K-12	1740	Arabic & English
The Earth School	2004	Boys	1-5	720	Arabic
The Moon School	2004	Girls	1-6	618	Arabic & English

### 3.2.4 Data collection instruments

This study is exploratory and requires a variety of data collection methods. Marshall and Rossman (1999, p. 159) stated that *“case studies rely on historical and document analysis, interviewing, and typically, some forms of observation as data collection.”*

These three data collection techniques were used in this study. In particular, Semi-structured interviews, direct observations, and documentation were used as primary sources of evidence for this study (i.e. triangulation). The major advantage of using triangulation rests on the premise that the weaknesses in each of the single data collection methods was compensated by the counter-balancing strengths of another (Jick 1979) and reducing the chances of errors and misinterpretations (Duchon and Kaplan 1988; Stake 1994). In addition, the exploratory nature of the research encouraged the researcher to include rather than exclude items for investigation in the instruments. These techniques were used together with other data such as systemic information about the school, examinations of student work and photographs to explore the variations in the use of ICTs in classrooms amongst the studied schools. Several perspectives were sought from the ISs stakeholders, specifically teachers,

headmistress, and students. The main sources of evidence for this study are described below.

#### **3.2.4.1 Semi-structured interviews**

Qualitative interviews vary in the degree to which they are structured so they can be structured, semi-structured and unstructured (Yin, 1994; Marshall and Rossman, 1999). Structured interviews entail more structured questions and could be designed as part of a case study. Open-ended (or unstructured) interviews enable researchers to ask respondents for the facts of a matter as well as for the respondents' opinions about events. Semi-structured interviews allow researchers to approach the research questions in a purposeful way. For the purpose of this study the researcher used the semi-structured interview as one of the main sources of evidence with the aim of gaining a deeper understanding of the study theme.

*“Semi-structured interviews are designed to have a number of interviewer questions prepared in advance but such prepared questions are designed to be sufficiently open that the subsequent questions of the interviewer cannot be planned in advance but must be improvised in a careful and theorized way.”*  
(Wengraf, 2001, p.5)

Semi-structure interviews were used in this study due to their flexibility and the ability to collect more detailed information from the respondents (Hitchcock and Hughes, 1995). In addition, they allowed the researcher to explore those areas where the interviewees perceived gaps, contradictions and difficulties which would not be picked up via pre-set structured questions (Burman 1996). Moreover, they gave the researcher the freedom to explore, probe, and ask questions that helped the researcher to understand and capture the perspectives of the programme participants, and thus to

cover all particular subject areas without predetermining them (Radnor 1994). Furthermore, interviews allowed the researcher to understand others' perspectives by attending to what they say. Bogdan and Biklen (1998, p.95) argued: "*good interviews are those in which the subjects are at ease and talk freely about their points of view.*" They continue: "*good interviews produce rich data filled with words that reveal the respondents' perspectives.*" Also the interviews' data was used to check the accuracy of the data obtained from other sources of evidence such as observations and documents. Appendix I presents the interview guide which was developed and used during the data collection process. The research questions and the initial research framework were used in preparing the semi-structured interview guide. The interview guide was validated by a pilot study and reviewed by the researcher's supervisor.

The pilot interviews were conducted with 8 interviewees from 8 different schools with the aim of testing the interview questions and the time needed to answer each interview's questions. All the interviewees were asked, by some telephone calls or sometimes in a direct visit to the interviewee's school, to give their permission for the required interviews and were informed about the research aim. Having conducted those pilot interviews, the interview guide was refined before being used consistently with all participants. Questions covered many areas, such as factors that affect the use of ICTs in classrooms, students' attitudes towards the used technologies, and the cognitive (i.e. learning) skills that might be acquired by using those technologies. From those pilot interviews, it was noted that:

1. Tape-recording was not allowed by all interviewees.

2. Interviewees took a lot of time (i.e. more than what was expected) to answer the interviews' questions.
3. Some interviewees were not able to answer some of the proposed questions due to their knowledge limitation with regard to the use of the ICTs in classrooms. Accordingly the researcher tried to use some simple terminologies that can be understood by most of the interviewees.
4. Most interviewees did not mind being interviewed more than once but the opportunity for further interviews was subject to the availability of time.
5. During the interviews, the researcher took notes and wrote down the interviewees' answers.

The interviews' questions were refined after the pilot interviews and then categorised based on the types of the interviewees (i.e. teachers, headmistress, and students). In particular, the following actions were taken:

1. The most important questions (i.e. those questions that relate directly to the research topic) were put in the first part of the interview guide. The aim was to collect the most relevant data within the shortest possible time and to save time for both the interviewee and the interviewer.
2. The questions were grouped according to the interviewees' group (e.g. teachers, head-teachers, and students).
3. Some irrelevant or redundant questions were either deleted or moved to another category (i.e. some questions were put to gather more data but they were not particularly relevant to the research topic).
4. All of the interviews were conducted in Arabic.

Appendix I presents the interview guide, which contains the interviews questions for all groups of the interviewees. Having developed and tested the interview guide, the researcher began to identify her interviewees. As mentioned in Section 3.2.3 four independent primary schools were selected to be the cases for this research. The researcher strove to interview as many people as possible from those four schools at many levels. The sample size in this study was restricted by the availability of many conditions, including the willingness of the interviewees to be interviewed, their availability, the importance of their roles in the education processes, and the availability of time. Accordingly, the sample size was restricted to the 79 respondents who granted the request for participation in this study. The respondents from each school and their details are summarised in Table 3.2 below (Some interview notes presented in Appendix II as examples).

**Table 3.2: Respondents' School and occupations**

<b>School Name</b>	<b>Interviewee Designation</b>	<b>Number of Interviewees</b>
<b><i>The Sky School</i></b>	Headmistress	1
	Teachers	15
	Students	10
<b><i>The Sun School</i></b>	Headmistress	1
	Teachers	15
	Students	10
<b><i>The Earth School</i></b>	Headmistress	1
	Teachers	0
	Students	0
<b><i>The Moon School</i></b>	Headmistress	1
	Teachers	15
	Students	10
<b><i>Total</i></b>		<b>79</b>

As it can be noted from Table 3.2, the researcher failed to interview any teacher or any students from the Earth School. This is because its headmistress refused to give

the researcher permission to conduct the required interviews. She justified her action by giving one main reason; she said: *“The previous administration of this school just replaced with the current one and we do not want to encounter any problems. Just ask me any question you want to ask teachers and I will answer with pleasure”*.

All interviews were conducted using a printed, standardized instrument as an interview guide for semi-structured interviews (see Appendix I). However, the interview questions were classified based on the interviewees' groups. In other words, the researcher did not ask all interviewees the same questions but rather questions were asked depending on the interviewees' different groups (See Appendix II). Furthermore, all interviewees were asked some open questions with the aim of giving them the chance to speak with more freedom and at the same time there were some unplanned questions that emerged from the interviewees' answers. All the interviewees' answers were translated and typed up by the researcher in draft responses.

There were some guidelines which were followed with the aim of improving the quality of the interviews' questions. For example, the interviewees were given enough time to answer the interviews' questions. Bogdan and Biklen (1998, p.95) recommend that the researcher should not give up on an interviewee too quickly because some participants need a chance to warm to the researcher. Moreover, although there are no rules that the researcher can always apply across all interview situations (Bogdan and Biklen 1998), the researcher tried her best to listen carefully to what people say, and *“treat(ed) every word as having the potential to unlock the mystery of the subject's way of viewing the world.”* (Bogdan and Biklen, 1998, p. 96). Also the interviewer

used to be flexible, and usually tried to use different techniques including joking for instance, and sometimes share her experiences with the subject.

#### **3.2.4.2 Observations**

As mentioned above, classroom observations were used in conjunction with semi-structured interviews and document analysis. Classroom observations were used with the aim of filling the gaps left by the interviews and documents and to give a deeper understanding of everyday practices within classrooms in the ISs. Patton (1987) reports that *“the data from observations consist of detailed descriptions of programme activities, participant’s behaviours, staff actions, and the full range of human interactions that can be part of programme experience”*. Observations were used frequently; detailed descriptions of the setting and the meanings and values of its inhabitants would need to be explored.

Observations helped the researcher to gain a ‘rich picture’ of the implementation and the use of ICTs in ISs. The researcher intended to approach observations in a rigorous and structured way, both in terms of the techniques that were used to gather data, and the methodological considerations of validity, reliability and the ethics of research. Members of a given community can take a great deal for granted about the knowledge others have; outsiders may not have access to this knowledge. It is important, therefore, for the representation of a given community to provide a reader with the required background knowledge. To achieve that, an explanation of observational situations inside and sometimes outside the classrooms were applied as often as possible.

According to Allwright *et al* (1991), observation is a major data collection tool in qualitative as well as in quantitative research but it was used qualitatively in this study. The researcher was interested in the impact of the use of ICTs on the behaviours and attitudes of both teachers and students. Classroom observation in addition to other methods were used as a means of getting as much information as possible about how the ICTs are employed and used in the ISs classrooms. They were used to find out what kind of interactions go on between teachers and students when it comes to teaching and learning new lessons in class. Therefore, three classroom observation parameters were carefully considered. These were the observer, the goals and the procedures of the observation (McDonough *et al* 1997). The observer was the researcher herself and the goal was use the 'classroom window' to find out more about the deployment and the use of ICTs in ISs classrooms. The procedure, which is the third parameter, was a checklist developed in advance by the researcher.

According to Cohen and Manion (1994), there are two main types of observation, namely participant observation and non-participant observation. The researcher used a non-participant observer technique in this research. *"The best illustration of the non-participant observer role is perhaps the case of the researcher sitting at the back of a classroom coding up every three seconds the verbal exchanges between teacher and pupils by means of a structured set of observational categories."* (Cohen and Manion 1994, p.9). As mentioned above, classroom observation was used to capture students' motivational intensity and attitudes in class towards (or a way from) the used ICTs and the role of teachers in encouraging and motivating their students to use the available technologies. Students' participation was also monitored.

As with every other instrument used for data collection, classroom observation has a number of drawbacks. For example, the researcher was aware of the effect of her presence inside the classroom on the behaviour of the subjects observed, be these teachers or students. Another common problem to all research, but particularly qualitative research, is the researcher's own subjectivity and bias. How can researchers be sure that their own values and principles have not excessively influenced what they observe, and the significance that they attach to it? Or alternatively, how can they be sure that they will not be tempted to 'go native' and adopt the perspective of their subjects? (Cohen and Manion 1994, p.111). Silverman (2000, p.12) writes of the need for "*rigorous, critical standards*" with regard to the nature of evidence and interpretation in qualitative research. In order to minimise such effects, the researcher told the subjects at the start of collecting data that she is surveying the use of ICTs in general and their affect on students attitude and learning skills that might be acquired or enhanced due to the use of ICTs in the ISs. She told the subjects that she was especially observing teaching behaviour (and attitude) only after the observation was over, as she did not want to affect the way teachers conduct their classes during the observation. However, participants were given the choice to withdraw the observation if they wished. In addition, the researcher used to sit in the back of the class with aim of keeping a low profile while in class to avoid disturbing teachers and students or interrupting class activities. Moreover, the researcher used a checklist that include:

#### **1. Environment**

- Technologies employed

- Organisation of classroom (e.g. number of students per class, computers/equipments available, the availability of local area network, wide area network, intranet, extranet, internet or any other sources of information)
- Overall type of teaching methods (i.e. instructional programmes)
- Whether teachers follow a clear plan in the preparation of their lessons
- Class control and management
- The ability of utilising the available technologies
- Teachers attitude towards the available ICTs
- Students attitudes and ability to cope with the available ICTs instructional tools.
- Number of computers available and how students were using them
- How space for class work, small group work and individual work was provided
- How students working at computers were monitored.
- Position of existing electrical outlets and network connections
- Aspects of care and responsibility that students must learn, and assisting them achieve this in their daily use of the ICT space.

## **2. Lesson type**

- ICTs items covered
- Number of items covered
- Special objectives covered (e.g. any lesson objectives that related to the use of ICTs to enhance the learning outcomes)

### **3. Lesson presentation**

- Means used in explaining the lesson (e.g. what sorts of technologies are used; other means such as wall sheets, using visual aids, etc.)
- Means of presenting other aspects of new words, such as using them in sentences to demonstrate meaning and grammatical characteristics, etc.
- Whether individual differences are taken into account during the use of the available instructional programmes

### **4. Students' participation/ skills.**

- Asking and answering questions
- Participating in lesson's exercises
- Learning skills acquired
- Other observations

### **5. Encouragement of students using ICT**

- Teachers make sure all students enjoy computer work
- Teacher makes sure all students enjoy using the available ICTs tools
- Teacher makes students feel good when they use the available technologies
- Teacher gives students special help with the ICTs tools

Appendix III contains some examples of the observations that took place during the data gathering process.

### 3.2.4.3 Documentations

Documents were used to complement the semi-structured interviews and observations as they provided useful additional information to supplement information available from other sources of evidence and highlighted new aspects that would need to be explored further by the researcher (Yin, 1994). Documents in this study involved the interviews' notes, brochures, strategies, plans, curricula textbooks, examinations results, SEC evaluations reports, newspaper clippings, schedules, presentations, and other reports (Patton, 1990; Yin, 1994).

Documentation was basically used to provide background information about the deployment and the use of ICTs in the ISs as well as the establishment of ISs themselves, their objectives, missions, visions, curricula, etc. The use of this instrument helped a great deal in revealing meanings, developing understandings and discovering insights (Merriam, 1988). In addition, documents data furnished descriptive information, offered historical understanding, tracked change and development, and proved "*useful for the theory building*" (Glaser and Strauss, 1976, cited in Merriam, 1988). Using documents as data collection tool was criticised by its built-in-bias which requires careful attention from the researcher (Marshall and Rossman, 1999; Yin, 1994). The researcher was aware of such built-in bias so documents were used as complementary source of evidence for the data collection from other sources and were analysed and validated by other sources of information. The collected documents were classified as follows (Appendix III gives some samples of the collected documents):

- Official education documents (13 documents); Table 3.3 shows the collected documents' names, their date and descriptions.
- Newspapers articles (3 articles); Table 3.4 list the serial, dates and topics of those newspapers articles.
- Transcript of a formal TV interview with Her Highness Sheikha Mozah Bint Nasser Al-Missnad, Consort of His Highness the Emir and Vice Chair of the SEC;
- SEC website and other related websites. Table 3.5: List the visited websites.
- Notes of 79 face to face semi-structured interviews

**Table 3.3: Summary of the major collected documents**

<b>Document code</b>	<b>Date</b>	<b>Description</b>
E&FMagazine	v.19/2006	Education & Future Magazine by Al-Raya Newspaper
ISBooklet	2004-2005	Independent Schools 2004-2005 booklet
SkyBooklet	2004-2005	The Sky School Booklet
PRFAB AIS	2004-2005	Performance Report for the Sky School
PRGuide	2004-2005	Performance Report Guide
PRFBIS	2004-2005	Performance Report for The Sun School
SunBrochure	2004-2005	The Sun School brochure
PRFKHIS	2004-2005	Performance Report for the Earth School
EarthBrochures		The Earth School brochure
PRFISIS	2004-2005	Performance Report for the Moon School I
MoonBrochures	2004-2005	The Moon School brochure
EFF	23-04-2006	Education for future. An investigation about the new era education, particularly about the Earth School
SAS	2005-2006	School and Schooling in Qatar 2005-2006 report: A statistical overview of aspects of schools and schooling in Qatar

**Table 3.4: Summary of the collected newspapers' articles**

<b>Newspaper Name</b>	<b>Serial No</b>	<b>Date</b>	<b>Description</b>
Al-Sharq	5975	25-10-2004	An exploration of the independent schools initiative by Al-Sharq newspaper
Al-Sharq	5989	08-11-2004	Conducting a special training for 60 citizens with the aim of preparing them to be effective operators for the independent schools
Al-Sharq	6127	26-03-2005	An investigation about the citizens opinions with regard to the idea of the independent schools

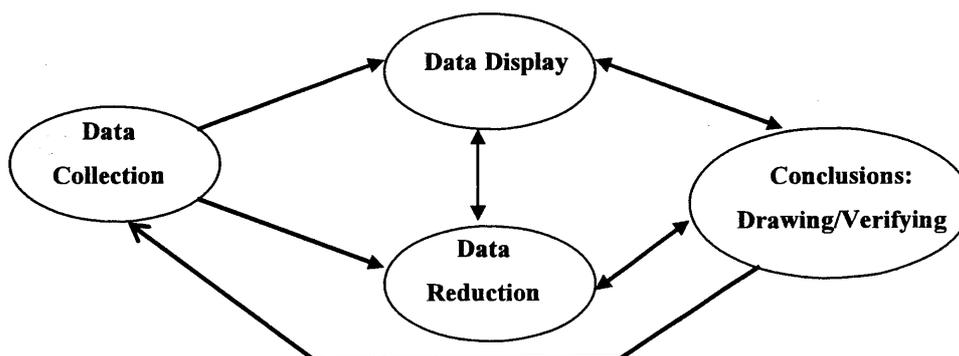
**Table 3.5: List of the visited websites**

<b>Ministry name</b>	<b>Its Website link</b>	<b>Access date/period</b>
SEC Website	<a href="http://www.english.education.gov.qa">http://www.english.education.gov.qa</a>	June/2005-Sept-2006
Her Highness Sheikha Mozah Website (HHWebsite)	<a href="http://www.mozahbintnasser.com">http://www.mozahbintnasser.com</a>	June/2005-Sept-2006
The Sun School Website (SunWebsite)	<a href="http://www.albayan.edu.qa/english_Bayan/index.html">http://www.albayan.edu.qa/english_Bayan/index.html</a>	August/2006
The Moon School Website (MoonWebsite)	<a href="http://www.israaschool.com/">http://www.israaschool.com/</a>	August/2006
The Ministry of Education Website (MOE Website)	<a href="http://www.moe.edu.qa">http://www.moe.edu.qa</a>	June/2005-Sept-2006
The Ministry of Foreign Affair (MOFA Website)	<a href="http://english.mofa.gov.qa">http://english.mofa.gov.qa</a>	June/2005-Sept-2006

### **3.2.5 Data analysis**

This section deals with the general strategy that was followed in the data analysis process. The researcher used a strategy which enabled her to choose from different techniques and to complete the analytical phase of the research successfully. According to Yin (1994), data analysis is about examining, categorizing, tabulating or otherwise recombining the collected data with the aim of finding answers to the stated research questions. Yin (1994, p. 102) also stated that the "*analysis of case study evidence is one of the least developed and most difficult aspects of doing case study*". Data analysis and data collection are suggested to be developed together in an iterative process that allows for theory development (Hartley 1994).

This study relied on theoretical propositional strategy as an analytical strategy which reflects a set of research questions, reviews of literature, and new insights Yin (1994). However, it was very important to decide on specific analytic techniques that will be used as part of the selected general strategy. The initial framework that was developed in Chapter 2 prior to the data collection exercise was a very useful tool in structuring and in guiding the data collection and data analysis processes. In addition, some other data analysis techniques such as content analysis, cross-interview analysis, cross-case analysis, coding, and classifications were used in this study. To be more specific, content analysis strategy, which is *“the process of identifying, coding, and categorising the primary patterns in the data”* (Patton 1990, p. 381), was mainly adopted as an analytical approach for this study with the aid of NVivo software. In doing so, the researcher followed three broad streams: data reduction, data display and data conclusion drawing that were suggested by Miles and Huberman (1984, p.22).



**Figure 3.1: Components of data analysis; interactive model; adapted from Miles and Huberman (1984, p. 23)**

Figure 3.1 shows the main components of the data analysis approach that was suggested by Miles and Huberman (1984). These steps were followed in this study as follows:

- The developed initial research framework and the interview guide were initially used in identifying the primary patterns in the data. By reading through all the data that was collected (i.e. official documents, interviews notes, observation notes, websites and other official brochures, and local newspapers articles) a rich picture of all case studies was formulated. Then, data was coded according to the themes that were identified by the initial framework and the research questions. The collected data was then analysed based on the themes that emerged from the literature review prior to the data collection. After that, any new theme which could occur from the data analysis was separated, classified and added to their respective classes within specific categories or sometimes by creating new classes within the same categories. As mentioned, the researcher used NVivo software to code, categorise and classify the identified pattern. As a result of this step, the volume of the data was reduced and presented in an organised way (i.e. data reduction).
- The second step was to move to the second major flow of analysis activity which is “data display” or data visualisation (Miles and Huberman, 1984). There were various display techniques that used during the data analysis process such as using tables and matrices of categories, narrative text, quotation, figures, screen shots, tabulating the frequency of different issues

and examining their complexity and their relationships (Gibbs 2002, Miles and Huberman, 1994; Patton, 1990; Yin 1994). Gibbs (2002, p.187) emphasise that tables are “*a convenient way to make comparisons across different subgroups of the data set and between different attributes of individuals*”. In this study, tables of data, also referred to as matrices, were used a lot in summarising, combining or separating, comparing and contrasting, and reporting findings visually. Miles and Huberman (1994) suggest that the major advantages of using matrices is that they will increase the reliability of the research so that any later researcher may repeat the process and might duplicate the findings. Direct quotes from the different cases were used to add qualitative insights and provide support to the data interpretation (Paton, 1990).

- Organising the researcher’s thoughts, “*finding a structure that can bring together all the researcher disparate jottings into a coherent ‘story’*” and drawing meanings from the displayed data was the third major flow of the data analysis process (Gibbs 2002, p. 222; Miles and Huberman, 1984; Miles and Huberman, 1994). In this study, various analytical techniques with regard to this step were used such as classifications and categorisation of the data, noting regularities and patterns, deriving explanations, and reviewing and rechecking findings amongst colleagues and the researcher’s supervisor. All these processes were frequently related to the initial framework and at the same time the initial framework was enhanced and revised by the analysed data.

As stated earlier, NVivo software was heavily used during the three steps mentioned above with the aim of increasing the reliability of the study and to get the help of the available technology in analysing mass qualitative data. With NVivo *“it is possible to manage, access and analyse qualitative data and to keep a perspective on all of the data, without losing its richness or the closeness to data that is critical for qualitative research”* (Bazeley and Richards 2000, p.1). In addition, it encourages an exploratory approach to analysis and helps to manage and synthesise the researcher’s ideas (Gibbs, 2002). NVivo does fit well with this research’s objectives and the approach to data analysis as it provides a powerful way to carry out sophisticated data coding. NVivo does not support the researcher by giving automatic analysis of the data, but it can help in the interpretations and structuring the study findings. Appendix IV contains a detailed description of using NVivo Software during the data analysis process.

### 3.3 Research quality criteria

The two standard criteria for judging the quality of any research are validity and reliability. Yin (1994) classifies validity into three types, namely construct, internal and external validity. Reliability (or objectivity) is also another criterion for carrying out unbiased research whereby the researcher strove to remain neutral to the phenomenon studied. On the other hand, Guba and Lincoln (1989) proposed a set of new criteria that can be applied to any interpretive research instead of criteria mentioned above which were built based on the ontological and epistemological assumptions of the positivist paradigm. These parallel criteria are presented in Table

3.6 below. These parallel criteria (i.e. credibility, transferability, dependability and confirmability) are intended to replace the conventional criteria of internal validity, external validity, reliability and objectivity, respectively and were used to judge this research quality. The following sections explain how these criteria were met in this study.

**Table 3.6 Parallel criteria for judging interpretive research**  
(adapted from Guba and Lincoln, 1989)

<b>Parallel criteria</b>	<b>Objective</b>	<b>Tactic</b>
<b>Credibility</b>	Establishing the match between the constructed realities of respondents (or stakeholders) and those realities as represented by the evaluator and attributed to various stakeholders	-Prolonged engagement -Persistent observation -Discussion of data and results with external peers and informants (member checks)
<b>Transferability</b>	Offering a sufficiently detailed account of the findings to enable the reader to judge how these findings can be transferred to other contexts	Thick description
<b>Dependability</b>	Ensuring the stability of the data over the time (i.e. Documenting any methodological changes and the interpretive process itself so that the reader can follow the process and the choices made by the researcher)	Making the research process explicit
<b>Confirmability</b>	Ensuring that the data, interpretations and results are rooted in the context and not just a result of the researcher's imagination	Making data available Describing the logic used for moving from data to the final results

### 3.3.1 Credibility

The credibility criterion is the replacement of internal validity that is concerned with explanatory case studies since it aims to ascertain that the causal relationships established are 'true' (i.e. "*in which an investigator is trying to determine whether event x led to event y*") (Yin, 1994, p.35). However, in this study, the reality is seen as a social construction in the interpretive perspective and hence credibility moves the focus from establishing causal relationships explaining an objective reality, to

establishing the match between the constructed realities of the respondents (Guba and Lincoln, 1989). The establishment of this match can be achieved by ensuring involvement at the site of the inquiry, and through discussing data and results with external peers and respondents (member checks).

In this research, the process of the research design started with a literature review of prior theories then the area of research was identified and after that an initial framework was developed. In other words, a pre-understanding of the phenomenon of ICTs employment in teaching and learning processes was achieved before the data collection process. In the data gathering and data analysis processes, a triangulation technique was used to enhance the credibility of the case studies findings through the use of three main sources of evidence. Patton (1990, p. 464) suggested four types of triangulation:

- Methods triangulation: In this study, three main data collection instruments were used with the aim of checking the consistency of the case studies' findings.
- Triangulation of sources: the research data was collected from three different sources, specifically interviewees, documentations, and observations.
- Analyst triangulation: the research findings were checked by the researcher's supervisor, some of her colleagues and the research herself of course.
- Theory/perspective triangulation: the use of multiple perspectives to interpret the data. In this study there is no clear triangulation with regard to theories behind it but it can be noted that Chapters 2 discussed and reviewed the literature of ICTs and its employment in teaching and learning processes

which implicitly involve a combination of Information Technology (IT) literature, education literature and other related literature.

### **3.3.2 Transferability criterion**

Transferability aims to give other researchers or readers a chance to check the accuracy of the research findings and how can they be transferred to another context through offering a sufficiently detailed account of the findings. The transferability criterion is developed as parallel to external validity (or generalizability) which *“deals with the problem knowing whether a study's findings are generalizable beyond the immediate case study”* (Yin, 1994, p.35). However, while the burden of proof for claimed generalizability is on the researcher, the burden of proof for claimed transferability is on the receiver (Guba and Lincoln, 1989). The main tactic for establishing transferability in this research was the use of thick (or detailed) descriptions. This research differs from quantitative studies, which depend on statistical generalisation. Transferability was achieved in the research design and data analysis of this study. As mentioned above, this study provided in depth description of the case study design and findings. In addition, findings were constantly discussed with reference to the related literature.

### **3.3.3 Dependability criterion**

The dependability criterion is developed to ensure the stability of the data over time (Guba and Lincoln, 1989) and to be used as parallel to the conventional criterion of reliability. In other words, it aims to ensure that the same findings would be arrived at

if a later researcher conducted the same study following the same procedures. Nevertheless, based on the interpretive school perspective applied in this research, it cannot be expected that a later researcher would arrive at exactly the same findings since the researcher's understanding was developed through a hermeneutic process that involves continuous interaction with the data. This is because a different researcher will not collect the same data since data on real-life events might not come together into one consistent picture. However, this difference can provide a valuable source of information about the case studies investigated. Alternatively, the dependability criterion was developed to ensure that decisions and interpretations made by the researcher are documented so that they can be traced by outside reviewers.

The tactic used in this study is shown in Table 3.6 which is making the research process explicit as this will enable other researchers to follow the process used in detail by the researcher for arriving at her conclusions. As mentioned above, a pilot study was conducted to test the interviews' questions, the time needed for each interview and the suitability of the questions to the interviewees' groups. Consequently, the interview guide was refined and made ready to use in the data collection process. Also a case studies database was established to increase the reliability and the general quality of case study research. Hence in line with Yin (1994) and Patton (1990) suggestions, the database of this research involves: (1) notes of all interviews which were stored in a safe place; (2) interview guide; (3) original copies of the case study documentation; (4) Observations documents; and (5) an electronic database for the data analysis notes (i.e. NVivo and word processor copies).

Finally, it is worth mentioning that most of these documentations are stored electronically.

### **3.3.4 Confirmability criterion**

The confirmability criterion is developed to ensure that the data, interpretations and findings of the researches can be tracked to their sources, and are not products of researchers' imagination (Guba and Lincoln, 1989). In other words, it is developed as parallel to the conventional criterion of objectivity. However, many interpretive researchers argue that there will always be some form of interaction between the researcher and the phenomena being studied in the interpretive research so this must be accepted as a natural part of the research process, as long as the nature of this interaction is documented explicitly.

Table 3.6 showed the main tactic to achieve this criterion. As it can be noted, this criterion could be achieved by making data available for inspection by others, and by describing the logic used for moving from the data to the final conclusions. This tactic was followed in this study since most of the data that related to this research are available electronically. The non-electronic part of the data is filed and stored as a hard copy database in a safe place.

## **3.4 Ethical considerations**

Ethical considerations were treated carefully throughout this research. The researcher was aware of such important issues and hence strove to protect the individual

participants and their organisations from harmful consequences that could be caused by the research activities. Ethical considerations require a careful treatment of respondents and should consider many major ethical issues that include privacy, deception, anonymity, accuracy and confidentiality (Miles and Huberman, 1994; Neuman, 2000). It was striven to make respondents aware of the research aim prior to the interviews as well as assuring their privacy and anonymity. In addition, they were given the chance to withdraw from the interview at any time. Also the privacy of the individuals was protected by conducting interviews in a private, closed office, by transcribing interviews away from research participants and colleagues, by referring to individuals by their nicknames which were selected by the researcher. Moreover, electronic versions of interview notes were kept on the researcher's laptop; and finally, the researcher tried to behave in a manner that would not harm the integrity and reputation of the interviewed schools.

### 3.5 Summary

This chapter explained the research strategy and the methodological steps that were followed in this study. It started with describing the research philosophy underpinning this research. The research approach that was used throughout this study can be positioned as broadly interpretive case studies. In addition, the chapter sheds light on the research methodology and the rationale for choosing it. Also, a detailed research design that covers all issues related to the research methodology was explained. This included a description of the four criteria that were used for judging the research quality and a discussion of the ethical considerations that were taken into account throughout the study. The next chapter will give a background about the four cases that included in this research and brief information about the education system in Qatar and its reform programme.

## CHAPTER FOUR: CASE STUDIES BACKGROUND

---

### 4.1 Introduction

The aim of this chapter is twofold; first it seeks to shed light on the country where the selected case studies were conducted and to give a historical background about the education system of that country. Secondly, it aims to give the reader a clear idea about the selected case studies and their specificities. In particular, this chapter is divided into ten sections. Section 4.2, presents a brief background about the State of Qatar. Then, Section 4.3 highlights the history of the education system in the State of Qatar whereas Section 4.4 explains the reform programme of that educational system. After that, Sections 4.5, 4.6, 4.7, 4.8 explore the mission, vision, teaching methodologies, and available facilities of the Sky School, the Sun School, the Earth School and the Moon School respectively. After that, a brief discussion and assessment will be presented in Section 4.9. Finally, Section 4.10 summarizes this chapter.

### 4.2 The state of Qatar in brief

Qatar is a peninsula that is situated halfway along the west coast of the Arabian Gulf. The total land area of Qatar is about 11,431 square kilometres (i.e. slightly more than half the area of Wales). According to the results of the 2004 population census, the population of Qatar amounts to 744,029 inhabitants compared to 522,023 inhabitants in the last census conducted in 1997. A minority (20%) of the population are citizens

while the rest are expatriates (e.g. other Arabs, Pakistanis, Indians, and Iranians). Residents are those who live in Qatar but are not Qataris.

Qatar's economy is dominated by oil and natural gas, which accounts for 70% of its export income. Comparing its economy with its population, Qatar has been considered as one of the richest countries in the world. Oil and gas revenues helped the country in diversifying its economy, which includes the development of chemicals, fertilizer industries, cement, steel, and banking.

Qatar began its new era and modern history with the rule of His Highness Sheikh Hamad Bin Khalifa Al-Thani who succeeded his father in 1995. The new era is characterized by many features, particularly the wider public participation in decision making. His Highness the Emir is the Head of the constitutional authorities, holding both legislative and executive powers. In addition, there is a council of ministers which assists in implementing the general policies of the State. His Highness the Emir appoints the prime minister, deputy of the prime minister and ministers, accepts their resignations and relieves them from their posts by Emiri Decrees.

### 4.3 A brief history of the education system

Initially, the education in the State of Qatar started in 1950 but the year 1956 was the starting point for the official education system which depended on modern educational principles (MOEWebsite). The first Ministry of Education was established in 1956/57. Then, a comprehensive educational policy was developed based on some key principles such as adherence to the heritage of the Islamic nation

and its moderate character as well as a commitment to the development of educational curricula and systems and constantly endeavours to benefit from modern and technological achievements and new educational experiments (MOFA Website). In addition, the education policy of Qatar is committed to respecting the heritage and conservative personality of the people and its development has accelerated to involve both males and females in every community in the country at all educational levels up to the university level. Table 4.1 shows the main events that took place with regard to the education system since 1950.

**Table 4.1: A brief historical background about the education system in Qatar**

<b>Date</b>	<b>Events</b>
1950/51	The establishment of the first elementary school in Qatar which was composed of four classes only and a total of 190 students.
1951/52	The main principles for the elementary curricula were developed.
1952/53	The educational committee was established with the aim of supervising the educational processes nation-wide.
1956	The first educational agency was established under the supervision of Sheikh Khalifah bin Hamad Al-Thani.
1957	The first education ministry was established. Sheikh Jasim bin Hamad Al-Thani was the first minister for that ministry.
1960/61	Both industrial and religion educational issues and responsibilities were assigned to the ministry of education.
1972	The ministry of education became a member of the of the united nations educational, scientific and cultural Organisation (UNESCO).
1976	Two institutions (one for boys and the other for girls) for deaf students were established.
1984	Deaf and mental handicapped students were separated. New schools were established for each type and for both girls and boys.
1999	A new institution for blind students was established.
2000	Two new types of schools were opened for both girls and boys. They were the so-called Developed Schools.
2002	The supreme education council was established.
2004-05	The first group (i.e. 12 schools) of new Independent Schools (ISs) began operation and a second group of 20 ISs was scheduled to open in September 2005. Additional Independent Schools will be established in subsequent years. The schools for 2004-05 include: 5 primary schools (2 for boys, 3 for girls) 2 preparatory schools (2 for boys) 2 inclusive primary/preparatory/secondary schools (1 for boys, 1 for girls) 2 first-stage primary schools (1 for boys, 1 for girls) 1 secondary industrial and technical school (for boys)

As shown in Table 4.1, the Supreme Education Council (SEC) was established in November 2002 with the aim of providing the best education for Qataris and preparing them to meet the needs of economic and social development. The establishment of SEC was based on an 18-month analytical and field study on the existing educational system which was released by Qatar's government under the slogan "*Education for A New Era*". The following section will explore this initiative in more detail.

#### 4.4 Education for a new era

*"Since 1995 His Highness the Emir has championed comprehensive, large-scale educational reform in Qatar. Appointed by the Emir, Her Highness Sheikha Mozah is working to raise educational standards and create new learning opportunities for all members of society". (HHWebsite)*

The efforts of the State of Qatar to establish the foundation of its vision of "*Education for a New Era*", a comprehensive education reform initiative was launched in November 2002. An Emiri decree was issued to establish the SEC to oversee the reform program. The reform programme has at its core new high quality, government-funded schools, nation wide assessments and evaluations, and new curriculum standards based on international benchmarks (HHWebsite). As Vice-President of the SEC, Her Highness Sheikha Mozah is committed to building a modern, world-class education system in Qatar and to shape educational policy for the nationwide initiative (HHWebsite).

*“Knowledge is everything today. We want our people to be wealthy not just with what they have, we want them to be wealthy with what they know”* (H.H. Sheikha Moza Bint Nasser, NBC news channel)

According to (SECWebsite), this comprehensive, long-term reform initiative is based on four principles. These are:

***Autonomy:** Allowing schools and teachers to be innovative in their approach to meeting the needs of individual students and parents, within a framework of international curriculum standards.*

***Accountability:** Implementing an objective and transparent assessment system to hold all school leaders, teachers and parents responsible for the success of students.*

***Variety:** Encouraging different kinds of schools and instructional programs.*

***Choice:** Allowing parents to select the school that best fits their children's needs.*

There are two key elements to the reform programme, namely establishing new government-funded ISs and issuing annual student assessments and surveys to help monitor and improve student learning and school performance. ISs are government-funded schools that are supervised by SEC instead of the Ministry of Education and operated by individuals (e.g. academics, teachers, other individuals or businesses). They are an integral part of the comprehensive education reform effort known as *“Education for a New Era”*. The operators of the ISs are given the freedom to carry out their educational missions and objectives while being held accountable to terms agreed in an operating contract (SECWebsite). Although they are encouraged to select teaching methods that satisfy their objectives, the emphasis is on:

*"Providing students with the skills essential to success in life, including critical thinking, decision making, problem-solving, teamwork, creativity, and the ability to use technology and communicate effectively" (ISBooklet, p.3).*

In addition, there are certain curriculum standards in Arabic, English, mathematics and science that they must meet. Furthermore, they should comply with periodic financial audits. There is also an Evaluation Institute (EI) that reports directly to the SEC. EI has developed comprehensive educational assessment methods, with the aim of measuring student and school progress annually through the use of standardized tests in Arabic, English, mathematics and science (SECWebsite).

As shown in Table 4.1, the first group of new ISs (i.e. 12 ISs) began operation at the start of the 2004-05 academic year, and a second group of 20 ISs was scheduled to open in September 2005. Table 4.2 list the latest statistical information issued by the EI in its annual report for the academic year 2005-2006. As it can be noted that there are 39 ISs that are operating until the date of issuing the report. The same reports gave some additional and valued information about teachers. Table 4.3 shows the percentage of teachers' gender, age, percentage of Qatari and their teaching experiences. It is clear from the mentioned table that most of the teachers are Qatari (i.e. 54%) and 70% of them are female. In addition, there is another interesting figure which is the average of the teachers' experiences (i.e. 11,6 years). Furthermore, it is clear from Table 4.3 that the education in Qatar still relies, to some extent, on the expatriates (46% of teachers are non-Qatari).

**Table 4.2: Overall numbers of schools, teachers and students; (SAS, p.1)**

		<i>School Numbers</i>	<i>Teacher Numbers</i>	<i>Student Numbers</i>
<b>System</b>	<i>Ministry of Education Schools</i>	152	6802	55778
	<i>Private Arabic Schools</i>	40	853	11045
	<i>Independent Schools (ISs)</i>	39	1726	21679
<b>Stage</b>	<i>Primary level</i>	141	5272	47630
	<i>Preparatory level</i>	73	2863	26500
	<i>Secondary level</i>	59	2612	23946
<b>All Schools</b>		<b>231</b>	<b>9381</b>	<b>88502</b>

**Table 4.3: Teachers' gender, age, and average of Qatari teachers and their teaching experiences; (SAS, p.4,7.)**

		<i>Male Percentage</i>	<i>Female Percentage</i>	<i>Average Age</i>	<i>Qatari teachers Percentage</i>	<i>AVG years of teaching experience</i>
<b>System</b>	<i>Ministry of Education Schools</i>	30%	70%	38.4%	68%	12.8%
	<i>Private Arabic Schools</i>	33%	67%	37%	1%	10.9%
	<i>Independent Schools (ISs)</i>	24%	76%	33.5%	39%	8%
<b>Stage</b>	<i>Primary level</i>	17%	83%	35.7%	62%	9.9%
	<i>Preparatory level</i>	46%	54%	37.6%	43%	12.0%
	<i>Secondary level</i>	44%	56%	40.7%	38%	15.6%
<b>All Schools</b>		<b>29%</b>	<b>71%</b>	<b>37.2%</b>	<b>54%</b>	<b>11.6</b>

Moreover, Table 4.4 reports information about the teachers' educational qualifications. It shows that the percentage of ISs teachers carry degrees above Bachelors degrees is 18% of their total number of teachers. This percentage, as it can be noted, is the best between the other two educational systems.

**Table 4.4: Teachers' educational qualifications; (SAS, p.5)**

		<b><i>Below Bachelor Degree</i></b>	<b><i>Bachelors Degree</i></b>	<b><i>Above Bachelors Degree</i></b>
<b>System</b>	<b><i>Ministry of Education Schools</i></b>	6%	80%	14%
	<b><i>Private Arabic Schools</i></b>	28%	59%	13%
	<b><i>Independent Schools (ISs)</i></b>	9%	73%	18%
<b>Stage</b>	<b><i>Primary level</i></b>	12%	78%	10%
	<b><i>Preparatory level</i></b>	3%	76%	20%
	<b><i>Secondary level</i></b>	2%	74%	24%
<b><i>All Schools</i></b>		<b>9%</b>	<b>76%</b>	<b>15%</b>

As mentioned earlier, there were four ISs that were selected as case studies for this research. These four cases are described in detail below.

#### 4.5 Sky independent school

The Sky school is the first case study that was investigated and explored during the data collection phase. Here is a brief summary of the key findings with regard to this school.

#### **4.5.1 School mission and vision**

The Sky school is an independent school and exclusively for boys entering the 1<sup>st</sup> to 5<sup>th</sup> grades. It follows the curriculum set by the Education Institute and uses English as the medium of instruction for Math, Science and of course, English. Whereas, Social and Islamic Studies are taught in Arabic.

According to ABAISBooklet (p. 1) the school philosophy believes *“that education is more than passing exams. It’s about passing life’s future challenges.”* The school employs modern technology together with a modern methodology which can enable its students to keep pace with an ever changing world (ABAISBooklet). The school encourages its students to think independently and to analyse, not memorise, information. Its vision is:

*“To become one of the most prestigious schools in the Gulf, graduating highly qualified students who are prepared to assume leadership roles in their society and will actively participate in its development.”* (ABAISBooklet, p.1)

The Sky school’s mission is to prepare its students in primary level with the most modern knowledge and skills required with the aim of leading productive and healthy future while taking pride in their Arab-Islamic heritage.

## 4.5.2 Teaching methodology

The Sky school employs highly qualified mentors and uses technological advanced tools such as interactive whiteboards and audio-visual equipment with the aim of enhancing children's learning experience.

*"Our classes are student-centred, encouraging creative and independent thinking while allowing children to learn according to their own pace and ability. We also adopt corporative learning, role-playing, brainstorming and the integration of technology as teaching strategies." (ABAISBooklet, p.4)*

It is clear from the above quote that the school is approaching technologies as strategies in the teaching and learning processes with aim of achieving some learning skills such as creativity, role-playing and cooperation. In addition, they use other instructional strategies such as cooperative learning. Figure 4.1 shows an example of cooperative lessons that are often given to the students of the Sky School.



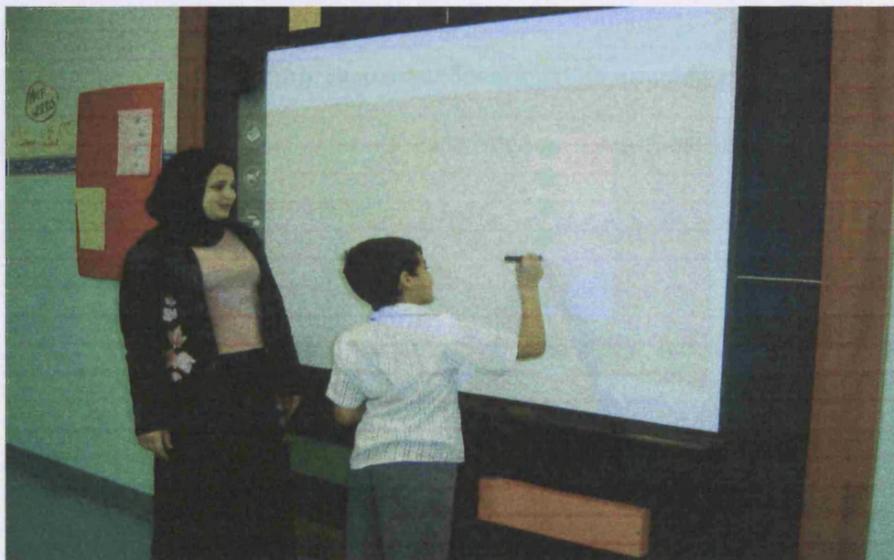
**Figure 4.1: The use of cooperative strategy in the learning process at the Sky school**

### 4.5.3 School facilities

The school is built to accommodate up to 25 classrooms with related facilities. Its building is equipped with the required support services according to international health and safety standards (ABAISBooklet). Each classroom is fitted with an electronic whiteboard (or smart board) that enables teachers to present their material in an attractive and stimulating way (see Figure 4.2 below).

*“We use the latest technology available so far to motivate learning habits of both the student and the teacher.” (ABAISBooklet, p.11)*

Again this quotes indicates that the Sky School management believes in the ability of technology in motivating teachers and students, enhancing students learning skills and in enriching the learning environment.



*Figure 4.2: The use of the interactive whiteboard in classrooms*

In addition, there are two computer labs that are equipped with up-to-date hardware and software with the aim of providing students with hands on experience in using and appreciating information technology, and allow them to access to a universe of knowledge.

Moreover, there is a science lab that enables students to learn in a fun and safe environment. Also there is an audio lab that uses modern equipments to support and enhance students' comprehension of both English and Arabic.

Furthermore, there is a library that has a collection of reading materials (e.g. books magazines, visual aids and other educational reference materials) both fiction and non-fiction, in English and Arabic. The art room is another environment that is designed and equipped to let students' creative talents burst out.

#### **4.5.4 School assessment methodology**

The Sky school follows a comprehensive educational assessment program that set by the EI. In addition, the school uses its own internal assessment methods to monitor students' progress. Its internal methods include:

- Diagnostic evaluation to determine cognitive skills and knowledge in Math, Science, Arabic and English.
- Formal evaluation using the national standardised test.
- Formative evaluation using class tests, projects, assignments, etc.

## 4.6 Sun independent school

The Sun school is the second school that was selected as one of the 4 case studies of this research. It is an independent school that is exclusively for girls. The following sections will highlight the main findings of the field study with respect to this school.

### 4.6.1 School mission and vision

According to (ISBooklet, p.5), this school “*offers a well balanced and broad educational programme based on the International Baccalaureate and focusing on problem solving, critical thinking and English language fluency.*” Its mission is to ensure that students have a strong awareness of and pride in their identity. Through an international, well-balanced curriculum assessed by a challenging evaluation system, the school strives to develop student potential and responsibilities for life-long learning in a constructive, cooperative, highly technological learning environment linked to the community and society as a whole. Classes are taught primarily in English.

In addition, the Sun school aims to provide a cadre of highly qualified graduates for Qatar’s future and to form an educational society of high standards accredited by international organisations and corporations (SkyBrochure). To achieve this aim, the school employed a professional staff, highly qualified in both vocational and academic fields (ISBooklet). In addition, it provided a professional development centre for its educators and other community members and offered focused and

ongoing training in current methodologies and cutting edge technologies, including UNESCO accreditation for ICDL (International Computer Driving License).

#### **4.6.2 Teaching methodology**

The Sun School believes that there should be many instructional tools that can enable teachers to communicate with students effectively. Having many instructional programmes (tools) enables teachers to choose the way that suit students' abilities and their way of thinking. Therefore, the Sun school employed many learning strategies such as corporative learning, problem solving, learning with games, and using the latest technologies. However, it sees the use of technologies in teaching and learning processes as a key strategy and a motivating factor that supports students to develop their learning and research skills and to solve some of their learning problems (SunBrochure).

#### **4.6.3 School facilities**

The school is equipped with some support services but the concentration was on those facilities that related to the employment of technologies in teaching and learning processes. According to the researcher observation, each classroom is fitted with a PC and overhead projector but there was not any electronic whiteboard in this school. In addition, there was a hall that is equipped with networked PCs, internet access and which can be used for the distance learning activities. This hall can be used also to display some live lectures, conferences from many different institution whether they as local or abroad (SunBrochure, p.43).

Moreover, the Internet is widely used in this school for scientific research, report preparation, and for explaining some class lessons. Also there is a learning resources centre which contains books, CDs, cassettes and an internet connection. Furthermore, the centre is equipped with a video room that students can use to see films, TV, Video, etc. In addition, there is an art hall that is designed to support students while they perform their art activities, workshops and to display their creative works.

#### **4.6.4 Sun school assessment methodology**

The Sun school follows a similar educational assessment programme to that assessment programme which is followed by The Sky School. In addition, the school uses its own internal assessment methods to monitor students' progress. Its internal methods include:

- Chapter tests which can be conducted under the subject teacher directly. Usually, students are given a week notice in advance.
- Quizzes: this is a 10-15 minutes test which be given at any time in any part of the subject under the study.
- Oral exams: these exams are often given to students in those subjects that require languages skills such as English and Arabic languages.
- Practical exams: this is the main test for all subjects, specially the scientific and applied subjects.

## 4.7 Earth independent school

The Earth school is the third case study that was selected to be explored in this research. It is an independent school and exclusively for boys. The main findings of the research with regard to this school are summarised below.

### 4.7.1 School mission and vision

The Earth School is designed to serve a maximum of 25 male students per class. The school's mission is to enhance core values that can help students grow by providing differentiated learning opportunities measured by carefully constructed assessment programs, enabling students to achieve at a level that will maximize success in a challenging elementary school (ISBooklet, SECWebsite). It aims to participate in the development of loyal Qatari citizens who embrace Islamic traditions and behaviour, while respecting others' beliefs and attitudes.

*Our mission is based on the belief and practice that students will grow up to be ethical, positive and believe in education as a way of life. We are committed to the provision of a quality education that is based on self-reflection and the belief that there is always a place for improvement. We are committed to developing a dynamic high performance team of dedicated teachers and support staff. (SECWebsite)*

The school focuses on students' success in a broad sense. It gives them the opportunity to excel both in and out of the classroom and challenges them academically by providing a stimulating and motivating environment with the aim of developing each student's desire for knowledge,

The teaching staff, according to (ISBooklet) have excellent knowledge of the curriculum and employ a variety of current teaching methods. In addition, they are supported to engage in professional development activities.

With regard to the curricula, the school introduced the British national curriculum in September 2001 for grade 1 students only. While other grades remained with the Qatari curriculum for the first year but the school intends to shift them gradually to the British national curriculum.

#### **4.7.2 Teaching methodology**

The Earth school aims to develop a range of skills which allow students to achieve success. It uses an educational model that incorporates an interactive, cooperative, enquiry based and ICT focused environment (see Figure 4.3). According to (SECWebsite) this model provides a holistic approach to learning as the student continues to be challenged to explore at a more comprehensive level for information and understanding.



*Figure 4.3: Example of cooperative learning lessons*

The school also shares teaching beliefs that guide the way the curriculum is delivered so every student receives the support he needs to access the curriculum (e.g. students with special education needs and students who need support in learning both Arabic and English). It concentrates on some learning skills such as learning experiences that are related to real life in areas of leadership, decision-making, tolerance, independence in learning, negotiation and analytical critical thinking skills.

Moreover, a variety of ways to learn including working as teams are employed in the teaching and learning processes. Finally, it is worth mentioning that the school provides students with the opportunity to participate in extracurricular activities outside of school hours such as individual and team sports; cultural and artistic activities; environmental and community care activities and studies of holy Quran as well as languages lessons.

#### **4.7.3 School facilities**

The Earth school provides an inspirational environment that challenges both students and teachers to be engaged in the process of learning through the use and promotion of problem solving and independent learning skills and values. It promotes the values of embracing change and innovation in curriculum planning, delivery and assessment, and supports this within the professional development programme.

Although this school is not using the ICTs with the same level as used in the above two schools (i.e. The Sky school and the Sun school), it has some lessons that depends

on using some learning technologies such as using Internet and other computer applications. Figure 4.4 shows the computer lab that provides the students with the some of the required information.



*Figure 4.4: The use of computer labs in the Earth school*

#### **4.7.4 Earth school assessment methodology**

The Earth school uses similar assessment methods that are used by the Sun school such as chapter test, quizzes, term test and verbal or oral tests. In addition, they use those tests that written by the EI with aim of comparing the school achievements comparing to other schools achievements.

## 4.8 Moon independent school

The Moon school is an independent school and it is exclusively for girls. The research showed some interesting findings with respect to this school. These findings and the main features of the Moon school are described briefly below.

### 4.8.1 School mission and vision

The Moon School's mission is to provide an institutional programme with the aim of developing tomorrow's leaders and giving each student the opportunity to acquire and utilise skills in speaking, reading as well as applying critical and creative thinking through technology (ISBooklet). The school also aims to equip girls aged 6-11 with a quality education that will prepare them to be life long learners, critical thinkers, responsible decision makers, and effective, involved, moral Qatari citizens. Through on-going staff development, all teachers will learn additional instructional techniques including differentiated instruction, small group and whole group activities, projects, and research to support and enhance academic success in all students (MoonBrochure). The school vision is to achieve educational excellence and the highest level of student learning, and, thereby, the opportunity for every student to be successful in a global economy and a contributing citizen in the society (SECWebsite).

### **4.8.2 Teaching methodology**

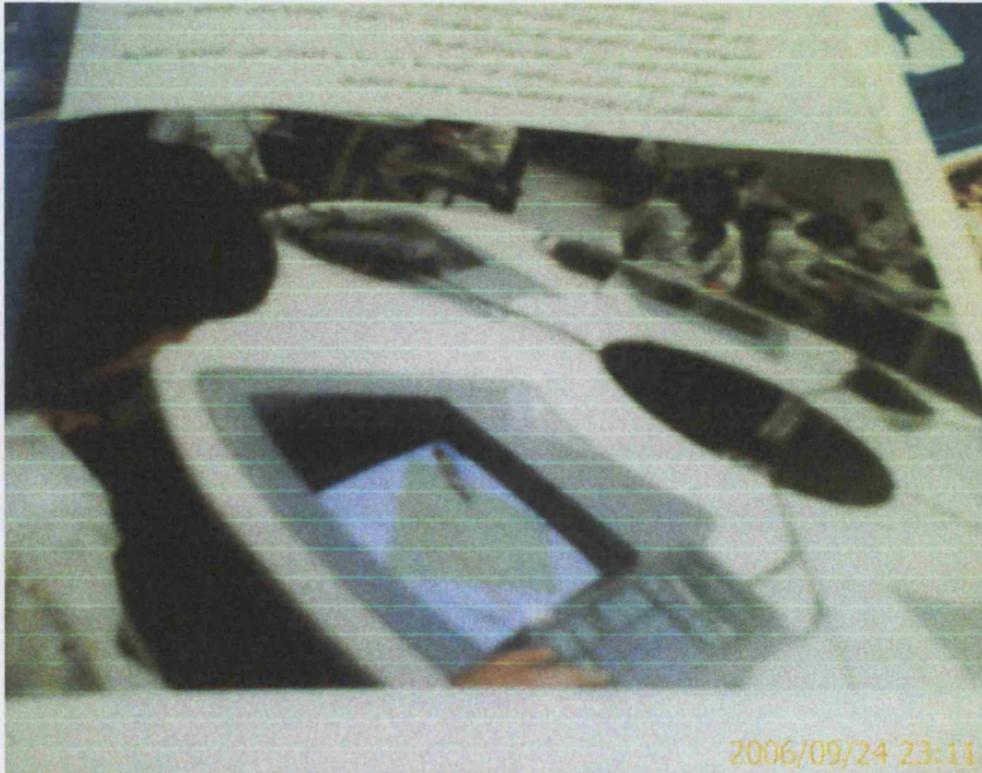
The Moon school is committed to providing its students with a quality education through teacher instruction, parental involvement in school and independent learning activities such as learning through projects and hands-on experiences through which students will acquire and apply information and a variety of skills. The school concentrates its efforts on helping students strengthen their reading, writing, math, and technology skills. Its instructional programme focuses on students learning skills by providing a learning environment that builds and supports the development of personal attributes to allow each student to become a productive citizen of Qatari society and the world at large (ISBooklet).

Moreover, technology is used to support teachers in the planning, preparation, and delivery of instruction, as well as in the recording and reporting of students' performance to parents and school administration. In other words, the main aim of employing technology in the school is to support teachers more than to train the students on such technologies or to use them in the teaching and learning processes inside classrooms.

### **4.8.3 School facilities**

The Moon school provides access for all students to many support services such as academic resource support, English resource support, transportation, food, health, welfare, counselling, library media, computer, after-school tutorial, and sports (ISBooklet, SECWebsite). Students have multiple opportunities to learn to use

computers and their applications, to review academic concepts and information, conduct research to extend their learning outside the classroom, and apply their knowledge and skills to individual and group projects. Figure 4.5 shows how was the smart classroom at the Moon school being used.



*Figure 4.5: The use of smart room at the Moon school*

#### **4.8.4 Moon school Assessment methodology**

The students' performance is measured by on-going teacher assessments and end of unit tests, with interim progress reports given to parents at parent-teacher conferences (ISBooklet). Also students' performance is often measured by the EI test on yearly basis.

## 4.9 Research focus

As mentioned in the introduction of this chapter that the aim of this chapter was to give the reader an idea and brief historical background about Qatar, its education system and to give a brief summary about the selected case studies and how they incorporated technologies in their instructional programmes. However, it is worth mentioning that the focus of this study and this chapter in particular is meant to be on technologies used in those case studies. It was clear from the above discussion that Qatar launched a comprehensive reform programme with the aim of improving its educational systems outcomes. In addition, it was clear that Qatar took major steps towards the intended radical change such as the establishment of SEC, the establishment ISs, and the establishment of IE. Moreover, it was obvious that most of ISs operators appreciate the role of technologies and their inputs in helping them to achieve the objectives behind this radical educational change (or reform). This could be understood from their reports, brochures, plans, and other official documents.

Table 4.5 below shows the overall level of satisfaction with the quality of computer facilities amongst teachers. As shown, ISs teachers are more satisfied with the provided computer facilities (i.e. the overall satisfaction score is 4.6) more than teachers from other education systems. According to (SAS, p.33), the percentage satisfied comprises respondents who indicated they were 'satisfied' or 'very satisfied' whereas the percentage dissatisfied comprises respondents who indicated they were 'dissatisfied' or 'very dissatisfied'.

**Table 4.5: Teachers' overall level of satisfaction with the quality of computer facilities available; (SAS, p.5)**

		<i>Percentage Satisfied</i>	<i>Percentage Dissatisfied</i>	<i>Overall level of satisfaction</i>
<b>System</b>	<i>Ministry of Education School</i>	77%	19%	3.8
	<i>Private Arabic Schools</i>	55%	37%	3.3
	<i>Independent Schools (ISs)</i>	97%	3%	4.6
<b>Stage</b>	<i>Primary level</i>	71%	24%	3.7
	<i>Preparatory level</i>	88%	10%	4.1
	<i>Secondary level</i>	82%	11%	4.0
<b>All Schools</b>		<b>77%</b>	<b>19%</b>	<b>3.8</b>

For 'overall level of satisfaction': 1.0 to 1.7 indicates strong dissatisfaction; 1.8 to 2.5 indicates dissatisfaction; 2.6 to 3.3 indicates neither satisfied nor dissatisfied; 3.4 to 4.1 indicates satisfaction; and finally 4.2 to 5 indicates strong satisfaction. That means that ISs teachers were strongly satisfied with the level of computer facilities that they have as their score was 4.6.

Furthermore, Table 4.6 below illustrates the overall level of students satisfaction with computer access. As it can be noted that ISs students were strongly satisfied with the level of access to computers facilities. Again they tend to be happier than the students of other educational systems. These two tables (i.e. Tables 4.5 and 4.6) indicate that there was more focus from the ISs officials on using technologies than other officials from the other two education systems,

**Table 4.6: Students overall level of satisfaction with computer access; (SAS, p.48)**

		<b>Percentage Satisfied</b>	<b>Percentage Dissatisfied</b>	<b>Overall level of satisfaction</b>
<b>System</b>	<b>Ministry of Education School</b>	64%	25%	3.6
	<b>Private Arabic Schools</b>	57%	32%	3.4
	<b>Independent Schools (ISs)</b>	85%	8%	4.3
<b>Stage</b>	<b>Primary level</b>	76%	15%	4.0
	<b>Preparatory level</b>	67%	23%	3.7
	<b>Secondary level</b>	57%	31%	3.3
<b>All Schools</b>		<b>77%</b>	<b>21%</b>	<b>3.8</b>

To summarise this section, it is clear that ISs officials used ICTs tools in their teaching and learning practices which indicate the importance of using such technologies and their role in promoting such comprehensive reform programme. Therefore this study seeks to investigate this issue further and to explore issues that might affect the use of the implemented technologies in classrooms. In addition, it aims to explore the impact of using these technologies on students' attitude as well as the major learning skills that might be acquired or improved due to the use of ICTs instructional tools in classrooms.

## 4.10 Chapter summary

This chapter highlighted some important aspects that relate to the country where the case studies of this research were conducted. In addition, it gave a historical background about the education system in Qatar and about the comprehensive reform programme that launched in the year 2002. Then, the participated ISs (i.e. 4 case studies) were described. In particular, their mission, visions, teaching methodology, facilities available and assessment methodologies were explained. From the description and discussion provided above, it was clear that these ISs were utilising ICTs in their instructional programmes and there was a clear realisation of these technologies' benefits and their ability in promoting the learning environment. Since it is important to draw the attention of the reader to the study focus, a brief discussion and assessment was provided in Section 4.9. Finally it is worth mentioning that this chapter will also serve as a source of information for the next chapters (i.e. data analysis chapters).

## CHAPTER FIVE: DATA ANALYSIS

---

### 5.1 Introduction

This chapter aims to analyse and discuss the field study (i.e. case studies) findings. The data collected from the interviews, official documents, and direct observations are structured and analysed in relation to the initial research framework developed in Chapter 2. As mentioned in chapter 2, the initial research framework was formulated based on a synthesis of the available literature with the aim of structuring the data collection and data analysis processes. At the same time this framework is intended to be tested and examined by the analysed data in this chapter and will be refined accordingly. In other words, this chapter will explore and examine those issues involved in this initial framework and which was found in real life and hence will be revised. The revised version might be similar or different from this initial research framework. The revised version of the developed framework will be discussed and presented in Chapter 6.

This chapter is divided into four sections. The next section (i.e. Section 5.2) will discuss and analyse the key factors that might affect the use of ICTs tools in classrooms. In addition, it will highlight the impact of using ICTs in ISs classrooms on their students' attitude. In other words, the section will analyse and discuss the data that is related to two key aspects of this study. Whereas the third main aspect of this research (i.e. the key learning skills that might be acquired or enhanced by the use of ICTs in classrooms) will be discussed and analysed in Section 5.3. As mentioned in

Chapter 2, many scholars emphasised the important role that ICTs can play in promoting students learning skills so the aim of this section is to examine this issue by analysing the collected data and to explore some other skills that might be emerged in this study, particularly in a context of an educational reform programme. Finally, Section 5.4 will summarise this chapter.

## 5.2 Key factors that affect the use of ICTs in classrooms

The classification of the main factors that will be discussed and analysed in this section is based on those terms found in the literature or those that emerged from the participants themselves during their interviews. The study findings showed that there are 8 factors that should be considered by education stakeholders should they seek effective use of ICTs tools in classrooms. These factors include: cultural issues, teachers' training, technical factors, availability and accessibility issues, workload, the type of the implemented technologies, teachers' attitude, and students' attitude. Section 5.2.1 below will shed light on those cultural issues that can affect the use of the implemented ICT tools in classrooms. These cultural issues are also important to give the reader an idea about the context in which the education reform programme and the study were conducted.

### 5.2.1 Cultural issues

As mentioned in Chapter 4, the State of Qatar is a small country blessed with rich resources but it relies on foreign experience to design and develop its educational curricula. It was also mentioned that the State of Qatar has clearly embarked on a very

ambitious educational reform programme with the aim of developing its educational system. In addition, the reform programme aims to meet students' requirements of advanced education that will help them meet the technological requirements and economic, political, and scientific changes. It was also mentioned that the reform efforts of developing education have shed light on its K-12 education, illiteracy, and adult education but the focus of this study is on the primary level only.

As mentioned above, the aim of this section is to give the reader an idea about the culture and the context in which the study was conducted. According to the study findings, there were some cultural issues that might have a direct or indirect impact on the reform efforts and which need to be highlighted. Cultural issues involve ideas, beliefs, and values that surround the education system which are usually have direct or indirect impact on the use and the acceptance of ICTs tools in classrooms. These surrounding aspects can give meaning to the behaviours of groups and individuals, and in turn, these behaviours are an expression of the culture (Maxwell and Thomas, 1991).

The study results showed that there are some general cultural issues that can characterise the Qatari society and some other specific issues that relate to the schools' culture. An example of those general cultural issues is those issues that relate to women (which are influenced directly by Qatari customs and habits) as well as those issues that relate to the wrong interpretation of Islamic regulations. Both types (i.e. the general and school culture) of these cultural issues would have a direct or indirect impact on the behaviour of the education stakeholders.

The restrictions on women's movement and interaction with society are examples of general cultural issues. There are some facts that relate to Qatari women which can give a brief idea about the nature of the Qatari society. These facts are not necessarily applicable for non-Qatari women. For example, while non-Qatari women may, for instance, obtain a driver's license, Qatari women are required to have the permission of their male guardian (husband, father, or brother) to get a license and must prove that their daily life necessitates movement. Another example that is related to religion and social norms is the restriction of making any kind of interactions between unrelated men and women in areas of the public sphere such as workplaces and schools which are segregated. However, it is worth mentioning that these practices are enforced by social norms and tradition not by the Qatar government, as it has no religious police as in other neighbour countries such as Saudi Arabia.

Furthermore, Qatar remains an insular society in which family life is central and women still retain important roles as they are responsible for organising the daily routine and they play a central role in arranging some social activities such as marriages. With respect to the public life, it is customarily segregated by gender, with most public entities having separate times or space for men or for families (i.e. women and children). Moreover, most women wear the hair-covering hijab and the black cloak-like Abaya (i.e. body cover) in public although it is not compulsory.

With regard to the schools cultural issues, the study findings showed some cultural aspects that can affect the use of ICTs in classrooms. Cultural aspects here involve, for instance, people's concerns about the content of the technology that can be used in classrooms such as Internet. One of the interviewees was explaining the cultural

issues that affected the acceptance and the use of technology in her school and at homes. She said:

*Our society is rich with customs and religion concerns which in fact affected the use and the acceptance of technologies in schools and at homes. For example, people still fear of buying personal computers or giving their children access to the Internet at home because they cannot control or restrict their children access to certain websites. Thus, to live in peace of mind they usually choose not to buy computers or giving their children access to the Internet.*

From the above quote, it can be understood that parents in Qatar still lack the know-how with regarding how to use computers and the Internet. In addition, they still are in need of awareness programmes that can inform them of the benefits of using new technologies and the means that can enable them to protect their students from accessing any unwanted websites. Other, people (or parents) might have other religion concerns due to the misinterpretation of Islamic regulations (or instructions). They still not aware that technologies are alike to other products that always have their own advantages and disadvantages. For example, cars, cameras, and TVs can be used positively or negatively. In other words, it is a fact that there are always advantages and disadvantages of any new technologies so parents should be aware of this fact.

Another teacher (i.e. Mrs Houaida) told a very funny story. She explained that she went with her mother to Hamad Hospital and accidentally they met a mother of one of her students. The student's mother start asking the teacher about her daughter progress and then the teacher answered:

*Your daughter's progress is OK but I am a bit worried about her progress with regard to the use of the technologies and particularly her research skills through the Internet. Then the mother said: well, that is something good because I am against the use of the internet as it makes students learn bad*

*habits that might break our religion regulations and our valuable customs; Then, I commented: I do not agree with you; Internet is very useful and I am spending most of my time on it at home as I am using it to search, interact with people and to collect useful information. The mother commented: well it is your opinion! After that I left the hospital together with my mother but I noticed that my mother was not willing to talk to me and she was very angry. When asked her why she is angry? She answered: do not you shy? How could you talk with that mother about the Internet and telling her that you are using it at home and spend most of your time on it!! You should keep this bad habit secret and not let others know about it! (Mrs Houaida & a parent's dialogue)*

As it can be understood from the above quote that the two mothers are against the use of the Internet and they were considering it as a bad tool that should not be used in schools or at homes. The core issue here seems to be less about fear of encountering inappropriate material but about content from outside the dominant culture. Therefore, both mothers look at the negative side of this useful technology and neglect the positive side.

A third teacher (i.e. Mrs Sahla) narrated another story that reflected the concern felt by students who worry about the dangers of being exposed to material and cultural (or familial) tensions (or concerns). She commented:

*In one of my classes I tried to teach students how to use the Internet and how to search for anything that they might need to know. I took my students to the lab and started teaching them. However, I noticed that there are some students who are not willing to join their colleagues and they seem hesitate and worry about the lesson. When I asked them what is the matter? They said; please keep us away of this lesson, as our family will be very upset if they knew that we are accessing and using the Internet. (Mrs Sahla and her students' dialogue)*

This quote illustrates the effect that parents can play and practise with their children due to some cultural aspects. Another teacher narrated another story that explains other cultural aspects with regard to the use of technologies in teaching. This teacher was giving private lessons to a Qatari student at her home. One day, the teacher left

two CDs with her student with the aim of giving the student time to install these CDs to her computer so she can be ready once the teacher comes next time. The CDs were about Arabic typing and some games that the teacher often uses to train her students on how to solve some problems. When the teacher came to see her students in the next day, she found the whole family waiting for her; she said:

*I could not believe what happened. The parents were angry and they were shouting at me. The father said: how could you leave these dangerous CDs with my daughter. Are you intending to spoil her mind and culture! Imagine, they did not give me any chance to explain why did I leave these two CDs or what is even inside them!*

As it can be noted from this quote, the parents were blindly refusing the idea of using these CDs in teaching their child. This is because they think that it is something against their culture and beliefs. They thought that these CDs will work against their values and customs and sometimes they look at these issue from a religion point of view.

To conclude this section, it can be said that there are some cultural factors that can affect the use and the acceptance of ICTs tools in teaching and learning processes. The source of these factors can be classified into two different sources, namely traditions or customs source and religious sources. Therefore, it seems that there is a critical need for awareness programme that draw the attention of the society to the benefits of using ICTs and particularly the Internet in schools. People should understand that although there are always two sides (i.e. negative and positive sides) of any technology, there are many ways that can enable them to utilise technologies and many ways to protect their children from any unwanted outcomes. In addition, they have to understand that technologies will never break their traditions or customs

as well as their religion regulations should they use them correctly. Furthermore, in light of the “education for new era” initiative it is necessary for educators in the State of Qatar to pay more effort to make society aware of the information age’s requirements and to widen their understanding about the benefit of using new technologies in the teaching and learning activities. Finally, it is worth drawing the attention of the reader to the fact that these cultural issues were found affecting students’ attitude towards ICTs and their acceptance to use them in their teaching practices more than their affects on teachers’ attitude who were found aware of the benefits of using these technologies and also willing to use them in their teaching and learning practices. This can be understood from the two quotes mentioned above (i.e. Mrs Houaida & a parent’s dialogue, p.125; Mrs Sahla and her students’ dialogue, p.126) and the private teacher’s story as well.

### **5.2.2 Teachers training**

Having explained some of the cultural issues that can affect the acceptance and the use of ICTs tools in classrooms, this section aims to explore and discuss another factor that was found as a key factor and which can affect the use and the acceptance of ICTs tools in classrooms. This factor is teachers’ training. The transformation of traditional classrooms into virtual classrooms depends on knowledgeable, skilled and enthusiastic teachers who are motivated and prepared to utilise ICTs tools and integrating them into their teaching and learning processes. The study findings confirmed that training is a key channel that can provide such teachers with the required knowledge so they can choose the most appropriate technologies and instructional strategies to meet their schools’ goals. The findings showed also that

there are some schools that were aware of the teachers training benefits and importance and some other schools are less concerned with this regard. For example, the Sky School was found as a good example of those schools that provided their teachers with the required training. Mrs Dowaa from the Sky School commented on the training issues by saying:

*When I joined this school, I took a very good training course that was sponsored by the school itself. After that training course we started using the available technologies in classrooms without encountering any problems.*

In addition, Mrs Ghada from the same school confirmed the above quote when she said:

*Yes, we had been given a training course at the beginning of this year that helped us to cope with the available technologies in this school. The course helped me to gain my student trust in using these technologies.*

Furthermore, Mrs Shaikha from the same school gave similar answered; she commented:

*Without the training that I took when I joined this school, I cannot imagine how I will deal with these advanced technologies. For example, the use of this interactive whiteboard is something that scared me at the beginning but when I had been trained on how to use it, I found it easy and very useful.*

From the above three quotes, there are two outcomes that can be deduced: (1) The Sky School made an effort to train its teachers, hence it succeeded in helping its teacher to cope with the provided technologies; (2) Teachers were happy about the provided training so they showed a good feeling about the use of ICTs in classrooms. This good feeling was reflected on their attitude towards the use of the available

technologies. One of the Sky School teachers assured that although that she was given good training, the real value was not realised until she started using those technologies; she commented:

*This school paid much effort in training its teachers on the use of the interactive whiteboard but the real value of using such technology was realized because teachers found it available in their classrooms and used it on daily basis.*

The Sun School was found as another good example of those schools that paid attention to the training issues. One of its teachers showed her satisfaction about the training course that she were given; she said:

*Although we are using simple technologies in this school, we were given good training course so we did not face any technical problem during the use of those technologies.*

Another teacher from the same school advocated the above quote; she commented:

*I was given a training course about the use of some technological tools that we usually use in classrooms. Now I can use these tools easily and in case I face any unexpected technical problem there is a technical team that can help me immediately. However, from my previous experience, I am proud of my current skills and I never face any critical problem.*

On the other hand, the Moon School represented the poor schools with respect to the training issues. A number of examples that prove the weaknesses of this school will be discussed and analysed in the Section 5.2.3 (i.e. Technical Support Section). However, there are many other examples that can be listed and discussed in this section. For example, Mrs Shamma stated that she did not receive any training programme at all. In addition, she said that she always faced technical problems and

at the same time there was not any technical team that can help her to solve those problems. In particular, she said:

*To be frank with you, I have not been trained on any type of the used technologies in this school although we have PCs and Video projectors inside our classrooms as well as smart room that is fully equipped with the latest technologies. Usually we face some technical problems when we try to use these technologies. These problems affected our attitudes as well as our students' attitude negatively towards the available technologies.*

This quote indicates that this teacher did not receive any training on the available technologies and at the same time the teacher is complaining about the lack of technical support in the Moon School. In other words, it seems that the Moon School lacks both technical support and the proper training for its teachers. Another teacher confirmed the above quote; she commented:

*Although we have some ICTs tools in our classrooms, I do not have enough confident to use them. This is because we had not been trained on how to use such tools. I would not shy of saying that I am considering these technologies as part of my classroom decoration!*

It is obvious from this quote that this teacher was angry about the lack of training in her school. In addition, it can be understood how could the training issues affect teachers' attitude towards the available technologies. Considering the available technologies as part of her classroom decoration indicates how angry this teacher was.

To summarise this section, it is clear that teachers' training is a very important factor as it supports teachers in their efforts to use technologies available in their schools. The discussion above advocated that the lack of experience with the technology seems to be the primary reason for teachers to not use technology in their classrooms.

Furthermore, the above discussion proved that training issues can affect teachers' attitude towards the use and the acceptance of the implemented technologies. It can be also noted that most teachers generally accept ICTs as instructional tools and are willing to use it in their teaching processes. However, some teachers were worried about how to use those technologies and explained their concerns about their ability to use them due to the lack of a proper training or the lack of technical support. Further examples that support this claim are discussed in Section 5.2.3 below.

On the other hand, it is worth mentioning that the findings of this section support findings found in the literature (see Wenglinsky, 1998; Rosen and Weil, 1995). This point was also supported by Wenglinsky (cited in Archer, 1998) who found that teachers who had received professional training with computers during the last five years were more likely to use computers in effective ways than those who had not participated in such training. Ongoing professional training as suggested by Ringstaff and Kelley (2002) is necessary to help teachers learn not only how to use new technology but also how to provide meaningful instruction and activities using technology in classrooms. In other words, teachers cannot be expected to learn how to use educational technology in their teaching after a one-time training course; hence they need continuous training and sustained assistance not only in the use of the technology but in their efforts to integrate technology into the curriculum (Kanaya and Light, 2005). Another important issue that needs to be taken in consideration is the relationship between teachers' training and their attitude. It was obvious from the collected data that the more teachers were trained the more they showed a positive attitude towards technologies and their integration in their teaching practices.

### 5.2.3 Technical support

Technical support was found essential for continued progress with integrating ICTs into teaching and learning processes. In addition, technical support was found as one of the key factors that can affect the use of ICTs tools in classrooms. According to the analysed data, the majority of the interviewed teachers were happy about the level of technical support that they received from their technical team whereas there were some teachers from one of the participated schools were not happy at all. These two different perspectives are discussed below.

A teacher from the Sky School expressed her satisfaction about the level of support that she received from the technical support team in her school. She commented:

*Although we were trained on the use of the interactive whiteboard, the IT [information technology] team in this school is always providing the support needed for teachers. I never heard from my colleagues any complaint about the technical support.*

This quote indicates that the management of the Sky School considered two important factors which are: providing proper training for their teachers and giving them the needed support during their work. The quote also confirms that there was not any complaint about the provided training or the provided technical support amongst the Sky School's teachers. Another teacher from the same school confirmed this issue when she said:

*Sometimes we face some little problems but we can also get the immediate support from the IT team. The training course that we took and the on-site technical support succeeded in motivating teachers to use the technologies provided by the school.*

This quote shows the good role that the proper technical support can play in motivating and encouraging teachers to use the available technologies. In addition, from this quote it can be understood that there is a relationship between the technical support and teachers' attitude. In other words, this led to the identification of relationship between teachers' attitude and the level of technical support. As mentioned earlier, the identification of such relationships will be discussed later in Teachers' attitude Section (i.e. Section 5.2.6).

Similarly, teachers from the Sun School also gave good feedback with regard to the level of technical support that they received from their support team. They justified their answers with regard to the technical support by two main reasons: first, because they were not using complicated technologies, simply they use video projectors and laptops; secondly, they have their own training centre which always provides them with the required technical support. For example one of this school's teachers commented:

*What we are using in this school is not that complex technology. We are using the data show and laptops. In case we face any problem, our training centre team will help us to solve it.*

Another teacher gave a similar answer but she thinks that her good skills were good enough to deal with the available technologies; she said:

*I think that I have enough knowledge in using such simple technologies even before joining this school. The school is using very basic technologies and I think anyone have basic computer skills will be able to cope with these technologies easily. Also the technical team here is always ready to help teachers should they face any technical problems.*

On the other hand, the Moon School's teachers told different stories about their technical support. During one of the researcher's visits to the school, one of its teachers switched the computer on with the aim of showing the researcher how she uses and employs technologies in her classroom. However, she found difficulty in using that computer due to some technical problems; hence she could not use it. Although we waited for more than half an hour, she could not fix the problem and she did not get any help from the help desk team. Consequently, she was very upset and commented:

*Do not be surprised, it is a logical result because we were not trained and we don't have helpdesk team. The school management is not willing to listen to our complaints and requests for training courses and technical support team.*

Another teacher from the same school complained about the training and technical support. This was during one the researcher visits to Moon School. The aim of the visit was to observe how teachers are using technologies that are available in the smart room. The researcher noticed that teachers cannot use the facilities themselves. Every time teachers want to visit and use the smart room, they have to invite a specialist to operate the hardware and software that is available in the smart room.

One of the Moon School's teachers complained about this issue; she said:

*As you can see every time we need to use these facilities we have to call this specialist to help us. Although she is always available and ready to help us, I feel that we are not integrating these technologies with our curricula as planned and we are not achieving the real benefits. In fact, teachers and students start to lose their interest in using such facilities because of the frequent interference of these specialists. There is a need to train teachers on these facilities and to keep these specialists outside. In so doing, we will be able to utilise and optimise these facilities and at the same time we can call specialists if there is a critical*

*need. In addition, there is a need to balance the technical support between smart room and other classrooms. Classrooms always lack the proper support.*

From the above quote and discussion, it is clear that providing on-site technical support tends to be a feature of schools actively exploring the opportunities provided by ICTs. However, technical support should play a complementary role to the training and should not replace it. In other words, teachers must be first trained and then supported by a helpdesk team that can provide support when needed. When teachers are trying to use a new technology in their classrooms and they encounter difficulties, there should be immediate help and support; otherwise, teachers will return to more traditional ways of teaching (Killion, 2000). According to McKenzie (1998), the best way to win widespread use of new technologies is to provide technical support and assistance when needed. It could have been very easy to create ill-feeling amongst teachers when something did not go right with the integration of ICTs and hence to return to old traditional methods of teaching. Again this section highlights an important and dependent relationship between providing good technical support and teachers' attitude towards the use of technologies in classrooms. This issue is discussed further in Section 5.2.6.

#### **5.2.4 Availability and accessibility of ICTs**

There is a set of access issues that were raised by the participants. These access issues played a critical role on affecting the integration of ICTs with the teaching and learning processes. In other words, the study showed that there were some participants who reported that although they have good ICTs skills, their skills were of limited value to them until they had reliable access to technologies at school and particularly

inside classrooms. For example, Mrs Mubarakah, from the Moon School, emphasized that the availability of ICTs and their accessibility are for her the utmost. She commented:

*I need to have ICTs tools inside every classroom and they must be easily accessible*

Others from the same school complained about using technologies in the smart classroom only which made them not realise the benefits of using those technologies.

For example, Mrs Sara (from the Moon School) said:

*I am with and encouraging the use of technology in schools and particularly inside classrooms. However, being using technology in the smart room only will limit teachers' access and will not make them realise the real benefits of such technology. Limiting technologies to be used in the smart room only require some coordination efforts and may be extra time from the teachers of this school and might discourage them to use these technologies.*

There are some important points that can be extracted from this quote. Firstly, she is encouraging the use of technologies in classrooms which indicate her positive feeling about the use of ICTS tools in classroom. Secondly, she is criticizing the availability and accessibility of ICTs tools in her school. She is suggesting that technologies should not be limited to one place only as this will limit the accessibility to the available technologies, will require extra coordination efforts and will not allow teachers to realise the real benefits of using such technologies in their teaching practices. Finally, she links the availability and accessibility of ICTs with teachers' attitude towards the use of such technologies in their classrooms.

A third teacher from the same school complained about the same problem which is limiting ICTs to be used in the smart room only as this will waste her time; she said:

*Accessing the smart room has been a problem. Sometimes I feel like it isn't worth the time spent trying to use the smart room with the students.*

On the other hand, there were other teachers who were worried about the use of ICTs in classrooms and they were unsure that ICTs can enhance learning but gradually they realised the benefits of using such technologies. Mrs Meznah from Sun School commented:

*When I joined this school, I found them using computers that connected to video projector inside the classrooms. I was a bit worried about how to use this technology and I was not really convinced that it can help us that much. To be honest with you, I also found some difficulties at the beginning of using it but now I cannot imagine my classroom without it.*

It can be understood from the above quote that the availability and the accessibility of technologies in classrooms encouraged this teacher to use them although she was worried and not convinced with the technologies benefits. This quote, in fact, highlights the importance of these factors (i.e. accessibility and availability) and their impact on teachers' attitude towards the use of ICTs instructional tools in classrooms.

Other teachers from another school (i.e. the Sky School) advocated the importance of having technologies available and accessible in classroom and explained their experience with this regard. For example, Mrs Noof said:

*This school paid much effort in equipping its classes with the latest technologies such as the use of the interactive whiteboard but the real value of using such*

*technologies was realized because teachers found them available in their classrooms and used them on daily basis.*

This quote gives another support to the importance of making technologies available and accessible for teachers. Another teacher from the same school commented:

*My ICTs skills were good when I joined this school but I can assure you that they were improved much when I start using the available technologies frequently. In my previous government school there was not any kind of ICTs tools inside classrooms, there were only labs that can be used occasionally so I was not sure at that time that technologies can offer us this incredible help.*

The above quote highlights another important point which is the benefit of the frequent use of the available technologies. Another point is the type of the technologies used in the Sky School, as it seems that this teacher is happy about the use of such technologies which were not available in her previous school. This gives another indication that the impact of the technologies types on teachers' attitude. Teachers' attitude will be further discussed in Section 5.2.6.

To conclude this section, it can be deduced that there are some teachers, such as Sarah and her colleagues from the Moon School, who expressed frustration with only using ICTs in the smart rooms or labs as they have to take extra time to try and work out the computer lab scheduling just to get access to the ICTs tools. On the other hand, teachers from the Sky School were happier about the used technologies and they realised the technologies' benefits more than other teachers from the other schools. This is because the Sky School's teachers were exposed to ICTs more than other schools' teachers. In addition, their classrooms, according to the researcher observation, were equipped with the latest technologies such the interactive

whiteboard which is also linked to internal network (i.e. intranet) and Internet. Therefore, it can be said that the availability of the right technologies and their levels of access are very important in determining levels of using those tools by teachers. These findings support what was found in literature with respect to the importance of organising ICT tools properly to ensure maximum access for all teachers (Pelgrum, 2001; Fabry and Higgs, 1997; Mumtaz 2000).

### **5.2.5 Workload**

Another point that was highlighted by the interviewees is the workload but it is mainly highlighted by the Sky School's teachers. As mentioned in Chapter 4, the Sky School is the only school that equipped its classrooms with the latest technologies such as Interactive whiteboard, intranet and video projectors. However, its teachers emphasised the need for a clear load-balancing strategy which can support teachers and encourage them to use the available technologies and to cope with any other technologies that might come later. One of its teachers commented:

*There is no doubt that I am happy about the technologies that are available in this school and I appreciate the role that these technologies can play but at the same time we, as teachers, found difficulties in playing more than one role. Our workload is increased in this school as we first pay more effort in preparing the curricula through these technologies and then present what we prepared to our students in the classrooms.*

It can be noted from the above quote that this teacher has a positive attitude towards the use of ICTs tools in classrooms but her concern is about the additional load that came as a result of using those ICTs tools. Therefore, it seems that there is a need for balancing teachers' load by for example employing more teachers or decreasing the

number of teaching hours. This was a suggestion of another teacher who also admitted that she enjoyed the use of ICTs tools and learnt new professional skills because of those tools. She said:

*Previously, I used to use the traditional ways in teaching my students and I never thought that technologies would improve our teaching practices that much. However, I have to say that I really enjoyed using these technologies and found them very helpful in attracting students attention and in making them enjoying as well as liking our classes. My concern with regard to the use of these tools is just about the time that we spent in preparing our classes. It will be very helpful if the school decreases the number of the classes that we give or brings other teachers who can help us in the preparation processes.*

Furthermore, according to the researcher observation teachers at the Sky School were preparing the lessons (i.e. curricula) themselves and there were not any prepared books or material. In other words, teachers used to receive prepared books (curricula) from the Ministry of Education but in the dawn of ISs each school suggested different curricula that come in line with each school's vision. This change added more work on teachers since each teacher is required to design and develop the curricula of her subject in addition to her major duty which is the teaching. This additional task causes some problems for the Sky School teachers as it needs extra time and more effort from the teachers. In addition, there were some teachers who complained about the lack of experience in designing and developing curricula since this is the first time that they have been asked to practice such task.

However, the study findings did not show the same results with other schools. This can be justified by two reasons: first, other schools did not implement some of the advanced technologies that were found in the Sky School; Second, some of the investigated schools have their own team who is responsible for designing and

developing their curriculum. In summary, load-balancing strategy was found as important factors that might affect teachers' attitudes towards the use of the available technologies. Ignoring this factor might lead to an ill feeling amongst teachers and might affect their attitude negatively.

### **5.2.6 Type of technology used**

According to the results of this study, there were many types of technologies that were used in the different schools that participated in this research. These technologies ranged from simple technologies that depend on providing PCs and data projectors to more advanced technologies that incorporate more advanced tools such as the interactive whiteboard. Therefore, the researcher strove to explore the impact of such difference on the efficiency of incorporating technologies in teaching and learning processes. One of the Sky School's teachers commented on this issue by saying:

*We are using advanced technological tools in this school with the aim of increasing the efficiency of our lessons and to assure efficient knowledge transfer. For example, the use of the interactive whiteboard in classrooms helped our teachers to be more organised and to present their lessons in a way that allow more participation from the students end. Also providing access to the Internet helped both teachers and students to do their research and to widen their knowledge base.*

As it can be extracted from the above quote that this teacher is happy to use the technology (i.e. the interactive whiteboard technology) in her school because of the facilities that the used technology provided them with. Her emphasis was on the role that this technology can play in attracting students' attention and the benefits that can be provided by such technology. Another teacher from the same school answered the same question with the following answer; she said:

*As you can see, this classroom is equipped with many tools that are linked to each other. This diversity of technologies helped much in creating a virtual environment that can attract the attention of students and make them work in a collaborative manner.*

This quote gives similar feedback to the above one but it highlights the issue of creating virtual environments and how such virtual environments can help in attracting students' attention. In addition, it gives a hint to one of the learning skills that can be achieved by the use of such technology which is collaborative learning.

Teachers from the Sun School were also interviewed to see their opinions on the relationship between the type of the provided technology and the efficiency of using such technologies. One of this school's teachers commented:

*There is no doubt that the technological tools which we are using in this school helped teachers in organising and presenting their classes. Nevertheless, it would be great if the school management consider more advanced technologies, as I am sure that they will have amazing impact on the students' achievements.*

It is clear from this quote that this teacher tries to link the advancement of the technologies used with their benefits. She is assured that the use of more advanced technology would improve the students' achievements. Another teacher from the same school said:

*I can assure you that there is a positive impact of the used ICTs tools in this school on the learning outcomes although we are using technologies that less advancement than other technologies that are used by other schools. In this school we noticed that students' achievements can be affected by the type of technologies that available for them to use. For example, students can learn more skills by accessing and using computers labs more than those skills that can be achieved by the use of data projector or PowerPoint in classrooms. Using computers labs can enhance, for instance, students' research and search*

*skills, their electronic communication skills, collaborative learning skills and so on. While the use of data projector will equip students with some limited skills such as presentation skills. Therefore, I am sure if we have other types of advanced technologies such as interactive whiteboard technology or virtual classrooms, our students' achievements will be further improved.*

The above quote gives an explanation of how the types of technologies can affect students learning skills which is by the end of the day will increase the efficiency of the teaching and learning processes. Moreover, teachers from the Moon Schools highlighted more issues that, in fact, relate to the type of the used technologies and linked these issues to their unhappiness about technologies that implemented in their school. For example, one of the interviewed teachers commented:

*Our classrooms are provided with simple technological tools such as PCs and Data projectors. In addition, we have a separate smart room that incorporates more tools. However, the used technologies did not give the expected results. In my opinion, this is because of the type of technologies we used and the way that we organised them. For example the PCs that are provided are old and create many technical problems when we use them. On the other hand, the smart room is, in fact, a black box to many teachers in this school as it is not always available and also because teachers had not been trained on how to use its technologies. Thus, you can imagine why we did not achieve the expected results from the provided technologies.*

This quote gives a comparison between two different technologies that gave similar and undesired results. As mentioned earlier, the Moon School used some old technologies in its classrooms and provided more advanced technologies in its smart room. However, its teachers and students did not get much benefit from using those technologies due to many reasons discussed earlier in the Teacher training Section (i.e. Section 5.2.2), Accessibility and availability Section (i.e. Section 5.2.4) and other sections. What can be learned here is that it is not always correct to link to the efficiency to the type of the used technologies only as there might other factors that should be considered. For example, there might be a school

that can implement and use different types of technologies and at the same time it is not paying enough attention to other important factors such as training, accessibility and availability, or load-balancing. In this case, the effect of technology type factor will not be that important. In other words there are many dependent relationships between these different factors. These relationships will be further discussed in chapter 6.

Another teacher from the Moon School gave a precise answer as she linked the outcomes of students with the type of the provided technologies; she said:

*What we are using in our classrooms is obsolete technologies. People today are talking about the use of interactive whiteboard, Internet, video conferencing but here we still talking about how to operate simple PCs and incorporate them in our lessons. You might be aware that there are some schools in Qatar that are using more advanced technologies and start to achieve amazing educational outcomes but this school still far off getting the anticipated benefits of such technologies.*

It is clear from the above quote that this teacher advocates the idea of linking teaching outcomes with the type of the used technologies.

To conclude this section, it can be said that most of participants agree that there is a relationship between the diversity (or the type) of the used technologies and their efficiency in the learning processes. In other words, the schools that consider providing different types of technological tools as instructional tools seem to be more satisfied about technologies than those schools that provide simple technological tools. In addition, providing more advanced technologies such as using the interactive whiteboard and incorporating Internet in the learning process can cause more positive impact about the use of technologies inside classrooms. This can be deduced from, for example, comparing the Sky School teachers' comments and the Moon School

teachers' comments. Furthermore, the availability and accessibility is found a key factor that might affect the efficiency of using certain technologies. In other words, there might be a school that provides advanced technologies and/or many different types of technologies but it could organise those technologies in a way that might not allow its teachers and students to utilise them as required. An example of such school is the Moon School since it has a smart room that is not always available for the teachers and students.

Moreover, it was observed that there were some schools that tried to provide some technological tools but they were suffering from the weakness of their infrastructures. The diversity and the use of different technologies in any schools require a robust technical infrastructure and adequate technical support. There is no doubt that working with an infrastructure that realistically cannot support the work will cause frustration to both teachers and students. Therefore, schools are responsible for providing not only normal access to computers and electronic networks but access that is robust enough to support the kinds of use that can make a real difference in classrooms. Also it is essential for schools to provide teachers with access to on-site technical support personnel who are responsible for troubleshooting and assistance after the technology and lessons are in place should they seek to increase the efficiency of the provided technologies.

### **5.2.7 Teachers attitude**

Teacher attitude determines whether a teacher is willing to try a new innovation (Rogers, 1995) which is in this study the use of ICTs in teaching and learning

processes. This definition will be assumed and considered as a base for the discussion and the analysis of the research findings with respect to teachers' attitude. The aim of this section is to explore teachers' attitude towards the use of ICTs tools in classrooms. This section will start first by discussing teachers' attitude at the schools level. Then, the findings will be discussed and analysed with the aim of giving general feedback about the teachers' attitude in light of the study results.

When participating teachers were asked about their opinions and feelings about the use of the ICTs tools in their teaching practices, they answered as follows:

Mrs Malak from the Sky School appeared to have a favourable attitude towards the use of ICTs in classrooms; she commented:

*Honestly, we get much help from using ICTs as instructional tools in our classrooms. For example, I am using the interactive whiteboard which has really saved me much time and effort in presenting the key points of lessons in a very attractive way.*

As it can be extracted from this quote that Mrs Malak was satisfied with the use of interactive whiteboard and she mentioned some advantages of using such technology.

Another teacher from the same school gave a similar answer when she said:

*Indeed, I am happy to use the available technologies in this school because I found them very helpful in attracting the attention of my students.*

The headmistress of the same school gave clear indication about the good feeling that she has about the interactive whiteboard technology; she emphasised that:

*...teachers liked the idea that they appeared to be at the cutting edge of technology. The interactive whiteboard is quick to learn to use; points could be highlighted using the pens and students were impressed by the use of such technologies. Frankly speaking, all of us were impressed by its clarity and being a very interesting demonstration tool.*

The same headmistress explained that their labs “*are equipped with the latest technologies and very rich with some sophisticated desktop applications that help students to improve their learning skills. In addition, students can access the Internet and search for any specific topic using global search engines such Google, Yahoo, etc.*” It can be understood that she was happy about their labs’ role in improving their learning skills.

A fourth teacher, from the same school, confirmed this answer by saying: “*I’m pleased that I managed to incorporate the interactive whiteboard into several of my lessons. It enabled me to keep the class together and provided a focal point for students who were not quite as computer literate as others*”. Another teacher also mentioned some additional advantages of the use of interactive whiteboard; she commented:

*Interactive whiteboard, in fact, decreased time required to prepare my lessons, as I would be able to pull things up on the board and not have to plan them on a normal blackboard. In addition, it allows me to share and re-use materials, reducing workload. I am really impressed with such technology as it also helps students to gain confidence in their skills.*

A sixth teacher mentioned the same advantages that stated above and added one more thing; she said: “*interactive whiteboard would allow me to save things for use later in another session*”.

The above quotes give clear indication about the Sky School's teachers and headmistress attitudes towards the use of ICTs, particularly interactive whiteboards. It is obvious that they have positive attitudes and encouraging feelings about using such technology in the teaching and learning processes. As a matter of fact, it was observed that all teachers who used the interactive whiteboard were extremely enthusiastic about the possibilities of such technology and most of them were inspired to use it in their lessons. Teachers were given confidence by the fact that interactive whiteboards were easy to use and reliable.

Furthermore, participants from the Sun School generally gave similar feedback about their opinions with regard to the use of ICTs in classrooms. For example, one teacher explained her happiness about the use of technologies and gave some advantages of using such technologies; she said:

*The use of technologies inside classrooms assisted me in controlling my students' behaviour and making them more concentrated on their lessons.*

Another teacher answered in the direction of the above answer (or opinion); She commented:

*The use of ICTs affected the way we prepare and present lessons. For example, the data show tool helped me to present my subject in a very acceptable way to my students. Its flexibility gave me chance to move from one topic to another and to present my subject in a way that draws the attention of my students.*

Their headmistress gave a similar answer and added that the school computer labs helped them to create collaborative environments for their students. She said:

*I am quite happy about these labs. To be honest, I never thought that these computer labs will improve and grows some key learning skills. I noticed that students work as groups and help each other in solving their problems.*

From this quote it can be deduced that there are some learning skills that were acquired by the use of the available computer labs such as teamwork and collaborative learning. These learning skills will be discussed further in Chapter 6.

In addition, some other teachers confirmed the usefulness of having computer labs in their schools which can be accessed frequently to improve their students learning skills and to link them to the whole world through the internet which is also used as the main source for information in their schools beside other sources like libraries. For example, one of them said:

*I often take my students to computer labs with aim of improving their learning skills. The existence of these computer labs is necessary to equip our students with the key skills that can help them later in the rest of their educational and work life.*

Another teacher emphasised the importance of these computer labs and their positive effect on the teaching practice. She commented:

*The use of technologies in teaching is added value to the traditional methods. Nowadays, I cannot imagine that I will work in a school that does not have computer labs. In fact, computers labs play essential role in the teaching and learning processes.*

Comparing the answers of the participants from the Sky School and the Sun School, it can be noted that both gave positive feelings about the use of technologies in their schools. They were happy about the use of ICTs tools, particularly interactive whiteboard and computer labs. In addition, they mentioned some advantages of using

these technologies. Moreover, some teachers gave some examples of the achieved learning skills that were acquired due to the use of those tools. However, to get a complete picture of teachers' attitude towards the use of technologies, there are two additional schools that need to be considered. The answers of these two schools' participants are described below.

The participants from the Moon School, however, did not answer positively with regard to the use of ICTs in classrooms. The reasons for their negative answers were related to their experience with the use of such technologies in their teaching practices. One of the Moon School Teachers said:

*I am not supporting the idea of using ICTs in classrooms because we lack the knowledge of using such technologies and hence I think that ICTs are a waste of time.*

It is clear from the above quote that the reason behind this teacher unhappiness, about the use of technologies in classrooms, is the lack of know-how to use such technologies.

Another teacher from the same school explained her experience with respect to the use of the Microsoft PowerPoint; she commented:

*I used the PowerPoint one time only and frankly I am not willing to use it again because I did not take the needed training and I do not have that confident which can help me to use it. In addition, this school lacks the technologies that I heard are used by other schools.*

Again this teacher justifies her unhappiness by the lack of proper training and the lack of self-confidence in using ICTs tools. She added another reason which is the lack of

some other good technologies that other schools use. The training factor was discussed earlier in Section 5.2.2. There are many other examples that explain the negative feelings that this school's teachers have but they are related to other factors which were discussed above.

As mentioned in Chapter 3, the headmistress of the Earth School did not allow the researcher to interview the school's teachers. However, the researcher was able to interview the headmistress herself. When she was asked about her point of view with regard to the use of technologies in teaching and learning processes; she answered:

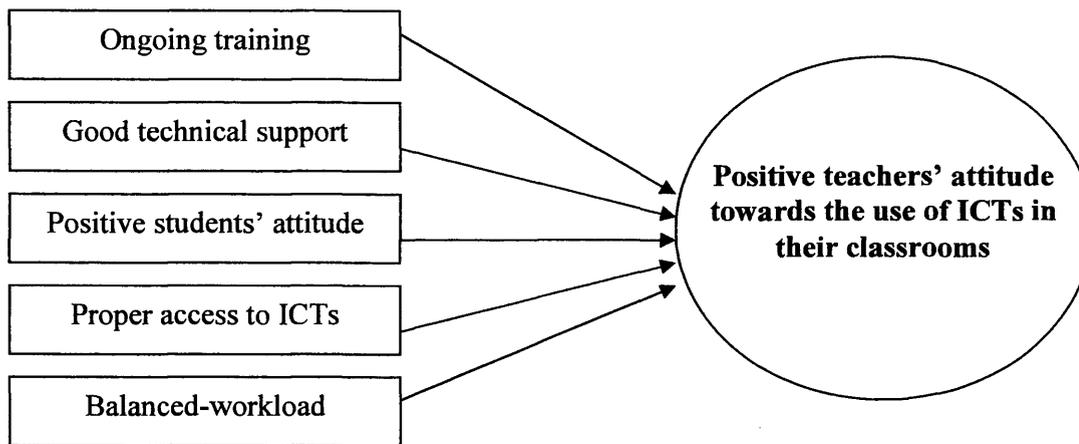
*I support the use of ICTs in classrooms although we still at the first step of using these technologies. However, we plan to expand the use of ICTs tools in the near future.*

From her answer, it can be understood that she has a good feeling about the ability of ICTs tools in improving the teaching and learning in classrooms.

Comparing the findings of the four schools with respect to the teachers' attitude, it can be noted that teachers generally accept ICTs as valid instructional tools. Whereas, teachers from the Moon School gave negative feedback about the use of those tools. In other words, although most teachers appear to have a favourable attitude towards the use of ICTs in classrooms, there is, at the same time, an anxiety about them.

However, the negative feelings that were noted from the Moon School teachers can be justified by the factors (i.e. cultural issues, access issues; workload, training, technical support; and students' attitude) that explained in Sections 5.3.1, 5.3.2, 5.3.3, 5.3.4 and

5.3.5. Those factors were really affected the acceptance of using ICTs in classrooms by some of the interviewees (e.g. the Moon School teachers).



*Figure 5.1: Factors affecting teachers' attitude towards the use of ICTs in classrooms*

Figure 5.1 shows that providing ongoing training, good technical support, proper access to the available technologies as well as balancing workload on teachers and achieving positive student attitude will lead to a positive teachers' attitude towards the use of ICTs tools in their classrooms. However, it is worth mentioning here that achieving positive students' attitude also depends on many other factors and one of these factors is teachers' attitude. This issue will be discussed in more detail in below. Furthermore, there are many dependent (or mutual) relationships between all these factors. These relationships will be further discussed in Chapter 7.

### **5.2.8 Students' attitude**

Students' attitudes towards the use of ICTs in classrooms were also found another important factor that can greatly affect the use of ICTs in classrooms. Few studies exist on the attitudes that students hold in relation to their use of ICTs tools in their

teaching practice. In addition, the study findings showed that students' attitude could affect their teachers' acceptance and use of the available technologies. For example, one of the Sky School's teachers commented:

*Students in this school played an important role with regard to the use of the interactive whiteboard. I found them very enthusiastic to use it and this positive behaviour encouraged me to use this interactive whiteboard in most of my lessons. I think that they are motivated by the facilities that this board can provide such as its interactivity, good colours, games, and its ability to correct their diagrams.*

Another teacher from the Moon School told a similar story and confirmed that her students usually prefer to go to the smart room and use the available facilities. Thus, she was affected by her students' attitude towards that smart room. She said:

*Although there were some technical problems that face our students during the use of the available facilities in the smart room, there was a continuous desire from students to go and to use that smart room which made me think to increase the use of the available technologies. In addition, I noticed that they often listen carefully to the smart room's specialist when she comes to explain how to use certain facility. Their behaviour encouraged me to fight for providing more reliable and accessible technologies.*

On the other hand, another teacher from the same school linked the attitude of her students with the ease of use and the type of technologies that can be provided in classrooms as well as with the immediate technical support. She commented:

*It can be understand that technologies can enhance teaching practice but they also might give negative results due to some reasons such as technical problems. For example, if the teacher is not aware of how to use technologies she will for sure encounter many technical problems and hence will need immediate support from the support team. Otherwise, she will waste her time and will give bad idea to her students about the used technologies. This is exactly what I noticed when I was using the PC and the data show that are available in my classroom. Because I do not have enough knowledge in the use of these tools I faced many problems during its usage and at the same time I did*

*not receive the support needed from our technical team. Accordingly, I noticed that my students start to feel boring and making noise in the classroom. Thus, their attitudes make me avoided using these technologies.*

With regard to the relationship between students' attitude and the type of technologies used, the study results showed that students liked to learn visually rather than by verbal instruction. For example, it was found that their attention can be attracted by the facilities that interactive whiteboard can provide such as providing a large focal point and colour image within the classrooms. Such facilities and others make students really enjoy the lessons. One the Sky School teachers mentioned that:

*Students were very motivated by the interactive whiteboard lessons which helped us much in making students able to understand lessons more than being spoon-fed with lessons.*

She continued justifying her opinion by saying:

*...the interactive nature of such technology caused the most excitement for both teachers and students.*

Another teacher confirmed this opinion and said:

*Interactive whiteboard allows greater opportunities for participation and collaboration, developing students' personal and social skills. Students as I noticed liked to use it and they really enjoyed their lessons through this useful technology.*

A third teacher mentioned some of the advantages of the interactive whiteboard that she uses in her classroom and linked between these facilities (or advantages) and her students' behaviour. She commented:

*The Interactive whiteboard is, in fact, encouraging spontaneity and flexibility, allowing teachers to draw on and annotate a wide range of web-based resources. Such facilities attracted students' attention and made them more focused on their lessons.*

A fourth teacher from the same school also confirmed the above opinions and mentioned other advantages of using the interactive whiteboard for both: students and teachers; when she said:

*It increases enjoyment of lessons for both students and teachers through more varied and dynamic use of resources, with associated gains in motivation.*

These findings were found in line with what was found in literature. For example, Hall and Higgins (2005, p.102) stated that: "*Students were very enthusiastic about particular aspects of IWBs [interactive whiteboards], such as their versatility in the classroom, multimedia capabilities and the fun and enjoyment they brought to learning*". Having understood teachers and headmistress opinions with respect to the students' attitude towards the use of the interactive whiteboard, the researcher interviewed some students with the aim of exploring their feeling about this type of educational technologies (i.e. the interactive whiteboard).

According to the study results the only school that was using the interactive whiteboard technology is the Sky School, hence all the interviewed students with respect to this technology were from that school. One of the interviewed students explains his feeling about this technology and showed positive feeling about it; he said: *I like it. It is easy to use and increases enjoyment of lessons.* Another students gave similar answer and added:

*It is wonderful and very interesting. We can use it to watch videos, DVDs, TV or even to access the Internet.*

As it can be noted this student tried to justify his opinion by mentioning some facilities that interactive whiteboard technology can provide. A third student was also happy about the use of the interactive whiteboard that is available in his classroom and mentioned that it is better than blackboard; he said: *It is better than the normal blackboard. I like it.* Furthermore, a fourth student tried to explain what he thinks about the use of the interactive whiteboard in his classrooms and confirmed what his colleagues mentioned above; he commented: *Um..um.. It makes us enjoy our lessons; it is cool.*

However, the situation was totally different at the Moon School. Most of the interviewed students were not happy about the use of the smart classroom. For example, one of the interviewed students commented:

*I do not like it. Even my teacher is not happy about it as well... all of us!*

Another student justified her unhappiness about the smart room with the accessibility of that smart room since the operator restricts the access to the smart room to her permission; she said:

*Many computers but I never used them. The operator is not allowing us to use them without her permission...so I did not find it useful..*

A third student from the same school confirmed the above two quotes when he said:

*I do not know... ah..um..I do not like to go there because I cannot, for example, use the available computers to access the internet...yes.. I can use the headphone only to listen to my teacher's instructions..*

From the above three quotes, it can be understood that students are not happy about the use of the smart classroom and they justified their unhappiness differently. As it can be noted one of them indicated the accessibility issues whereas another indicated a usability reason. As a matter of fact, the findings of this study showed that students could be easily affected by another factor which is their teachers' attitude towards the use of the available technologies. One of the interviewed teachers confirmed this when she said:

*There is no doubt that we can affect the behaviour of our students, positively or negatively, towards the use of the available technologies. For example, most of the teachers in this school were suffering from the lack of know-how with respect to the use of our smart classroom and consequently our students start showing some symptoms of unhappiness. In other words, they start asking their teaches to not to go to the smart classroom or sometimes they feel sleepy during the class.*

In addition, during one of the researcher's visits to the Moon School, it was observed that some students did not have enough confidence when using their computers and hesitated to ask their teacher for help. In other words, they did not show the same level of interest as the Sky School's students with regard to the use of interactive whiteboard. Another teacher was commenting on the students' attitude towards the use of the smart classroom, she said:

*There is a clear link between students attitude and the environment that surrounds the use of the implemented technologies. The environment here involves the way that technologies were designed and implemented, the experience of teachers who use the technologies and their interest in using such technologies, the ease of use, the access and visibility issues and so on.*

*However, students in this school, in my opinion, were affected mainly by their teachers' attitude and the lack of proper access to the available technologies.*

The above quote gives many factors that can affect the students' attitude towards the use and the acceptance of the implemented technologies, but it justifies the negative attitude that the students of the Moon School showed with their teachers' attitude and the lack of proper access to the smart classroom.

With regard to the students' attitude towards the use computer labs in their schools, most of the interviewed teachers confirmed that the students like to go to computers labs and enjoy their lessons in these labs. One of the interviewed teachers from the Sky School said:

*Absolutely they like to use computer labs and they really enjoy them.*

Another teacher from the Sun School confirmed this answer and said:

*My students usually express their happiness when we have a lesson inside one of these computer labs. They like to go there and use the available facilities.*

A third one from the Moon School commented:

*Students would love to go to these computer labs. There are some applications that make them motivated to go there. This is beside their desire to access and use Internet through these computer labs.*

Students' opinions were further investigated with respect to the use of the available computer labs. The students' answers were in the same direction as their teachers'

answers. For example, one of the Sky School's students was asked about his opinion on the use of computer labs in his school; he answered:

*I'd love to go there and access the Internet.*

From his answer it can be deduced that the reason behind his happiness with respect to the use of computer labs is because he can use those computers labs to access the Internet. Another student from the Moon School gave similar answer; she said:

*Um..ah.. My teachers usually take us there. I like to communicate with my colleagues using email.*

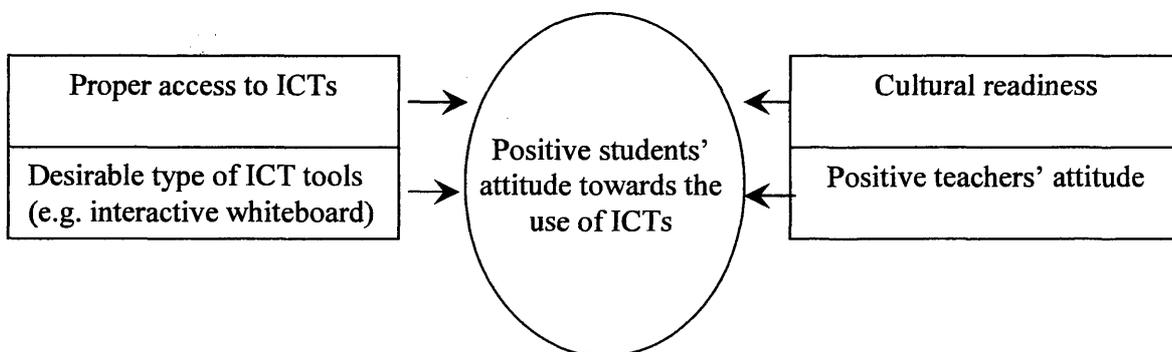
As it can be noted from the above quote that the student is happy about the use of the available computer labs because she can use them to communicate with her friends through emails. A third one from the Sun School justified his feeling about the use of computer labs with the possibility of accessing the Internet and surfing some cartoon websites; she said:

*I like to access the Internet and to visit cartoon websites*

To summarise this section, it can be noted that students generally have good attitude towards the use of the implemented technologies in their schools. However, students perceived several factors as affecting their attitudes, including their teachers' attitude towards the used technologies, accessibility issues, the type of the used technologies, and their parents cultural issues. For example, it was clear that the Moon School

students were affected by their teachers' attitude towards the smart classroom, the accessibility of that smart room and their teachers' experience (i.e. the lack of know-how) in using smart classroom facilities.

With regard to the type of the used technologies, it was also obvious that students were more motivated to use interactive whiteboards than the other technologies. In addition, they were happier to use computer labs than using the smart classroom. Moreover, it was clear from Section 5.2.1 that parents' cultural issues negatively affected their children's (i.e. students) attitude towards the use and acceptance of the implemented technologies in their schools. This can be understood from the two quotes discussed in Section 5.2.1 above (i.e. Mrs Houaida & a parent's dialogue, p.125; Mrs Sahla and her students' dialogue, p.126) as well as the story mentioned by the private teacher in page 126-7. There were also some other factors that could affect students' attitude but their impact was less than the mentioned factors above. These factors include match of learning opportunities with students' preferences and software attributes. Figure 5.2 shows factors that can encourage getting positive students' attitude toward the acceptance and use of ICTs tools in teaching practice.



*Figure 5.2: Factors encouraging students' attitude towards the use of ICTs*

Figure 5.2 suggests that there are four factors that should be considered to achieve positive students' attitude towards the use and the acceptance of the implemented technologies in their classroom. First, teachers should show their students a good attitude towards the use of the available technologies and should encourage their students to use those technologies. However, there are many other factors that can also affect teachers' attitude and should be considered as well (see section 5.2.7). Most importantly it can be noted from the Teachers Attitude Section (i.e. Section 5.2.7) and this section that there is a mutual (or dependent relationship) effects between the students' attitude and the teachers' attitude.

Secondly, students should be provided with proper access to the implemented technologies, otherwise there might be an unwanted outcome. Thirdly, it was clear from this section that there is a big role that the type of technology provided can play. Thus, schools should pay more attention to the type of technologies that they intend to implement. This issue is discussed above in Section 5.2.6.

Finally, as mentioned in Section 5.2.1 cultural issues are need to be considered and treated carefully. Students were found affected by their parents cultural aspects so there is a pressing need to make those parents aware of technologies benefits and the advantages of using ICTs instructional tools in teaching and learning practices. However, the study also revealed that there is no big impact of such cultural issues on teachers' attitude towards the use of ICTs instructional tools in classrooms. In other words, the study findings showed that teachers were aware of the mentioned cultural aspects and were not affected by them.

### 5.3 Key learning skills

According to this study findings, ICTs offered teachers enhanced resources that support learning through teaching, help to raise the levels of interaction as well as to refresh work and to redo it, and to provide immediate visual quality of resources. ICTs also helped to engage students, to widen their vocabulary, to improve the quality of engagement due to the fast pace of lessons, and to explore things in greater depth. In other words, the use of ICTs in classrooms helped students to be drawn into more positive modes of motivation. These positive modes of motivation enabled students to be more creative in their thinking and their use of the available technologies. Consequently, students started to acquire many good learning skills such as presentation skills, neatness, being able to choose colours, backgrounds, borders, etc. The aim of this section is to shed light on the leaning skills acquired by the students who participated in this study.

For the purpose of making the analysis more structured, these learning skills will be discussed under three main categories, specifically creativity, collaborative learning, and critical thinking and problem solving. These categories are based on what was found in the literature (i.e. represented by the initial research framework which was developed in Chapter 2) and according to the terms that were emerged from the participants during the data collection process. These categories are discussed and analysed below.

### 5.3.1 Creativity

Before discussing the research findings in relation to what the so-called creativity skills, it is worth identifying the meaning of the term itself (i.e. creativity term) and to identify some of the characteristics that were found in the literature and which are used to identify creative students during the field study. The aim is to form a base for the discussion and to make the reader clear about the theme under the discussion.

As mentioned in Chapter 2, Boden (2001, p. 95) defined creativity as a person's "*ability to come up with new ideas that are surprising yet intelligible, and also valuable in some way*". Creativity is usually used to describe characteristics in individuals (i.e. to indicate notions of personal involvement, novelty and value). To be more specific, Shallcross (1981) identified some characteristics of students who can be described as creative. These characteristics include: openness to experience; willingness to take risk; sense of humour or playfulness; independence; self-confidence; enjoyment of experimentation; sensitivity; lack of a feeling of being threatened; personal courage; unconventionality; flexibility; preference for complexity; goal orientation; internal control; originality; self-reliance; and persistence.

Creativity is then a set of important learning skills that help students to be self-motivated and self-esteemed as well as helping them to improve their learning achievements. In other words, a student who is encouraged to think independently and creatively become more open to new ideas, keen to work with others to explore ideas and even willing to work beyond time when pursuing an idea. Consequently, his or

her pace of learning and level of achievement will be increased. As a matter of fact, the research findings showed that ICTs could play an important role in improving the creativity of the students. These findings are described and discussed below.

As mentioned in Chapter 3, the researcher used direct observation as one of her data collection methods. Therefore, it is worth mentioning that during the data analyses process, the researcher will try to shed light on what she had observed during the data collection processes in relation to the theme under discussion. With respect to creativity, the researcher observed that students were eager to go to computer labs and to access the Internet. When students were asked about their opinion in using computer labs, one of them said:

*it is much more fun than purely following our teachers' instructions. It can be boring to sit down and follow instructions only. Computers labs give us chance to do something that we like and to depend on ourselves.*

This quote informs that students start gaining some creativity skills such self-confidence, enjoyment of experimentation, and self-reliance.

In addition, it was observed that students at the Sun School were participating in explaining and presenting part of their lessons to their colleagues by using PowerPoint software. Each student was presenting her part differently by using a different style, different colours and even by following different ways of passing knowledge to their colleagues. One of the Sun Schools' teachers was looking at the researcher with big smile and looked like proud of her students' achievements. She commented:

*As you can see, we have been able to convince our students with the used technologies and encouraging them to use the available technologies creatively. From students' presentation you can imagine the level of motivation, self-esteem, and personal courage that our students achieved by using this PowerPoint software.*

As it can be noted from the above quote that this teacher mentioned some of the creativity characteristics that were found in the literature such as self-esteem and personal courage. Furthermore, one of the Sun School's teachers advocated the idea of using ICTs in classrooms and expressed her hope to use these technologies in the coming years. She justified her wishes by her trust in ICTs tools and their ability in equipping students with the proper creativity characteristics; she said:

*I would use ICTs in my classrooms in future because these technologies help students to think for themselves and be creative in their ideas.*

Another teacher from the Sky School emphasised the role of teachers in “*encouraging students to think in ways that are wider, more creative and different from that they were used to*”. She also confirmed that ICTs gave teachers chance to explore and to develop their students' skills.

Another teacher from the same school gave examples of how did interactive whiteboard improve her students' skills; she said:

*It encourages the widespread development of generic skills of creativity such as generation of new ideas, opportunity sensing, and giving criticism and responding to.*

Indeed, interactive whiteboard as observed by the researcher can capture and present information in a usable form from a variety of ICT tools and information sources.

Teachers can smoothly jump from one type of digital media to another and can easily introduce text, sound, video, graphics and interactivity based on the tactile nature of the board. The combination of such facilities and other skills that the Sky School teachers hold provided a teaching and learning environment that helped to introduce different learning styles, and to teach a variety of learning skills. The images and the interactivity nature of the interactive whiteboard were used to reinforce learning and hence empower students to engage in a way that would not normally be possible in a classroom situation, adding to the richness to the learning experience.

The headmistress of the Sky School was talking about her school experience with the use of technologies, particularly the interactive whiteboard. She said:

*I don't know how our teachers can return to teaching without the interactive whiteboard. Indeed, it helped our teachers to develop students' creativity and their learning skills in general. For example, to teach investigation skills without the interactive whiteboard can be challenging. This is because it supports teachers to stress the importance of accuracy and to translate what students see on the board onto their own piece of work.*

This quote gives us some examples of how an interactive whiteboard can be used to acquire investigation skills. Investigation skills such as accuracy are part of the creativity skills (see the creativity definition and its characteristics above).

Another teacher from the Moon School was commenting on the importance of using ICTs in classrooms and confirmed that the use of ICTs in classroom is the main factor in developing students' creativity. She also gave an example of how the use of Internet can enhance students' creativity; she said:

*Although I have a concern about the way that ICT tools are used in this school, there is no doubt that ICT tools can improve students' learning skills. From my experience, ICT tools such as interactive whiteboard or networked computers can enhance the creativity of students. For example, students can depend on themselves and acquire new research skills and by using different research engines through the Internet.*

Another teacher from the same school explained her experience with respect to the use of ICTs in classrooms. She mentioned that she was working in a school that was using some advanced technologies. The technologies being used as she mentioned greatly helped in improving her students' creativity. This can be understood from the creativity characteristics such as students' concerns about their work quality. She commented:

*I was working in a school that use some advanced technologies that are not available in this school. Honestly, when I was there I felt that those technologies helped students to take pride in their work and they were taking a genuine interest in the quality of their work.*

To summarise this section, it is clear that creativity is one of the acquired skills due to the use of ICTs in classrooms. When teachers worked in an environment that encouraged individual creative input, students gained some learning (or creativity) characteristics such as independence, self-confidence, enjoyment of experimentation, and personal courage; and learned to evaluate their work more critically and honestly. The use of ICTs in classrooms introduced an open investigative practical work approach to learning and teaching and enhanced the creative thinking of students and teachers as well. However, there are some aspects that still need further exploration such as the need to explore the relationship between the acquired creativity and the taught subjects. This is because this study tried to investigate the leaning skills that can be acquired by the use of ICTs in classrooms in general and not for specific taught

subject or curriculum. This is due to the limitation of resources and time available for this study.

### **5.3.2 Critical thinking and problem solving**

As mentioned in Chapter 2 that there is no agreement between scholars with respect to the definition of critical thinking and it has changed somewhat over the past decade (Huitt, 1998). However, for the purpose of analysing the study findings, the definition that was suggested by Hitt (1998) is considered (see Table 2.1). In addition, it is worth identifying critical thinking skills as this will help in guiding the discussion. According to Lawson *et al* (1989, p.27), thinking skills can come under some key headings such as:

*skill in accurately describing phenomena, skill in sensing and stating causal questions, skill in recognising, relating and stating alternative hypotheses and theories, skill in generating logical predictions, skill in planning and conducting controlled experiments to test hypotheses and theories, skill in collecting, organizing, and analysing relevant experimental and correlational data, and skill in drawing and applying reasonable conclusions.*

The research findings with regard to critical thinking skills showed promising results, particularly in the Sky School. The reason has because the Sky School is the only school among the participants' schools that is considered ICTs tools as one of its main instructional tools. In addition, it is the only school that is using some advanced ICTs tools such as the interactive whiteboard. The research results with respect to the critical thinking skills are based on the researcher observations' findings during her visits to the Sky School. These findings are presented and discussed below.

Many lessons were attended with the aim of exploring the students' behaviour, their acceptance of the used technologies, and the learning skills that were acquired by the use of the implemented technologies. During one of the researcher's visits to the Sky School, she witnessed a very interesting discussion between the class teacher and her students. The discussion was about drugs.

The teacher started her class by displaying CD content on the interactive whiteboard. The CD contains a report about drugs and their bad effects on people and on students in particular. In addition, the roles of parents were discussed in details in that report. After that, the teacher started discussing the topic with students but she was concentrating on the role of parents. Then, one of the students raised his hand and said;

*teacher, did you not notice that both the reportage and you did not mention the role of the government. Where is the role of the government? We cannot throw all blame on parents and forget other important parties.*

The teacher was really happy about her student's reaction/question and looked at me with a big smile and said:

*I gave them homework two days ago about this lesson and I asked them to do some research on the Internet about this topic. Indeed, I found this a very good strategy as it prepare my students for the discussion and make them think critically and participate efficiently. They often like to participate in the discussion and criticise the content of the lesson in many occasions.*

After that, she looked at her students and said: *"excellent! Yes, government should play an important role by making people aware of its bad effects and by chasing those people who deal with such dangerous products"*.

From this dialogue, there are two main issues that can be deduced; First, the used ICT tools were good enough to attract the attention of the student and to make him concentrate on the content of the report. It was also noted that the design of the ICT tools inside the classroom and the way that they were operated, played an important role in preparing the learning environment and made it ready enough to help the teacher and her students to be more focused on their lesson. Secondly, the student gave his teacher a chance to comment on the topic and waited until she finished. However, once he found his teacher ignored the role of the government, he decided to participate and to criticise the report. This type of thinking is really worth to be appreciated and noted. It is a learning skill that is acquired due to many factors but there is no doubt that the used ICTs are the main factor in achieving such skill.

Another story happened during one of the researcher's visits to the same school. The researcher attended one of the classes at the Sky School after taking the permission from the class teacher. The class teacher was explaining the life phases of one of the most famous Muslims scientist. At the end of the story she told her students that the scientist was died in Iraq. However, one of her students stands up and commented:

*Please teacher, I have read in one of the Internet websites that this scientist died in Damascus!*

Then, his colleagues supported him and said: "*yes teacher, he is correct*"; the teacher then said:

*Well, I think he died in Iraq but let me check and I will let you know in the next class."*

In the next day the teacher told the researcher that students were correct; she continued:

*This is one of the Internet advantages. Nowadays, most of our students are using the Internet frequently and it becomes one of our main sources of information. Usually, we give our students the topic of the next lesson and ask them to prepare for the lesson by searching through the Internet. The students have the ability now to use many different search engines and the know-how of retrieving the required information. They can access the Internet from the different computer labs that available in this school. The availability of ICTs and their ease of use supported students to improve their learning skills. Frankly speaking, our students are equipped with many important skills such as creativity, critical thinking, collaboration and teamwork, problem solving and others. Believe me, I will not be surprised if I find them better than me in using ICT tools; it is the information age, you know!*

The above dialogue and the teacher's quote prove that students become able to discuss and critically think about the correctness of the delivered information. It is also become difficult to persuade them with something that they are not convinced about its accuracy. In addition, it is obvious that the Internet played an important role and become a very important source of information. Furthermore, it is worth mentioning that students become familiar with such technology and might utilise it better than their teachers. Another important point is the skills that were mentioned by the teacher as examples of new skills that her students achieved due to the use of technologies in her school.

A third story which informs the level of the critical thinking that students at the Sky School were reached, happened during the third visit of the researcher to the Sky School. One of the Sky School's teachers was explaining a lesson on the interactive whiteboard to her students. The teacher was presenting some static images with the

aim of making the topic easier for students to understand. Then, one of her students commented:

*Excuse me teacher; what is the difference between presenting these images on the interactive whiteboard and using other traditional tools to present them on the normal blackboard! Do not you think that it was better if you could use some interactive material like what Mrs Hanan usually use.*

The teacher then said: “*Oh... thanks Ali for this; I will do next time*”.

It is clear from the above situation that the student was not happy about the way his teacher was using the interactive whiteboard and the use of static images. He criticised his teacher explicitly and urge her to best utilise the available facilities. In addition, he was able to compare between two different methodologies of teaching (i.e. between this teacher’s way and Mrs Hanan way; Mrs Hanan is another teacher) and advise his teacher to change her way of teaching.

With regard to the use of ICTs as problem solver, the researcher strove to interview as many as possible educators (i.e. headmistresses and teachers) and asked them about their opinions in the role of ICT in solving educational problems and in developing students’ problem-solving skills. Their comments are discussed below.

One of the interviewed headmistresses answered a question about the role of using ICT in developing students learning skills, particularly problem solving skill; she said:

*In my opinion ICT should be used in schools to create learning environments centred on students as learners. I belief that students should learn more from what they do through the use of ICT tools and think about rather than from what they are told by their teachers.*

Another headmistress answered the same question by saying:

*It depends on the aim of using ICTs in schools. For example, if the aim is to offer new learning opportunities, or maybe to improve the way in which learning activities are taken place, then the focus should be on the overall effectiveness of learning environments.*

As it can be understood from both answers that ICTs mainly can be used to facilitate the learning environments through improving the way knowledge is transferred to the students. That means that the focus is on learners (i.e. students) and solving some problems that is related to learning environments regardless the source of those problems.

Teachers were also asked the same question and they gave different answers. One of the interviewed teachers said:

*I think before implementing any sort of technologies in any school, it is necessary to start by deciding what a student, teacher or school wants to achieve or, for instance, if the aim is to solve problems then what sort of problems they seek to solve. In other words, educators should identify what problems are associated with providing leaning environments and inputs, and then tailor ICT tools to provide solutions.*

On the other hand, another teacher emphasised the importance of using ICTs in leaning practices and acknowledged their potential; she said:

*There are many potential uses for ICTs in the learning practice. For example, ICTs can be incorporated into leaning environments to provide courses in music, technical drawing, statistics, mathematics and to learn some other skills such as typing, math problems solving, thinking skills and so on.*

By comparing these two answers, it can be deduced either implicitly (i.e. the first answer) or explicitly (i.e. the second answer) that ICTs can be implemented to either solve learning environments problems or improve student skills that relate to problem-solving issue.

A third teacher gave a clearer answer when she said:

*There is a clear role for some of ICT tools in developing problem solving skills for students. Also some of these tools can play an important role when the teaching area of mathematics, for instance, and the problems associated with student learning.*

A fourth teacher gave an example of the problems that ICTs can be used to solve; she stated:

*The use of ICTs in classrooms would provide appropriate material and overcome classroom management problems. ICTs can be used to support learning activities that are difficult to perform in other ways. For example, ICT tools might play an important role in addressing the needs of special groups of students (e.g. low ability and those requiring extension activities).*

The above two answers are more specific with regard to the use of ICTs in classrooms and their role in promoting problem-solving skills. Also a fifth teacher gave a direct answer and confirmed the ability of ICTs tools in improving problem-solving skills; she said:

*There is no doubt that ICT tools are able to support problem solving activities and they are well suited for use as means of developing and improving higher order thinking skills for students.*

To summarise this section, the research findings indicated the important role of the used technologies in promoting critical thinking skills of the participated students. Although students were new to the used technologies, they showed encouraging results and force their teachers to increase the use of such technologies. These findings support what was found in the literature and they added additional value, which is the context in which these findings happened. These findings were collected and analysed in a context of comprehensive educational reform where technologies were considered one of the main factors in changing the education to reflect the objectives of the new educational initiative: "*Education for new era*".

With respect to the problem-solving skills, it is clear from the above discussion that ISs implemented ICT tools for two main reasons: first to overcome some of the problems that related to the learning environments; second to enhance the thinking skills and problem solving abilities for their students. This leads to conclude that educators at Qatar, particularly ISs stakeholders realised the importance of ICTs and their positive impact on the learning process outcomes; and hence some of the ISs were motivated by this fact and implemented some advanced ICT tools such as technologies that was implemented by the Sky School.

### **5.3.3 Collaborative learning and teamwork**

Collaborative learning is an educational method or approach in which two or more students at different performance levels work together towards a common purpose (Dillenbourg 1999; Johnson and Johnson 1989, 1994; and Slavin 1995). One of the main objectives of using ICTs in teaching and learning processes is to address issues

that relate to the process of group work as it is now widely believed that ICTs are providing new possibilities for collaborative learning (Crook, 1994; Light and Littleton, 1999). Howe and Tolmie (1999) argued that there is no media that can facilitate the productive interactions in groups better than the use of computers. However, other scholars suggested that the success of collaborative learning is highly dependent on the quality of interaction between students and based on the assistance that each student receives from their peers (Wegerif and Scrimshaw, 1997).

The researcher investigated the role of ICTs in promoting collaborative learning during her visits to the participated schools. The study findings showed promising progress and gave clear indications that collaborative learning in an ICT learning medium is both possible and acceptable for the majority of the participated teachers and students. The following discussion gives an idea about the research findings with respect to the role of ICTs in promoting collaborative learning.

The majority of the interviewed teachers appeared to be in agreement that when students are paired with others in a structured format (i.e. collaborative learning) by using ICTs as a medium of learning, their performances are likely to increase, including with low achievers. For example, one of the interviewed teachers said:

*The use of networked PCs helped students to work together and finish their coursework in an excellent teamwork environment, particularly when paired students are active participants in the learning process.*

Another teacher from another school commented on the role of interactive whiteboard on creating collaborative learning environment; she stated:

*The use of interactive whiteboard participated in enriching learning experience for students as they work as groups and share and discuss their ideas amongst one another.*

A third teacher explained her point of view with respect to the role of computer labs in enhancing collaborative learning; she said:

*Computer labs permit grouping students into many groups; and hence each group of participants will have the chance to share and develop a deeper understanding of the topic under study which would then enhancing cognitive skills.*

Furthermore, most of the participants in this research confirmed the advantage of using ICT tools as collaborative medium on the learning outcomes, particularly those low performance students. For example one of the Sky School's teachers said:

*Once we group students based on their learning ability, their learning outcomes appear to be mixed so those who were considered as low performers in the past become medium or even high performers because of using ICT tools as a medium of collaboration.*

Another teacher from the Sun School gave a similar answer; she commented:

*I can assure you that my students' performances were improved by the use of ICT facilities in this school. These ICT tools helped us much to create a collaborative learning environment where students can be grouped homogenously or heterogeneous to perform certain activities. Creating such collaborative learning environment helped those low performers to improve their learning outcomes as they motivated by the electronic medium and by their colleagues who were considered as high learning performers.*

The headmistress of one of the participated schools also answered in the same direction; when she said:

*The use of the interactive technological tools supported the effort of teachers in improving the learning outcomes of their students. The ability of such interactive tools to create a collaborative learning environment supported them to overcome the learning difficulties that lower performance students face.*

Furthermore, during one of the researcher's visits to the Sky School, there was a class that was taking place in one of the school's computer labs. It was a chance for the researcher to investigate the role of ICTs in promoting collaborating learning skills and to observe students' activities and their practical skills. It was observed that students were grouped into many groups. Each group consists of two or three students. All groups were given the same assignment (i.e. exercise) and were asked to finish it within 25 minutes. It was observed that some groups finished their assignments early and some were struggling with their exercise. However, those groups who finished early tried to help their colleagues in other groups. When the researcher asked their teachers about the purpose of such exercise; she said:

*The purpose of this exercise is to create a collaborative learning environment that teaches students how to work together in a form of teamwork towards one common objective. The common objective in this lesson is to teach student the required skills to search for any topic through the different Internet search engines.*

To summarise this section, it can be noted from the above quotes that ICTs provided a suitable learning environment that enabled students to work collaboratively. The participants interviewees gave clear indications about the ability of technologies in creating a collaborative learning environment where students were able to perform some work which otherwise could not be done and they helped to engage students, helped to widen their participation in lessons, improved the quality of engagement and teamwork, enabled students to explore things in greater depth and in a collaborative manner. In other words, the majority of the interviewed participants

confirmed the ability of ICTs tools in promoting the collaborative learning skills and their ability in motivating those low performance students to improve their learning outcomes. Teachers also noted the importance of ICTs in helping students to take more responsibility for their work, and improving their ability to communicate with each other and to work as a team. Although the period of establishing ISs is relatively short (i.e. one year old only as of the date of collecting case studies data), it can be predicted that there will be promising future for the use of ICTs in these school. This prediction came as a result of the research findings that analysed and discussed in this chapter.

## 5.4 Summary

This chapter discussed and analysed the case studies' findings that were collected during the field study phase of this research. The chapter starts with discussing and analysing those findings that are related to the key factors that could affect the use of ICTs in ISs classrooms. Those factors are classified into eight key factors according to the concepts found in literature as well as the terms that emerged from the research participants. These eight factors are: cultural issues, teachers training, technical support, types of technology used, students' attitudes, accessibility and availability, workload, and teachers' attitude. This chapter also showed that there are some dependent and mutual relationships between these factors. Such relationships were found very important to be understood should educational stakeholders seek to use ICTs tools effectively in classrooms. In addition, the chapter examined the impact of using ICTs instructional tools on students' attitude and suggested that there are three factors that should be considered in order to achieve positive students' attitude towards the use and the acceptance of the implemented technologies in their classroom. These factors include: the importance of having positive teachers' attitude, the importance of giving students proper access to the implemented technologies, and the importance of implementing the right technologies that suit the students learning abilities. This issue and others will be discussed further in Chapter 6 (i.e. the discussion chapter).

In the second part of this chapter (i.e. Section 5.3) discussed and analysed the key learning skills that were acquitted by the use of the implemented technologies in the ISs. As discussed above, there were three major learning skills that were identified.

These include creativity, critical thinking and problem solving, and collaborative learning skills. With regard to the creativity, it was found that creativity is one of the acquired skills where students gained some learning characteristics such as independence, self-confidence, enjoyment of experimentation, and personal courage; and learnt to evaluate their work more critically and honestly. The use of ICTs in classrooms enhanced the creative thinking of students and teachers as well. However, it is worth mentioning that there were some aspects that still need further exploration such as the need to explore the relationship between the acquired creativity and the taught subjects. This issue might be explored through future researches.

This chapter has also indicated the role of the used technologies in promoting critical thinking and problem solving skills for the participated students. It was found that although students were new to the used technologies, they showed encouraging results. In particular, it was found that the ISs benefited from implementing ICT tools from two main perspectives. Firstly, they used the implemented ICTs to overcome some of the problems that relate to the learning environments.

Secondly to enhance the thinking skills and problem solving abilities for their students. Furthermore, there were clear indications from the study findings that the majority of teachers and headmistresses advocated the role of ICTs in creating collaborative learning environment. In other words, the majority of the interviewed participants confirmed the ability of ICTs tools in promoting the collaborative learning skills and their ability in motivating those low performing students to improve their learning outcomes.

Moreover, it was found that although the period of establishing the ISs was relatively short at the time of collecting case studies data, it could be predicted that there will be a promising future for the use of ICTs in these school. This prediction came as a result of the study findings that analysed in this chapter. This leads to the conclusion that educators in Qatar, particularly the ISs stakeholders realised the importance of ICTs and their positive impact on the learning process outcomes. Hence some of the ISs were motivated by this fact and implemented some advanced ICT tools such the Sky School. Chapter 6 will discuss these findings in more detail and will revise the developed framework accordingly. In other words, it will present the contribution of this study to the knowledge in a form of a revised framework for the efficacy of ICTs in classrooms.

## CHAPTER SIX: DISCUSSION

---

### 6.1 Introduction

The aim of this chapter is to discuss the research findings in light of the research questions and research objectives. In addition, it aims to gather the research results (discussed in chapters 4 and 5) together and present them in the form of a framework that answers the research's main question. Themes in chapter 5 were identified by *"bringing together components or fragments of ideas or experiences, which often are meaningless when viewed alone"* (Leininger 1985, p.60). As a result, it was possible to identify the most common issues raised across the study.

This chapter, therefore, seeks to highlight these inferences (i.e. findings) and link them to the research objectives with the aim of making sure that findings really answered the research questions and satisfied the research objectives. In doing so, the extent to which the present study confirms, challenges or extends the findings of other studies discussed in the literature review is considered. The chapter is composed of five sections. Section 6.2 explains and discusses how the study findings answered the research sub-questions. The answer to the main research question is presented in a form of a comprehensive framework and presented in Section 6.3. In other words, the initial research framework developed in Chapter 2 is examined and tested by the analysed data in Chapter 5, and discussed further in this chapter and finally presented in its final shape in Section 6.3. This revised version is meant to answer the main research question and to be used to examine the efficient use of ICTs in primary

schools' classrooms. The aspects that were identified in the literature review phase and consequently appeared in the initial research framework but did not appear in the revised version of the developed framework are discussed and justified in Section 6.4. Finally, Section 6.5 will summarise this chapter.

## 6.2 Answering the research sub-questions

This section aims to show the reader how the study's results addressed the research sub-questions. In other words, it links the research findings that analysed in Chapter 5 to their respective research questions stated in Chapter 1. The section is divided into four sub-sections according the number of the sub research questions stated in Chapter 1. These four subsections are discussed below.

### 6.2.1 Key influencing factors

The first sub research question was as follows:

*What are the key factors that can affect the use of ICT in primary ISs classrooms?*

The key factors that were found to affect the use of ICTs in classrooms were discussed in Chapter 5, and grouped into eight main categories, namely cultural issues, teachers training, technical support, availability and accessibility of ICTs, workload, type of technology used, teachers' attitude, and students' attitude. The **cultural issues** were found as real hinderers that can restrict the benefits of using educational technologies in the ISs. The source of these factors, as mentioned in

Chapter 5, can be classified into two different sources, specifically traditional (or customs) and religious sources. Such cultural issues need to be treated carefully before, during and after the implementation of ICTs in the ISs schools.

The study findings showed that there is a critical need for treating those cultural issues at all levels (i.e. parents level, students level, teachers level, headmistresses level, etc.). Treating such cultural issues requires performing some awareness programme that draws the attention of the society to the benefits of using ICTs and particularly the Internet in schools. Education stakeholders should understand that although there are always two sides (i.e. negative and positive sides) of any technology, there are many ways that can enable them to utilise technologies and many ways to protect students from any unwanted outcomes. In addition, they should believe in technologies' ability in promoting teaching and learning processes. Furthermore, parents have to understand that technologies will never break their traditions or customs as well as their religious regulations should they use them correctly.

Moreover, in light of the "*education for new era*" initiative, it is necessary for educators in the State of Qatar to make a greater effort to make the society aware of the information age requirements and to widen their understanding of the benefits of using new technologies in education. Most importantly, teachers, head-teachers and headmistresses should not be affected by such cultural issues and should not give up trying to make parents and students aware of the advantages using ICT tools in classrooms and in schools.

*The availability and accessibility* issues were found as one of the key factors that affect the use of ICTs in classrooms. The study highlighted a set of issues that were raised by teachers and which influenced the integration of ICTs with the teaching and learning processes. Most of the participating teachers confirmed that although they have good ICTs skills, their skills were of limited value to them until they had reliable access to technologies at school and particularly inside the classrooms. Once ICTs become available in schools, there should be a clear access strategy for those ICT tools.

For example, it was mentioned in Chapter 5 that there are some teachers, such as Sarah and her colleagues from the Moon School, who expressed frustration at using ICTs in the smart rooms or labs only as they have to take extra time to try and work out the computer lab scheduling just to get access to the ICTs tools. Whereas teachers from the Sky School were happier about the used technologies and they realised the technologies' benefits more than other teachers from the other schools. This is because of the availability of ICT tools in every classroom in the Sky School, hence its teachers were exposed to ICTs more than other schools' teachers.

The Sky School's classrooms, according to the researcher observation, were equipped with the latest technologies such the interactive whiteboard which is also linked to internal network (i.e. intranet) and Internet. Therefore, it can be said that the availability of the right technologies and their levels of access are very important in determining levels of using those tools by teachers.

Another key factor that was found affecting the use of ICTs in classrooms is the level of *technical support* offered for teachers at ISs. Technical support was found essential for continued progress with integrating ICTs into teaching and learning processes. Technical support (i.e. just-in-time support or on-site technical support) was found to be a feature of schools actively exploring the opportunities provided by ICTs. For example, the absence of the right technical support caused negative feeling amongst the Moon School's teachers and hence affected their attitude towards the use of the available technologies in the school. On the contrary, the good level of technical support that was provided by the Sky School management helped to make its teachers happy about the provided technologies and motivated them to utilise those technologies.

The study left no doubt that when teachers are trying to use a new technology in their classrooms and they encounter difficulties, there should be immediate help and support; otherwise, teachers will return to more traditional ways of teaching and will avoid using the available ICT tools. It could have been very easy to create ill feeling amongst teachers when something did not go right with the integration of ICTs in the learning environment. This highlights the important and dependent relationship between providing good technical support and teachers' attitude towards the use of technologies in classrooms. In other words, providing technical support and assistance when needed is the best way to win widespread use of new technologies. However, it is worth mentioning that technical support should play a complementary role to the training and should not replace it. Teachers must be first trained and then supported by a helpdesk team that can support in the correct time. Training issues will be discussed further below.

**Teachers' training** (i.e. technical training) was found to be one of the key factors that easily affects teachers' acceptance and use of technologies inside their classrooms. The transformation of traditional classrooms into virtual classrooms depends on knowledgeable, skilled and enthusiastic teachers who are motivated and prepared to utilise ICTs tools and integrate them in their teaching and learning processes. Therefore, the study results suggested that training is a key channel that can provide teachers with the required knowledge so they can choose the most appropriate technologies and instructional strategies to meet their schools' goals. That is simply because students cannot benefit from technology if their teachers are neither familiar nor comfortable with the provided technologies.

As discussed in Section 5.2.2, the lack of experience with classroom technology seems to be the primary reason for teachers not using technology in their classrooms. It was also mentioned that the lack of proper training could affect teachers' attitude towards the use and the acceptance of the implemented technologies. The study reported that teachers generally accept ICTs as an instructional tool and are willing to use it in their teaching processes, but at the same time, some of them were worried about how to use those technologies and explained their concerns about their ability to use them due to the lack of a proper training or the lack of technical support. Further examples that support this claim are discussed in Section 5.2.3.

**Students' attitude** towards the use of ICTs in classrooms was also found as another important factor that can greatly affect the use of ICTs in classrooms. Section 5.2.8 discussed this issue in more detail. It was mentioned that there were many teachers

who confirmed that they had been positively affected by their students' attitudes with regard to the use of ICTs in classrooms specially those who were exposed to ICTs more than others. The study findings showed that students generally have good attitudes towards the use of the implemented technologies in their schools. However, students perceived several factors as affecting their attitudes, including their teachers' attitude towards the used technologies, accessibility issues, and the type of the used technologies. For example, the Moon School's students were affected by their teachers' attitude towards the smart room, the accessibility issues of that smart room and their teachers' experience (i.e. the lack of know-how) in using smart classroom facilities. It was also obvious that students' attitude can be affected by the type of the technologies used as they were more motivated to use interactive whiteboard more than other technologies and they were happier to use computer labs more than using the smart classrooms.

Moreover, *workload* was highlighted as a key factor that can affect teachers' attitude and their acceptance as well as their use of the implemented technologies. Ignoring this factor might lead to ill feelings among the teachers and might negatively affect their attitude. The participants' teachers emphasised the need for a clear load-balancing strategy which can support teachers and encourage them to use the available technologies and to cope with any technologies that might come later. Some of the ISs (e.g. the Sky School) implemented advanced technologies that require teachers to design and prepare their curriculum in advance beside their teaching efforts. In other words, this change adds a larger burden on teachers since each teacher is required to design and develop the curricula of her subject in addition to her major duty which is teaching.

In addition, there were some teachers who complained about the lack of experience in designing and developing curricula since this is the first time that they have been asked to practise such task. However, it is worth mentioning that the study findings did not show the same results with other schools for two main reasons. Firstly, other schools did not implement some of the advanced technologies that were found in the Sky School. Secondly, some of the investigated schools have their own team responsible for designing and developing their curriculum. In brief, the study found that teachers generally accept ICTs as an instructional tool and are willing to use it in their teaching practices. However, their attitude towards the use of the available technologies can be easily affected by the lack of clear load-balancing strategy in addition to the mentioned factors above.

The *type of technologies implemented* was found to be another factor that affected the use of ICT tools in classrooms. Type of the technologies implemented factor involves the diversity of technologies (i.e. PCs, Data projector, Interactive whiteboard, internet, etc.), technical infrastructure, and the degree of advancement of those technologies (i.e. not obsolete technologies).

In relation to the diversity and the type of the used technologies factor, the findings showed that there is a relationship between this factor and its efficiency in the learning processes. In other words, the schools that consider providing different types of technological tools as instructional tools seem to be more satisfied about technologies than those schools that provide simple technological tools. For example,

the Sky School's teachers and students were more motivated and happier than the Moon School's teachers and students.

Furthermore, it was found that providing more advanced technologies such as using the interactive whiteboard and incorporating the Internet in the learning process can improve teachers' and students' attitudes towards the use of ICTs tools. However, as mentioned earlier, it is very important to make these technologies available and accessible for teachers and students. It was found that there might be schools that provide advanced technologies and/or many different types of technologies but it could organise those technologies in a way that might not allow its teachers and students to utilise them as required. The Moon School is an example of such schools. As mentioned in Chapter 5 that the Moon School established a smart room that contains advanced hardware and software but it was not always available for the teachers and students.

Another important technological factor is the *technical infrastructure*. The study results showed that there were some schools that tried to provide some technological tools but they were suffering from the weakness of their technical infrastructures. The diversity and the use of different technologies in any school requires a robust technical infrastructure and adequate technical support. Also it is essential for schools to provide teachers with access to on-site technical support personnel who are ready always to give the required support at the right time. Figure 6.1 illustrates research findings that were discussed and analysed in Chapter 5 in relation to the key factors that might affect the use of ICTs in classrooms. It summarise all issues discussed above in a graphical way.

## **6.2.2 Factors affecting students' attitude**

The second sub research question was as follows:

*How does the use of ICTs affect primary ISs students' attitude?*

This section aims to discuss in more detail the impact of the implemented technologies on students' attitude according to the study findings. In other words, students' attitude was discussed earlier (i.e. Section 5.2.8) as one of the eight factors that can affect the use of ICTs in classrooms but here the impact of using such technologies will be discussed in light of the study findings and in a context of a comprehensive educational reform program. For example, the impact of each type of technology used on students' attitude is going to be analysed and discussed separately. The aim is to investigate the efficiency of using those different types of ICT tools in the learning and teaching practices.

As mentioned in Chapters 4 and 5, each school of ISs was following its own strategy with regard to the integration of ICTs in its teaching and learning processes and had implemented different types of ICTs tools. This causes a difficulty for the researcher to give general feedback about students' attitude with respect to the different types of technologies used by the participating schools. Consequently, students' perceptions were studied in relation to the type of technology used in their teaching practices.

The study showed that there were many types of technology that were used in ISs in Qatar such as interactive whiteboard, smart classrooms, overhead projector, data

projector, TV/Video and CDs/DVD. However, for the purpose of structuring the discussion, these different types of technologies are classified into three main categories, specifically interactive whiteboard (which is usually connected to many peripherals such as data project, PCs, laptops, speakers, CDs, DVDs, printers, local network which enable access to the internet and so on), smart room (which also involves a collection of peripherals such as PCs, laptops, CDs, DVDs, and data projectors) and computers labs (or networked PCs). Therefore, the discussion of students' attitude took place in light of these categories.

Interactive whiteboards were used in the Sky School only. Before discussing the impact of using interactive whiteboards on students' attitude, it is worth reminding the reader that it was mentioned earlier that there is a dependent (or mutual) relationship between the students' attitude and teachers' attitude (this issue is further discussed in Section 6.2.4). In other words, it was mentioned earlier that students' attitude could be easily affected by their teachers' attitude and vice versa. In addition and as shown in Figure 6.1, students' attitude can be affected by another factor which is the availability and the accessibility to the implemented technologies. Therefore, every time students' attitude is discussed in relation to any technology category, these two factors will be investigated. The aim is to identify the real causes behind students' attitude against any technology category (i.e. interactive whiteboard, networked PCs and smart classroom).

Generally the study results showed that students were motivated and benefited from the use of the interactive whiteboard. It was found that students like to learn visually rather than giving them verbal instruction. Students were attracted by the facilities

that interactive whiteboard can provide and which make them enjoying their lessons. The researcher observed that the interactive whiteboard can provide a huge advantage over individual PCs and computer labs for incorporating ICT into teaching as it enables teachers to easily provide content for a wide range of learning styles. Teachers' attitude was also investigated with the aim of making sure that students' attitude towards this technology (i.e. interactive whiteboard) is free of the effect of their teachers' attitude. It was found that if teachers have a positive attitude and encouraging feelings towards using interactive whiteboards due its easiness and reliability. In addition, it was observed that all teachers who used the interactive whiteboard were extremely enthusiastic about the possibilities of such technology and they were happy to use it in their lessons. These findings, showed how students' attitude and teachers' attitude are dependent on each other.

Furthermore, students' attitude was investigated in relation to the second category of the used technology, which is "smart room". Smart classroom was used by only one of the participating schools which is the Moon School. Chapter 5 analysed the Moon School's students and teachers' opinions in relation to the use of this smart classroom and its associated problems. The research findings reported three main problems associated with the use of smart classroom. Firstly, teachers complained about the lack of know-how to use technologies available in smart classroom and the lack of proper training.

Secondly, the limited number of smart classroom as there was just one smart classroom in that school which make its schedule always busy. Finally, teachers were also complaining about the continuous interruptions that are caused by the specialist

who is responsible for operating the smart classroom. This negative impression about the smart classroom amongst teachers has affected students' attitude towards the use of the available technologies in that smart classroom. According to the study results, students were generally not happy about the use of the smart classroom in the Moon School. However, this negative feeling, as mentioned above, is not purely because of the used technologies in the smart classroom but because of many others factors. These factors include teachers' attitude, availability and accessibility issues and the know-how to use such technologies. In other words, this result showed the dependent relationship between students' attitude and teachers' attitude. In addition, it is shown that the availability and accessibility factor can affect teachers' attitude as well as students' attitude.

With respect to the impact of the third category (i.e. computers labs or networked PCs) on students' attitude, it was found that students were generally happy about the use of computers labs in their schools. By investigating the reasons behind this positive attitude amongst students, it was found that the same factors mentioned above (teachers' attitude and the availability and accessibility issues) had played important roles in achieving such positive feelings. For example, teachers showed positive attitudes and good impressions about the use of networked PCs (i.e. computer labs). In other words, they confirmed the usefulness of having computer labs in their schools which could be accessed frequently to improve their students learning skills and to link them to the whole world through the Internet.

In summary, the study results confirmed that students generally have good attitudes towards the use of the implemented technologies in their school except the smart

classroom. On the other hand, there are some factors that can affect students' attitude such as teachers' attitude towards the used technologies, the availability and accessibility of those technologies, the type of the used technologies, the cultural issues (e.g. parents concerns with regard to the use of Internet and CDs).

For example, it was clear that the Moon School students were affected by their teachers' attitude towards the smart classroom, the accessibility of that smart classroom and their teachers' experience (i.e. the lack of know-how) in using smart classroom facilities. With regard to the type of the used technologies, it was also found that students were more motivated to use the interactive whiteboards than other technologies and they were happier to use computer labs than using the smart classroom.

Cultural aspects were also found as a very important factor that could affect students' attitude negatively (e.g. Mrs Houaida & a parent's dialogue, p.125; and Mrs Sahla and her students' dialogue, p.126). In other words, educational officials should strive to prepare for cultural readiness if they want to achieve positive students' attitude towards the use of the implemented technologies and hence obtaining the anticipated benefits from implementing and using those ICTs instructional tools. Moreover, the study results informed some other factors that could affect students' attitude but their impact was less than the mentioned factors above. These factors include match of learning opportunities with students' preferences and software attributes.

### 6.2.3 Key learning skills

The third sub research question was as follows:

*What are the key learning skills that might be achieved or enhanced by the use of ICTs in primary ISs classrooms?*

The detailed answer for this question is presented in Section 5.3, in Chapter 5. The research findings suggested that there are three major learning skills that were acquired as a result of incorporating ICTs in teaching and learning practices in the ISs, in the State of Qatar. These are: creativity, critical thinking and problem solving, and collaborative learning. Creativity was found as one of the important skills that was achieved by the use ICTs where students gained some key learning characteristics such as independence, self-confidence, enjoyment of experimentation, and personal courage. Such skills helped students to evaluate their work more critically and honestly. The use of ICTs in classrooms introduced an open investigative practical work approach to learning and teaching and enhanced creative thinking of not only students but also their teachers. However, the study results highlighted the importance of investigating some other aspects that still need further exploration such as the need to explore the relationship between the acquired creativity and the taught subjects. Such issues might be explored through future research.

The study findings also highlighted the role of the used technologies in promoting critical thinking skills for the participated students although they were new to the used technologies. As a matter of fact, students showed encouraging results that were in

line with what was found in the literature. However, the added value in this study is the context in which these findings were taken place. In other words, the data was collected and analysed in a context of comprehensive educational reform where technologies were considered as one of the main factors in changing the education to reflect the objectives of the new educational initiative: *“Education for new era”*. The ISs also benefited from implementing ICT tools in acquiring other critical learning skills such as problem solving skills. This could be understood from two main perspectives: firstly, ISs used the implemented ICTs to overcome some of the problems that relate to the learning environments; secondly they used ICTs to enhance the thinking skills and problem solving abilities for their students. This result indicates that educators in Qatar, particularly the ISs stakeholders realised the importance of ICTs and their positive impact on the learning process outcomes; and thus some of the ISs were motivated by this fact and implemented some advanced ICT tools such as the Sky School.

Furthermore, the research results indicated clearly that the majority of teachers and headmistresses advocated the role of ICTs in creating collaborative learning environment. In other words, the participating teachers and headmistresses appeared to be in agreement about the ability of ICTs tools in promoting the collaborative learning skills and their ability in motivating those low performance students to improve their learning outcomes. In addition, it is worth mentioning that although the period of establishing the ISs was relatively short at the time of collecting case studies data, it can be predicted that there will be promising future for the use of ICTs in these schools. This prediction came as a result of the study findings that analysed in this chapter and Chapter 5.

Finally, it is worth mentioning that because ISs were new to the introduced technologies at the time of data collection process, the research findings were limited to the mentioned three main learning skills. However, these skills might be increased in future due to the increment of educators' awareness about ICTs benefits and their role in enhancing teaching and learning practices.

#### **6.2.4 Relationships among research main aspects**

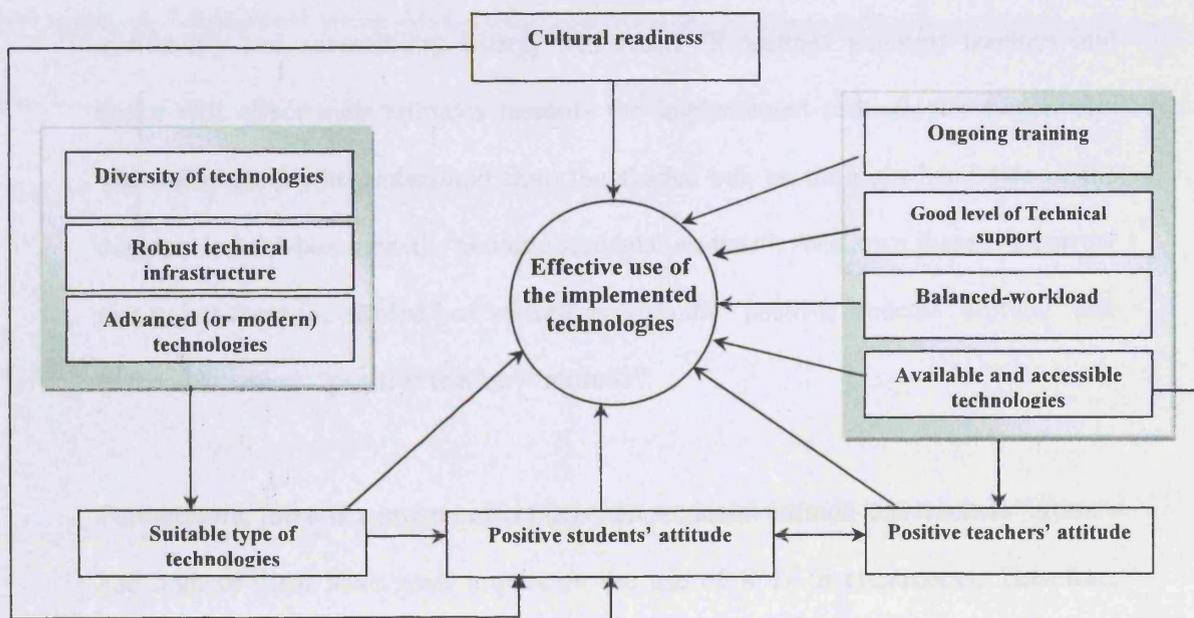
The fourth sub research question was as follows:

***Q4: What is the type of the relationship between the factors that affect ICTs use in primary ISs classrooms, the impact of using ICTs in primary ISs classrooms on students' attitude, and the learning skills that might be acquired or enhanced by the use of ICTs in primary ISs classrooms?***

The type of relationship among the main research's aspects is illustrated by Figure 6.1. As it can be noted, there are eight factors that point to the circle in the middle of the figure. The circle represents the result that can be achieved due to the positive impact of those eight factors. In other words, in order to achieve effective use of ICTs in classrooms, there are eight factors that should be treated carefully by the education stakeholders. The treatment of each factor requires certain actions from the ISs management. For example, ISs management should make sure that they provide their teachers with the proper training at the beginning of their employment on the implemented technologies. Most importantly, the training should continue over the

coming years, particularly after every implementation of new technologies or new upgrades for the used technologies.

Similarly, the management of every school should provide adequate and on time technical support. Otherwise they might get unwanted results with regard to the use and acceptance of the implemented technologies. In addition, there should be clear load-balance strategy that enables teachers to use the available technologies effectively. The absence of such a strategy would create an additional load on teachers and would affect their attitudes negatively towards the use of the provided technologies in their classrooms.



*Figure 6.1: The mutual influences among research main aspects*

Figure 6.1 also emphasises the availability and accessibility of the implemented technologies. In other words, there is no point of implementing or providing

technologies that are not available to be used by teachers and students at the right time (e.g. the smart classroom in the Moon School). In addition, if these technologies are available but they are not accessible then the results will remain the same (i.e. negative attitudes amongst students and teachers). That means, the management of each school should make sure that the implemented technologies are available every time they needed by teachers or students and there should be clear accessibility strategy should they seek to get effective use of those technologies and efficient learning environment.

Moreover, Figure 6.1 indicates that the poor treatment of the mentioned five factors (i.e. teacher training, technical support, load-balancing, students' attitude, and the availability and accessibility issues) will create ill feelings amongst teachers and hence will affect their attitudes towards the implemented technologies negatively. This message can be understood from the shaded box on the right hand side of the diagram and the box named: "positive students' attitude". As shown there is an arrow that points from the shaded box as well as from the "positive students' attitude" box to the box named: "positive teachers' attitude".

Furthermore, there is a mutual effect between students' attitude and teachers' attitude and both of them have great impact on the use of ICTs in classrooms. Therefore, schools management should treat these two important factors carefully by avoiding those issues that affect them negatively and providing a suitable leaning environment. For example, students attitude can be affected by four main factors as shown in Figure 6.1, specifically cultural aspects (e.g. the impact of parents' cultural issues on their children with respect to the use of the Internet and CDs), the availability and the

accessibility of the implemented technologies, teachers' attitude and type of the used technologies. Therefore, in order to achieve positive students' attitude there are certain actions that need to be taken by schools management. These actions, for instance, include: (1) implementing suitable technologies that suite students' level of thinking; (2) making the implemented technologies accessible and available for students; (3) making sure that all those factors that affect teachers attitude are treated carefully in order to achieve positive teachers attitude towards the implemented technologies; (4) treating cultural aspects carefully by, for example, launching some awareness programmes through the available media (this issue is discussed further below).

On the other hand, there are three factors that can help in providing a suitable type of technologies (see Figure 6.1). These factors involve: (i) the necessity of implementing different type of technologies such as interactive whiteboards, networked PCs, data projector, access to the internet, electronic library and so on; (ii) making sure that the implemented technologies are not out of date nor cutting edge technologies (i.e. while old technologies might give negative results as what was happened in the Moon School, the cutting edge technologies need sophisticated users who are not necessarily available in those schools that implemented such technologies); (iii) providing robust information technology infrastructure that able to cope with the implemented technologies and which can minimise the need for the technical support.

Finally, Figure 6.1 presented cultural issues as one of the eight factors that affect the use of ICTs in classrooms. It suggests that there should be cultural readiness in order to achieve effective ICTs use in classrooms. This readiness cannot be obtained unless

education officials change or improve those beliefs and values that surround the education system which usually have a direct or indirect impact on the use and the acceptance of ICTs tools in classrooms. These surrounding aspects can give meaning to the behaviours of groups and individuals; so education officials should make sure that these aspects are directed to the benefit of their students.

For example, there should be some awareness programmes internally (inside ISs themselves) and externally (through the available media such as TV channels, Advertisements, Radio, posters, etc) that encourage students to use technologies in general and in education specifically. In addition, there is a need for changing those negative beliefs that parents have against technologies. They should know the advantages of using such technologies in education and their positive impact on their students' educational outcomes. Furthermore, they should be taught as much as possible about the ways that they can protect their children from using or accessing unwanted technologies (e.g. they should know how to protect their students from accessing undesired websites).

### 6.3 Revised framework for efficacy of ICTs in classrooms

This section seeks to answer the main research question which is:

*Can we develop a framework that can help and guide ISs stakeholders to identify the key factors that affect the use of ICTs in primary ISs classrooms, to explore the impact of using of ICT instructional tools on primary ISs students attitudes, to examine the main learning skills that can be acquired or enhanced by the use of ICTs in primary ISs classrooms, and to identify the type of the relationship between these three aspects?*

First of all, it is worth mentioning that all discussions mentioned earlier in this chapter are part of the answer to this main question. However, this section presents all the research results in the form of a comprehensive framework that shows how the study findings met the research objectives. As mentioned in Chapter 2, the researcher has developed an initial research framework for the adoption and use of ICTs as instructional programme inside classrooms. This section will introduce a refined version of the mentioned initial research framework. The refined version is a triangulated (i.e. treat three key aspects) framework based on the research findings and supported by a synthesis of different suggestions found in the literature. It looks to the adoption and use of ICTs in classrooms from three different but related angles, specifically the factors that affect the use of ICTs in classrooms, the impact of the use ICT instructional tools on students' attitude, and the learning skills that can be acquired by the use of ICTs inside classrooms. Figure 6.2 below shows the refined version of the triangulated research framework for the efficacy of ICTs in classrooms.

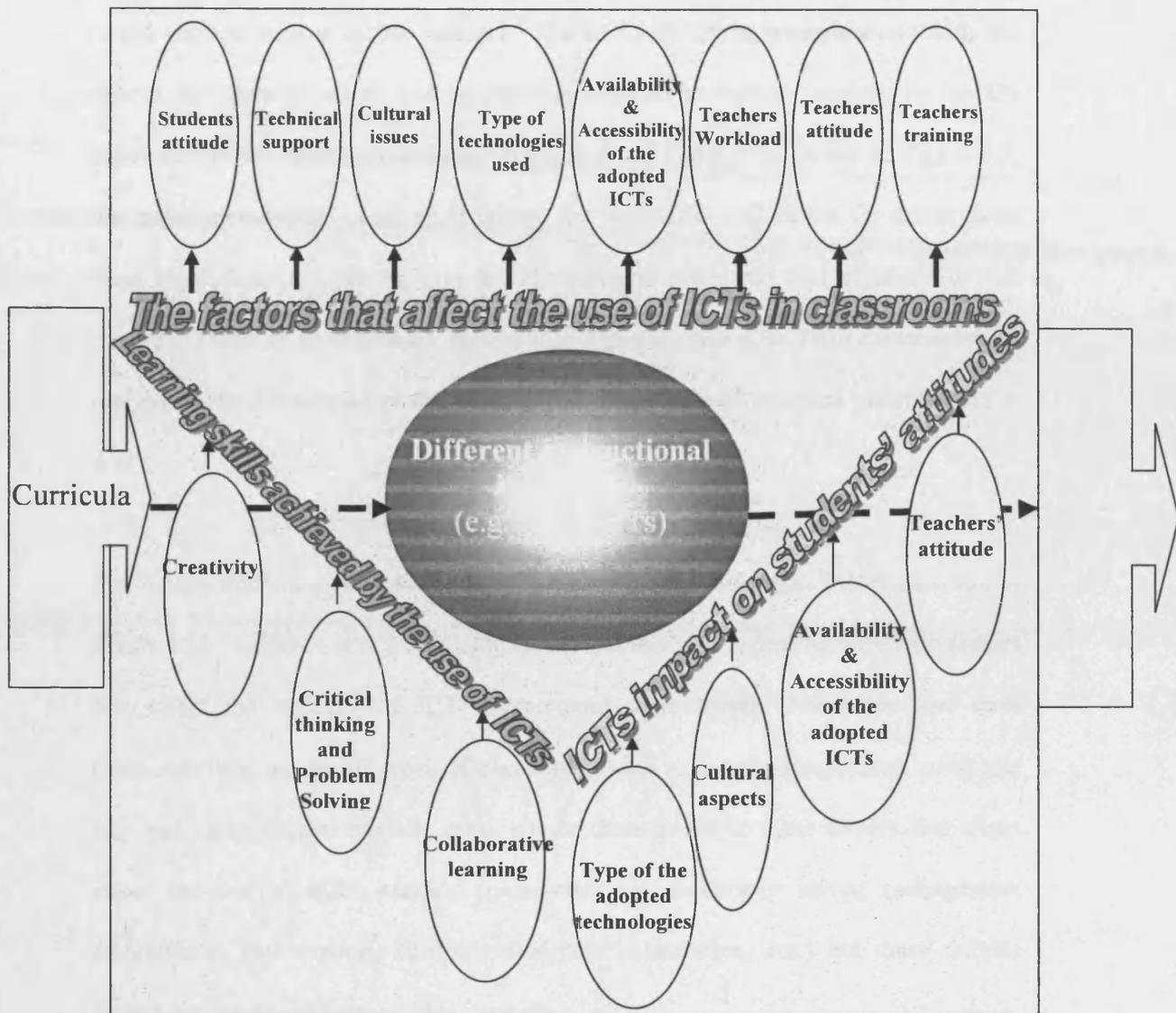


Figure 6.2: A triangulated framework for the efficacy of ICTs in classrooms (i.e. a revised version of the developed initial research framework in Chapter 2)

Figure 6.2 illustrates the process of teaching that takes place inside classrooms. As it can be noted, the process starts with designed and developed curricula that need to be taught by teachers. Teachers can use many different instructional tools to teach their students (i.e. see the circle inside the triangle). One of those instructional tools is the ICT instructional tools that are implemented in classrooms. In addition, Figure 6.2 shows that the teaching and learning processes (i.e. see the circle inside the triangle)

are surrounded by three main angles (i.e. the triangle). Each side represents one aspect of the studied themes in this research. The first side of the triangle deals with the factors that were found as real aspects that need to be treated carefully by the ISs management (i.e. education officials in the State of Qatar). As shown in Figure 6.2, this angle is composed of the eight factors that were discussed above. By determining these eight factors, it can be said that the study achieved the first objective of this research, which is: *to determine factors that affect the use of ICTs in classrooms, in the ISs at the primary level*. Section 5.2 has discussed and analysed these factors in depth.

The factors that compose this first side were explained earlier (see the explanation of Figure 6.1). However, it is worth mentioning that this side is dealing only with factors that affect the efficacy of ICT instructional tools *inside* classrooms (the term classroom here means all types of classrooms such as normal classrooms, computer labs and smart classrooms.). In other words, there might be other factors that might affect the use of ICTs *outside* classrooms (e.g. leadership issues, management commitment and support, curricula designers cooperation, etc.) but these outside factors are out of the scope of this research.

The second side of the triangle is dealing with the learning skills that acquired due to the use of ICTs in ISs (see Figure 6.2). As mentioned in Chapter 5 that there were many learning skills that are acquired by the use of ICT tools in classrooms. Those learning skills were classified into three main groups, specifically creativity, critical thinking and problem solving, and collaborative learning skills. By looking at Figure 6.2 again, it can be noted that these skills are represented by the second side of the

triangle. Hence it can be argued that this side has satisfied the second objective of the study, which is: *To examine the learning skills that might be acquired or enhanced by the use of ICTs in the classrooms*. Section 5.3 has discussed and analysed these skills in more details.

However, it should be noticed that there might be more skills that will be acquired or improved in future due to frequent use of ICTs. The findings of this study came as a result of a one-year experience with the use of ICTs in the ISs, in the State Qatar. Therefore, the future is promising as there is an opportunity for enhancing the current skills and achieving others over the next few years. In other words, once teachers and students gain trust and confidence in ICTs over the time, the factors that affect the use of ICTs will decrease and there will be greater possibilities for obtaining more learning skills.

Figure 6.2 also shows a third side that deals with the impact of using ICT instructional tools in classrooms on students' attitude. This third side of the triangulated framework seeks to satisfy the third objective of the study, which is: *To explore the impact of using ICTs on students' attitudes* (See Section 5.2.8 for more details). Generally, the study findings showed a positive students' attitude towards the use of technologies in classrooms. However, it also listed some factors that can affect students' attitude and make them avoid or ignore the used technologies. These factors, as shown in Figures 6.2 and 5.2, involve cultural aspects, teachers' attitude, the availability and accessibility to the adopted technologies, and the type of the implemented technologies.

As mentioned above, cultural issues should be taken into educators' considerations before, during and after the adoption of technologies in their educational systems. In particular, parents should be aware of the advantages of using technologies in education and the importance of preparing their children for the information age. The research findings highlighted the importance of such issues and how parents on many occasions negatively affected their children (i.e. students) attitude.

Teachers also should be able to deal with the available technologies and should appear confident when using ICTs instructional tools in front of their students. The study findings showed how students were affected by the lack of their teachers' experiences in using the ICTs instructional tools at the Moon School. The lack of experiences in using technologies also leads to a development of negative teachers' attitude and consequently will affect their students' attitude negatively.

In addition, the accessibility to the available technologies is another important factor that can affect students' attitude. For example, students were not happy about the Moon School's smart classroom due to the lack of proper access to that smart room. Another key factor that can change students' feelings about the provided technologies is the type of those technologies. This issue was discussed above in more details. It was mentioned that students liked to deal with interactive whiteboards more than other technologies. The availability of some attractive features in the interactive whiteboards helped in achieving students' satisfaction and desire to use this type of technology.

Having discussed the revised research triangulated framework, the researcher wants to draw the attention of the reader to an important issue, which is the dependent relationship between these three sides of that triangle shown in Figure 6.2. In other words, in order to achieve effective students' learning by the use of ICT instructional tools in classrooms, there must be careful treatment for those eight factors that affect their usage. Once those eight factors are treated carefully in practice, it would be possible to obtain the students' satisfaction with the introduced technologies and hence students will start acquiring new learning skills. Finally, it is worth mentioning that there is a fourth implicit objective that needs to be achieved in this study. That is to share the study findings with the SEC to enable effective planning for future students. A copy of this thesis will be handed to the SEC immediately after completing the requirements of this study.

## 6.4 Other aspects

The aim of this section is to highlight those aspects that appeared in the initial research framework illustrated by Figure 2.2 but were not covered by the revised version of the research framework showed in figure 6.2. There are mainly two aspects, which are: teachers' involvement and education stakeholders' commitment. With regard to the teachers' involvement issues, the researcher could not find potential evidence that help to include this factor in this study's findings.

This could be justified by the radical educational reform context where the data of this study was collected. In other words, as mentioned in Chapter 4, the State of Qatar launched a comprehensive reform programme with respect to its education system.

Therefore, there was not any chance for Qatari teachers to be involved in such radical change. This is because this radical change was decided by a higher authority and there was not any role for teachers to play in this regard. In other words, the change was not optional for them but it was compulsory and they have to cope with it. Consequently, there was not any evidence that could help the research in understanding the importance of such factor with respect to the research theme.

In regarding to the role of education stakeholders commitment factor, there was not enough data that could help the researcher to include it as a factor. Although the study findings indicated clear commitment from the interviewed teachers and headmistresses, it was not possible for the researcher to interview the remaining stakeholders (i.e. operators, parents, curricula designers, etc.) due to the limitation of the time and resources available for the study. In addition, the focus of the study was on the implementation and the use of technologies *inside* ISs classrooms. In other words, interviewing other stakeholders was *out of the study's scope*.

## 6.5 Summary

This chapter summarised the study findings and explained how did these findings answer the research questions. In addition, it is showed how these findings met the research objectives. The initial framework that was developed in Chapter 2, based on a synthesis of different suggestions found in the literature, is refined by the analysed data and presented in its final shape in this chapter.

The refined version is, in fact, a triangulated framework that links three different but dependent sides with each other and show the effect of these sides on utilising ICTs instructional tools in classrooms as well as the ICTs impact on students attitude. Moreover, it identifies the key learning skills that might acquire due to the use of ICTs in classrooms and links these skills to the level of maturity that schools reach with respect to the use of ICT instructional tools.

It is hoped that this framework will help in optimising the use of technologies in teaching and learning processes and in making education stakeholders aware of the benefits of incorporating technologies into their educational system as well as aware of the factors that might affect the use of those technologies. Furthermore, it can be argued that the developed framework has succeeded in finding a way to enable education officials to identify the dependent relationship between the factors that affect the use of ICTs in classrooms and the dependent relationship between the three themes of the triangulated framework.

Finally, it is hoped that education officials will benefit from this framework and will find it useful to understand, plan and perform the expected shift from traditional way of teaching to the anticipated virtual learning environment and to help them to predict the challenges and risks that might face them during the adoption of ICT tools in their classrooms.

## CHAPTER SEVEN: IMPLICATIONS AND CONCLUSIONS

### 7.1 Introduction

Chapter 6 summarised and presented the major findings of this study in the form of a framework that deals with the efficient use of ICTs in classrooms in a developing country that is performing a comprehensive educational reform programme. In particular, the framework deals with the efficient use of ICTs from three different but related dimensions (i.e. aspects). These dimensions include the key factors that affect the use of ICTs in classrooms, the impact of the use of ICT instructional tools on students' attitude, and the major learning skills that could be acquired or improved by the use of ICTs instructional tools. In addition, the framework highlighted the dependent relationship between those three dimensions as well as the dependent relationship between the identified factors that affect the use of technologies inside classrooms.

This chapter starts by presenting the key study findings along with an evaluation of the research quality and research findings. Specifically, Section 7.2 summarises the research methodological and theoretical implications and presents an evaluation of the research findings in light of Klein and Myers (1999) principles. Then, Section 7.3 summarises the research implications for practice. The possible limitations and future researches are presented in Section 7.4. Finally, Section 7.5 presents the concluding remarks of this study.

## 7.2 Implications for research

The implications of this study for current and continuing research efforts with regard to the *efficacy of* ICT instructional tools inside classrooms are divided into methodological and theoretical implications. The implications of the research design on future empirical efforts are considered as methodological implications whereas those issues that surrounding theory, which are dealing with the specific implications of the study's findings for existing theory that related to the use of ICTs in classroom in primary schools, are considered theoretical implications.

### 7.2.1 Methodological implications

The benefits of using interpretive case study strategy were realised in this study. This research revealed some key issues that relate to the use of interpretive case study approach and hence the researcher intends to summarise and present these methodological issues in the following subsections.

#### 7.2.1.1 Initial research framework

As mentioned in Chapter 2, the researcher has developed an initial framework based on a synthesis of different suggestions found in the literature. This initial framework was developed in light of Huberman and Miles (1994) suggestion who emphasised the importance of developing a theoretical framework that can be used to explain the main issues to be studied. In this study, there were three main objectives of developing the mentioned framework, which are: first to highlight the area that the

research intended to tackle and to structure the process of the data collection. Secondly, it was used to structure and guide the data analyses processes. Thirdly, as mentioned in chapter 3, this research followed an interpretive research strategy; hence the researcher developed an initial research framework based on some suggestions found in the literature. For example, Walsham (1995b, p. 76) stated that *“the motivation for the use of theory in the earlier stages of interpretive cases studies which takes account of previous knowledge and which creates a sensible theoretical basis to inform the topics and approach of the early empirical work”*. Indeed, the initial research framework was found very useful in structuring the data collection and the data analysis processes. In addition, it helped much in making the researcher focusing on the research topic and preventing her from including irrelevant aspects. This framework was tested and refined by the collected data and presented as a main contribution of this study to the knowledge in Chapter 6.

#### **7.2.1.2 Triangulation**

This study has used three main sources of evidence in the case study field (i.e. case studies sites), in addition to the use of the initial framework and other secondary sources mentioned in Chapter 3. These three sources of evidence are: semi-structured interviews, direct observations, and documentation. According to Patton (1990) and Cunningham (1997), this combination of methodologies is often referred as triangulation. Jick (1979) mentioned that the major advantage of using triangulation rests on the premise that the weaknesses in each of the single data collection methods will be compensated by the counter-balancing strengths of another. In addition, the

use of triangulation in this study was very useful in reducing the chances of errors and misinterpretations (Duchon and Kaplan 1988; Stake 1994).

### **7.2.1.3 Interpretive case study strategy: lessons learned**

As mentioned in Chapter 3 that the research methodology that was chosen for this study has been of a qualitative nature. In addition, interpretive case study strategy was selected to be used as research approach in this study. This strategy, as a matter of fact, helped in providing a rich picture and in-depth understanding of the use of ICTs in classrooms and its related aspects in a developing country that conducting a comprehensive educational reform programme. In other words, it was very useful in understanding the nature of a radical change for an education system that took place in a developing country and which relied on technologies as one of its enablers for that change. Throughout this study, the researcher learned some lessons with regard to the use of the interpretive case study approach and would like to share her experiences with those who are interested in further research in the area of this study or in any other area related to the use ICTs in schools generally. These lessons are provided below.

Firstly, bias was limited by making multiple entry points into the case studies sites so the researcher penetrated the case studies sites at different levels (e.g. headmistresses, teachers and students). Secondly, the research was intense and caused enormous demands on the researcher as she was dealing with different schools which employed different educational strategies and different ways of teaching and learning practices,

meeting new people every day, convincing them to set aside some time for meeting, and conducting personal face-to-face interviews.

Thirdly, translating interviews notes, and official Arabic documents collected during the data collection process drained the researcher's time and energy. She translated interviews notes and those documents herself, which consumed much of her time. However, consideration was given to this practice (i.e. translating the collected data) as data is collected from one country in Arabic and presented in another country in English language.

As a matter of fact, translation is found as one of the main methodological issues, which the researcher explored, and it was given attention as well as great care. One of the main problems that is related to translation of data is the issue of crossing boundaries from one linguistic context to another. Therefore, in order to be good at crossing such boundaries requires extensive training and experience, accompanied by a continuous search for meaning. The researcher found it problematic despite her experience with languages. The researcher's main concern is that readers might misunderstand her translation into another meaning which is different to that understood by native speakers.

It is very important to stress that, despite the fact that the researcher was working very hard to minimise the effect of the problem on the validity of her research, she is fully aware that problems associated with translation were not easy to solve. Therefore, finding someone else to do this job might be helpful as researchers are always in need

to focus on developing insights, writing their insights and feeding them back to research participants or refining them in future interviews.

Fourthly, the advantage of using the available software such as NVivo software, which was used in this study. As mentioned in Chapter 3, there were two objectives in using the software. Firstly, to increase the reliability of this study; secondly, to get the help of the available technology in analysing mass qualitative data (Bazeley and Richards, 2000). The exploratory strategy that was used in analysing the data of this study encouraged the researcher to use NVivo package which helped a great deal in managing and synthesising the researcher's ideas. Indeed, the NVivo software played an important role in the interpretations and structuring the study's findings.

Finally, in light of Klein and Myers' (1999) principles the researcher would like to share her experience with other interested researchers with regard to the use of such principles in evaluating this study. These principles are derived from the philosophical base of previous interpretive research (Klein and Myers 1999). Therefore, the researcher has found it worthwhile to evaluate her research against philosophical principles that most other interpretive studies follow. The evaluation of this research in light of Klein and Mayers' (1999, p.73) principles is summarised below.

### ***1. The Fundamental Principle of the Hermeneutic Circle***

*This principle suggests that all human understanding is achieved by iterating between considering the interdependent meaning of parts and the whole that they form. This principle of human understanding is fundamental to all the other principles. (Klein and Myers 1999, p.73)*

As a matter of fact, this research has achieved this principle to a great extent. The research process with respect to this study started by reviewing the literature of using ICT in teaching and learning processes and then an initial theoretical framework was developed based on the researcher's understanding of the concerned literature. That initial research framework developed as a result of many versions that were developed throughout the extensive process of reviewing the literature, which aimed to look at the different 'parts' that lead to the 'whole' picture (Klein and Myers 1999). As mentioned earlier, the developed framework helped a great deal in understanding the key factor that affect the use of ICTs in classrooms, the impact of using those technologies on students' attitude, and the learning skills that might be acquired or enhanced due to the use of those technologies in a hermeneutic context. In addition, the data collection and data analyses practices gave careful consideration not only to the views and behaviours of headmistresses, teachers, and students but also to the context in which these participants operate. In other words, the analysis constantly related to the use of ICTs in classrooms practices with its context (i.e. the context of a comprehensive reform programme).

The circle was completed when the final version of the developed framework was written up after analysing the case study findings (i.e. Figure 6.2). As it can be noted from Figure 6.1 in Chapter 6 that most of the key factors that affected the use of ICTs in classrooms were dependent on each other. For example, one of the factors that restrict the benefits of using ICTs in classroom is the negative teachers' attitude towards to the use of ICTs in their teaching practices. Therefore, teachers' attitude should be positive if education officials seek to optimise the use of ICTs in classrooms. However, in order to obtain positive teachers' attitude, there are other

five factors that should be satisfied as shown in Figure 6.1. These are ongoing teachers' training, good level of technical support, available and accessible technologies, positive students' attitude toward the use of ICTs in classrooms and balanced workload. That means that there was "*iterating between considering the interdependent meaning of parts* [dependents factors such as teachers attitude and independent factors such as technical support factor] *and the whole* [the eight key factors that were found according to the data analysis process] *that they form*. These eight factors themselves become as a part of the revised framework, which is composed of three key dimensions (i.e. The key that affect the use of ICTs in classrooms, the impact of using ICT tools on students attitude and the major learning skills that could be acquired or improved by the used technologies).

## ***2. The Principle of Contextualization:***

*Requires critical reflection of the social and historical background of the research setting, so that the intended audience can see how the current situation under investigation emerged. (Klein and Myers 1999, p.73)*

Chapter 4 has explained the historical background of the education systems in Qatar. In addition, it gave a rich picture about the comprehensive educational reform programme that was launched in the year 2002. Furthermore, the key issue that was considered as valued input with respect to the contributions of this research to the knowledge is its context. In other words, the findings of this research were achieved in a context of an educational radical change that took place in a developing country. The historical context of the studied case studies was also investigated. Sustained over time observation processes, formal, informal meetings, official documents, local newspapers articles made it possible for researcher to contextualise the use of ICTs in

classrooms at ISs. Moreover, being a teacher for more than 12 years gave the researcher additional advantage because she had a clear idea about the history of the education system in Qatar. This advantage helped her to highlight the most important part of that history so readers can “*see how the current situation under investigation emerged.*”

### ***3. The Principle of Interaction Between the Researchers and the Subjects:***

*Requires critical reflection on how the research materials (or “data”) were socially constructed through the interaction between the researchers and participants. (Klein and Myers 1999, p.73)*

According to Walsham (1995b), the interview technique is the most common data collection technique in an interpretive case study research. Thus, this research, as mentioned in Chapter 3, relied much on the face-to-face interviews. During each interview the researcher used to interact with the interviewees and utilise meaning that they assign to topic under the investigation. In addition, it was possible for the researcher to conduct some of the interviews sessions out of the interviewees’ offices and to create a social interaction with her participants with the aim of ascertaining the facts (Klein and Myers 1999). Having said this, it is worth mentioning that the effect of the researcher’s presence on the investigated field was treated carefully by, for instance, not to influence the respondent by the researcher reactions to responses given.

### ***4. The Principle of Abstraction and Generalization:***

*Requires relating the idiographic details revealed by the data interpretation through the application of principles one and two to theoretical, general*

*concepts that describe the nature of human understanding and social action.*  
(Klein and Myers 1999, p.73)

The results of the data analysis process, particularly perceptions that the interviewees have had were linked with actual theoretical general concepts in the literature which represented by the developed initial research framework in this study. Gradually, this led to a refined version of the research framework for the efficacy of ICTs in classrooms (i.e. presented in Chapter 6).

#### **5. *The Principle of Dialogical Reasoning:***

*Requires sensitivity to possible contradictions between the theoretical preconceptions guiding the research design and actual findings (“the story which the data tell”) with subsequent cycles of revision.* (Klein and Myers 1999, p.73)

The researcher used a research strategy that to the best of her knowledge attempted to be cautious about contradictory issues concerning the research results and the researcher’s existing and underlying assumptions. She engaged in regular comparison of the study findings with her initial research framework and conducted follow-up interviews with the aim of exploring the relationship between interviewed data, the developed framework and the reality.

#### **6. *The Principle of Multiple Interpretations:***

*Requires sensitivity to possible differences in interpretations among the participants as are typically expressed in multiple narratives or stories of the same sequence of events under study. Similar to multiple witness accounts even if all tell it as they saw it.* (Klein and Myers 1999, p.73)

Multiple perspectives from participants with different backgrounds, levels of experience, and at different levels were sought during the data collection period. These different perspectives together with the collected data from other sources of evidence were exposed with the aim of achieving a better understanding of the problem situation and improving the analytical processes.

### **7. *The Principle of Suspicion:***

*Requires sensitivity to possible “biases” and systematic “distortions” in the narratives collected from the participants. (Klein and Myers 1999, p.73)*

As mentioned in Chapter 3, multiple data collections methods (e.g. semi-structured interviews, direct observations and official documents) were used as sources of evidence which allowed triangulation and adherence to the principle of suspicion (Klein and Myers, 1999). By using these different sources of evidence and others (e.g. local newspapers articles, TVs interviews, etc) the researcher has validated many aspects of the collected data, and was aware of such possible biases in the narratives collected from the interviewees. This allowed the researcher to identify inconsistencies and arrive at deeper insights.

### **7.2.2 Theoretical implications**

The focus of this study is on the *efficacy of* ICT instructional tools in classrooms for ISs at the primary level. There were four sub research questions that were answered by this research. These are: (1) What are the key factors that can affect the use of ICT in ISs classrooms, at the primary level? (2) How does the use of ICTs affect ISs students' attitude? (3) What are the key learning skills that might be achieved or

enhanced by the use of ICTs in ISs classrooms? (4) Q4: What is the type of the relationship between the factors that affect ICTs use in primary ISs classrooms, the impact of using ICTs in primary ISs classrooms on students' attitude, and the learning skills that might be acquired or enhanced by the use of ICTs in primary ISs classrooms?

Although these research questions were discussed and answered in chapter 6, it is important to brief the reader with their answers in this chapter with the aim of clearly presenting the theoretical implications of this study. The potential theoretical implications of this research for the efficient use of ICTs in classrooms are classified into four key categories, namely the theoretical implications that relate to the key factors that could affect the use of ICTs in classrooms, the impact of the use of ICT instructional tools on students' attitude, the key learning skills that could be acquired or enhanced by the use of ICTs in classrooms, and the type of the relationship between these three aspects.

With regard to the key factors that could affect the use of ICTs in classrooms, it could be argued that there are many theoretical implications of this research that relate to those key factors. First, to the best of the researcher knowledge, this is the first study that explored the key factors that can affect the use of ICTs in classrooms in a developing country that in a process of comprehensive educational reform initiative. Chapter 2 showed how teachers' attitude towards the use of ICT in schools and/or at homes was investigated by different studies. However, it was clear that there was a lack of a study that explore teachers' attitude towards the use of ICTs in classrooms, in a developing country that engaged in a radical change to its educational system.

Secondly, this research introduced another key contribution to the knowledge which is the identification of those factors that could affect teachers' attitude, in specific, towards the use of ICT instructional tools in a developing country that used ICTs as key enabler in its educational reform efforts. The third contribution of this study with respect to the first dimension of the study (i.e. the key factors that could affect the use of ICTs in classrooms) is the identification of main factors that affected students' attitude towards the use of ICTs in classroom, in the context mentioned above. These contributions are discussed further in the following subsections (i.e. Sections 7.2.2.1, 7.2.2.2, and 7.2.2.3).

Regarding the second dimension that was tackled in this study (i.e. the impact of ICTs on students' attitude toward the use of ICTs in classroom), the research presented a potential theoretical implication with this regard. Students' attitude towards the use of technologies in classrooms was studied in a developing country that uses ICT instructional tools for the first time in newly established schools and in light of educational reform activities. Students' attitude was found to be important factor that can greatly affect the use of ICTs in classrooms. Students generally showed good attitude towards the use of the implemented technologies in their classrooms. Yet, students perceived many factors as affecting their attitudes. These factors include their teachers' attitude towards the used technologies, the availability and accessibility issues, and the type of the used technologies. These factors are discussed briefly in Section 7.2.2.2 below.

With respect to the third dimension (i.e. the learning skills that could be acquired or improved by the use of ICTs in classrooms) that was explored by this study, this study showed some valuable inputs (or data). The study showed that although the period of establishing the ISs was relatively short at the time of collecting case studies data, some the students' learning skills were improved. In addition, they started acquiring some new learning skills as discussed in Chapter 5. The theoretical implication of this study with respect to these acquired skills is the context in which these skills were acquired or enhanced. Exploring these new learning skills in a context of radical educational changes that taking place in a developing country is argued to be a new contribution to the knowledge. In addition, the classification of the explored learning skills is another contribution of this study to the knowledge with respects to this aspect.

Finally, it is worth highlighting that this study introduced another contribution to the knowledge, which is the identification of the type of relationship between the mentioned three aspects and in the mentioned context (this issue was discussed in Sections 6.2.4 and 6.3). In addition, the study identified a mutual relationship between some of the explored factors in this research. This issue is further highlighted in the following subsections.

#### **7.2.2.1 Key Factors affecting teachers attitude**

As it can be noted from Figures 5.1 and 6.1, this study explored the five key factors that were found to affect teachers' attitude towards the use of ICTs in ISs classrooms. The study findings showed that in order to get positive teachers attitude there should

be: (i) ongoing teachers training on the available technologies; (ii) good level of technical support to the used technologies; (iii) a clear strategy for balancing the workload on teachers due to the use of such technologies; (iv) availability and accessibility to the implemented technologies; and (v) positive students' attitude. The study also investigated and identified the dependent and a mutual relationship between some of these factors such the mutual and dependent relationship between teachers' attitude and students' attitude. As stated earlier, these findings are explored and identified in a developing country that launched a comprehensive educational reform programme and used ICTs as one of its enablers to the anticipated change and to improve its school learning environments.

#### **7.2.2.2 Key Factors affecting students attitude**

Although students' attitude was found as one of the key factors that affect teachers' attitude, it was found also that students' attitude could be greatly affected by teachers attitude (i.e. mutual effect). Figures 5.2 and 6.1 illustrated those factors that were found as key factors that could affect students' attitude. As it can be noted that to get positive students attitude towards the use of ICT in the ISs classrooms, there are three main factors that should be considered, which are: (1) teachers should display a positive attitude to their students towards the used technologies; (2) the implemented technologies should be available and accessible for students; and (3) the importance of using a suitable technologies that attract students attention and make their classes more controllable (i.e. type of technology used). Figure 6.1 also showed the key aspects that could be considered when deciding on the type of technologies that need to be used in classrooms. These aspects include the importance of having robust

technical infrastructure, the importance of diversifying the used technologies, and the importance of using modern technologies (i.e. at least not neither obsolete technologies). The identifying of these factors and their related aspects, classifying them, and exploring their relationships in a developing country that in a process of reforming its educational system is considered as one of the potential theoretical implementations for this research.

### **7.2.2.3 Theoretical framework for the efficacy of ICTs in classrooms**

Chapter 6 summarised the research findings and presented them in the form of a revised version of the developed framework. Figure 6.2 illustrate the developed framework which is intended to be used for exploring aspects that relate to the efficient use of ICTs in classrooms and which summarised the answers for the research questions and consequently the answer for the main research question. The developed framework is composed of three main dimensions (or sides) that deal with three different but related aspects. These three dimensions were discussed in Chapter 6 and this chapter as well. It is argued that this is the first empirical attempt that conceptualised aspects that relate to the *efficacy of* ICTs in classrooms, in a developing country that was in a process of radical change to its education system and used ICTs as one of the main enablers to the intended change. This framework, therefore, is argued to be suitable for those developing countries (i.e. with similar circumstances and characteristics to the country under the study) that seek to best employ ICTs in their educational reform initiatives.

### 7.3 Implications for practice

The literature (e.g. Benbasat and Zmud (1999) showed that it is essential for researchers to present their researches findings in a form that allows them to relate their studies to a practical context. The framework that discussed above as the key finding and as the main contribution of the study to the knowledge aimed to find an operational classification for those aspects that affect the use of ICTs in classrooms. It is intended to help educational officials (e.g. educators or education stakeholders) and decision makers to understand, plan and perform any intended change to their educational systems by using ICT instructional tools as enablers, to predict the challenges and the risks that they could face once they use such tools, and to assess their educational reform progress in light of using such technologies.

The framework is meant to be use by those developing countries that plan to shift from their traditional education systems to educational systems that prepare their students to the information age. In particular, the developed framework aimed to help educational officials and those new operators for the coming ISs in the State of Qatar to best utilise technologies in their ISs and to understand the different aspects that could affect their efforts with regard to the employments and implementation of ICT instructional tools in their classrooms. It is also hoped that this framework will help the current ISs operators with respect to the mentioned aspects in practice so they can best utilise their investment in those ICT instructional tools. Finally, it is hoped that this study will provide the SEC with a suitable findings that will help in making better policy decisions and applying their educational strategies with greater certainty. In other words, the findings of this study is expected to provide the SEC with real data

on ISs' use of ICTs, to facilitate change more effectively for the benefit of their students.

## 7.4 Limitations and future research

There is no perfect research. This research, as with many other PhD researches, carries some limitations. Firstly, the Qatar educational reform programme is a lengthy programme (i.e. long term project that will take many years to be completed; as discussed chapter 4). It is started in the year 2002 and it is still in progress until the date of writing this chapter. It is expected to continue for the coming few years. Therefore, the researcher was limited and constrained by the time factor since this study had to be completed within the timeframe given to complete a PhD study. Future research could be conducted at a later stage of the educational reform initiative to include those schools that become mature enough in the employment and the use of ICT instructional tools in classrooms. Such future research could also refine, test and validate the developed framework.

Secondly, this study was only concerned with the use of ICTs, in classrooms, in a developing country that is in the process of an educational reform programme. Therefore, it is hard to argue whether the developed framework is applicable in other educational reform programmes, in other countries (although this was checked against the extensive literature review that was conducted throughout the study). Nevertheless, it is worth mentioning that statistical generalisation is out of the scope of this study. A potential avenue of future research would be to test the developed framework with other educational reform initiatives that took place in a similar

situation (i.e. those developing countries which have similar conditions (i.e. similar size, number of schools, cultures, economical aspects, etc)). Another important point that is need to be highlighted here is that the objective of this study was to build theory rather than building and testing theory, hence a later study might test the developed framework and highlight its strengths and weaknesses.

Thirdly, it is worth highlighting that this study was concerned with the use of ICTs in classrooms for primary schools only. Given the time and resources available for a PhD student, it was not possible for the researcher to include other levels (i.e. intermediate and secondary or high school levels). Future studies would have to be done which address the other levels (i.e. intermediate or high school levels). Finally, this study was limited to the use of ICTs in classrooms which would give other future research a chance to test the developed framework of those aspects that affect the use of ICTs in schools generally and to include other factors related to parents, the use of ICTs at homes, the use of ICTs at public areas (e.g. the use of the internet in what the so-called iPark (stand for internet park) in the State of Qatar).

## 7.5 Concluding remarks

Many countries in the developing world, particularly the Middle Eastern countries launched many educational reform programmes with the aim of improving their educational systems' outcomes. Some of those countries belief in the ICTs' ability to enhance their learning environments. The general aim of this study was to investigate and explore the efficient use of ICT instructional tools in the ISs classrooms in a developing country that engaged in a comprehensive educational reform programme,

hence to build a theory (i.e. a framework for the *efficacy of* ICTs in primary schools' classrooms) that provides both theoretical and practical new insights into the use of ICTs in primary school classrooms.

Although there were many studies that tried to explore the advantages of using ICTs in schools, there were clear differences in the focus, perspectives and there was a lack of a study that investigates and explores the efficacy of ICTs in classrooms in a developing country that in a process of radical change to its educational system. In addition, all the previous studies were focusing on one or two of the aspects that were explored in this study. In other words, there was a lack of a study that conceptualise all the three aspects that were included in the developed framework. Therefore, this study was intended to bridge this 'gap'.

The developed framework (i.e. the theory of this study) combined evidence from literature with the findings of interpretive case studies with the aim of narrowing the gap between the aspects that affect the efficient use of ICTs in classrooms in theory and practice. The developed framework can provide the educational stakeholders, particularly the current and new ISs operators with aspects that help them to better utilise ICTs in their classrooms. In other words, the developed framework can be used to determine the road ahead for employing and using ICT instructional tools in classrooms. It is assumed to help them in identifying the key factors that affect the use of the ICT instructional tools, the main factors that affect students' attitude towards the use of ICTs and teachers' attitude as well, the possible learning skills that could be enhanced or acquired due to the use of such technologies, and the dependent relationship between all these issues.

To the best of the researcher's knowledge, this is the first study that addressed all these aspects in a context of comprehensive educational reform programme in a developing country. Thus this study can be considered as one of the pioneer studies in this area of the use of ICT in education. It can be also claimed that this study has made a novel contribution to the area of using ICTs in education generally and has expanded the boundaries of knowledge. Finally, it is worth concluding this research by confirming that the developed framework is intended to provide a foundation for further researches in the *efficacy of* ICTs in classrooms.

## REFERENCES

- Abrami, P. C. (2001). Understanding and promoting using complex learning using technology. *Educational Research and Evaluation*, 7, 113-136.
- Ajzen, I and Fishbein, M (1980). Understanding attitudes and predicting social behavior. NJ: Prentice-Hall.
- Al-Ammari, J. A. (2004). *Benefits and barriers to implementing computer use in Qatari elementary schools as perceived by female teachers, an exploratory study*. Unpublished PhD Thesis, Ohio State University, 2004.
- Al-Asmari, A. (2005). *The use of Internet among EFL teachers at the colleges of technology in Saudi Arabia*. Unpublished PhD Thesis, Ohio State University, 2005.
- Alavi, M. (1994) Computer mediated collaborative learning: An Imperial Evaluation, *MIS Quarterly*, 18 (2), 159-174. In Janicki, T (2003) *Evaluation of a Computer-supported Learning System*, *Decision Science Journal of Innovative Education* Vol. 1 (2) 203-223.
- Albirini, A. (2004). *An exploration of the factors associated with the attitudes of high school EFL teachers in Syria toward information and communication technology*. Unpublished PhD Thesis, Ohio State University, 2004.
- Al-Kahtani, S. (2001). *Computer assisted language learning in EFL instruction at selected Arabian universities: Profiles of faculty*. Unpublished doctoral dissertation. Indiana University of Pennsylvania.
- Alkhalifa, E. M. (2005). Effects of the Cognitive Level of Thought on Learning Complex Material. *Educational Technology and Society*, 8(2), 40-53.
- Allegra, M., Chifari A., and Ottaviano S. (2001). ICT to Train Students towards Creative Thinking, *Educational Technology and Society* 4(2), 42-58.
- Al-Oteawi, S. M. (2002). *The perceptions of Administrators and teachers in utilizing information technology in instruction, administrative work, technology planning and staff development in Saudi Arabia*. Unpublished PhD Thesis, Ohio University, 2002.
- Alrumaih, A.A. (2004). *Multimedia instructional applications for pronunciation instruction in English as a foreign language setting in Saudi Arabia: A study of attitudes, beliefs, and pedagogies*. Unpublished doctoral dissertation, Kansas State University.
- Anderson, C.S. (1982). The search for school climate: a review of the research. *Review of Educational Research*, 52(3), 368-420.

- Avouris, N., Komis, V., Margaritis, M., and Fiotakis, G. (2004). An environment for studying collaborative learning activities. *Educational Technology and Society*, 7 (2), 34-41.
- Avril M. Loveless (2002). Report 4: Literature Review in Creativity, New Technologies and Learning, School of Education, University of Brighton, *FUTURELAB SERIES*.
- Bazeley, P., & Richards L. (2000). *The NVivo qualitative project book*. London: Sage.
- Becker, H. J. (2000). Pedagogical motivations for student computer use that lead to student engagement. *Educational Technology*, 40(5), 5-17.
- Becta (2003). Primary Schools – ICT Standards. An Analysis of National Data from Ofsted and QCA by Becta, Becta, Coventry. Available at: [http://www.becta.org.uk/page\\_documents/research/Introduction.pdf](http://www.becta.org.uk/page_documents/research/Introduction.pdf)
- Becta (2003). The Becta Review 2005: Evidence on the progress of ICT in education. Ofsted and QCA by Becta, Becta, Coventry. Available at: [http://www.becta.org.uk/page\\_documents/research/becta\\_review\\_feb05.pdf](http://www.becta.org.uk/page_documents/research/becta_review_feb05.pdf)
- Benbasat, I. and Weber, R. (1996). Research Commentary: Rethinking “Diversity” in Information System Research. *Information Systems Research*. 7(4): pp.389-399.
- Benbasat, I. and Zmud, R.W. (1999). Empirical Research in Information Systems: The Practice of Relevance. *MIS Quarterly*. 23(1): pp.3-16.
- Benbasat, I., Goldstein, D.K. and Mead, M. (1987). The Case Research Strategy in Studies of Information Systems. *MIS Quarterly*.11(3): pp.369-385.
- Berg, G. A. (2003). *The Knowledge Medium: Designing Effective Computer Based Learning Environments*. Hershey, PA: Information Science Publishing.
- Beynon, J. (1991). *Just a few machines bleeping away in the corner: a review of naturalistic studies of computers in education in the UK*. In (R. L. Blomeyer and C. D. Martin, (eds) *Case Studies in Computer Aided Learning*, London: The Falmer Press).
- Bitner, N. and Bitner, J. (2002). Integrating technology into the classroom: eight keys to success. *Journal of Technology and Teacher Education*, 10(1), 95-100.
- Boden, M. (2001). *Creativity and knowledge*. In (A. Craft, B. Jeffrey and M. Leibling. (Eds.). *Creativity in education*. London: Continuum. pp. 95-102).
- Bowes, J. (2003). *The emerging repertoire demanded of teachers of the future: Surviving the transition*, <http://crpit.com/confpapers/CRPITV23Bowes.pdf>. Accessed in August 20, 2005.

- Braak, S. J. (2001). Factors influencing the use of computer mediated communication by teachers in secondary education. *Computers & Education*, 36(1), 41-47.
- Bracewell, R., Laferrière, T., Breuleux, A., Benoit, J., and Abdous, M. (1998). *The emerging contribution of online resources and tools to classroom learning and teaching*. [http://www.fse.ulaval.ca/fac/tact/fr/html/apport/app98\\_es.html](http://www.fse.ulaval.ca/fac/tact/fr/html/apport/app98_es.html). Accessed in January 13, 2006.
- Bransford, J., Darling-Hammond, L., LePage, P. (2005). Introduction. In (J. Bransford and L. Darling-Hammond (Eds.), *Preparing teachers for a changing world: What teachers should learn and be able to do* (pp. 1-39). San Francisco: Jossey-Bass).
- Britain, S. and O. Liber (2004). A Framework for Pedagogical Evaluation of Virtual Learning Environments, JISC e-learning pedagogies programme report. Available at: [http://www.jisc.ac.uk/uploaded\\_documents/VLE%20Full%20Report%2006.doc](http://www.jisc.ac.uk/uploaded_documents/VLE%20Full%20Report%2006.doc), Accessed in July, 22, 2007.
- Bryman, A. (1988). *Quantity and Quality in Social Research*. London: UNWIN HYMAN.
- Cassell, C. and Symon, G. (1994). *Qualitative Methods in Organisational Research: A Practical Guide*. London: Sage Publications.
- Chance, P. (1986). *Thinking in the classroom: A survey of programs*. New York: Teachers College, Columbia University.
- Chung, C., and Ngan, M. Y. (2002). From "Rooftop" to "Millennium": The development of primary schools in Hong Kong since 1945. *New Horizons in Education, Journal of Education, No. 46*. pp. 24-32. Hong Kong: Hong Kong Teachers' Association.
- Clark, C. M. and Peterson, P. L. (1986). Teachers' thought processes. In M. C. Wittrock (ed.) *Handbook of Research on Teaching*. 3rd edn. New York: Macmillan.
- Clark, J. (2001). Stimulating collaboration and discussion in online learning environments. *Internet and Higher Education*, 4 (2), 119-124.
- Coffey, A. and Atkinson, P. (1996). *Making Sense of Qualitative Data*. London: Sage.
- Coggins, C. C. (1988). Preferred learning styles and their impact on completion of external degree programs. *The American Journal of Distance Education*, 2(1), 25-37.
- Coleman, P. (1998). *Parent, student and teacher collaboration: the power of three*. California: Corwin Press Inc.

- Cox, M. J, Rhodes, V. and Hall, J. (1988). The use of Computer Assisted Learning in primary schools: some factors affecting the uptake. *Computers and Education*, Vol. 12(1). pp. 173-178.
- Cox, M.J, (1993). Information Technology Resourcing and Use in Watson, D.M. (Ed.) *Impact - An evaluation of the Impact of the Information Technology on Children's Achievements in Primary and Secondary Schools*. King's College, London.
- Cox, M.J., Preston, C., and Cox, K. (1999). What Motivates Teachers to use ICT?. Paper presented at the *British Educational Research Association Conference*. Brighton. September.
- Cox, M., Preston, C., and Cox, K. (1999b). What Factors Support or Prevent Teachers from Using ICT in their Classrooms? Paper presented at the *British Educational Research Association Annual Conference*, University of Sussex at Brighton, September 2-5 1999. <http://www.leeds.ac.uk/educol/documents/00001304.htm>, Accessed in June, 25, 2006.
- Creswell, J.W. (1998). *Qualitative Inquiry and Research Design: Choosing Among Five Traditions*. London: Sage Publication.
- Crook, C (1994) *Computers and the Collaborative Experience of Learning* Routledge, London
- Dalton, D. W. (1989). Computers in the schools: A diffusion/adoption perspective. *Educational Technology*, 29 (11), 20-27.
- Daley, B J, Watkins, K, Williams, SW, Courtney, B, Davis, M, and Dymock, D (2001). Exploring learning in a technology-enhanced environment. *Educational Technology & Society*, 4(3), 126-138>
- Davis, F.d, Bagozzi, R.P and Warshaw, P.R. (1989). User acceptance of computer technology: a comparison of two theoretical models. *Management Science*, Vol. 35(8). 982-1003.
- Davis, N. E., Taylor, C., Tearle, P. and Wright, B. (1992). Staff Development Strategies for Information Technology in Initial Teacher Education, *Developing Information Technology in Teacher Education*, 6, pp. 5–16.
- Desforges, C. (1995). British Journal of Teacher Education? BERJ? In (Cox M., Preston C., Cox K. (1999b). What Factors Support or Prevent Teachers from Using ICT in their Classrooms? Paper presented at the British Educational Research Association Annual Conference, University of Sussex at Brighton, September 2-5 1999. <http://www.leeds.ac.uk/educol/documents/00001304.htm> ) Accessed in June, 25, 2006.

- Despotakis, T. C., Palaigeorgiou, G. E., and Tsoukalas, I. A. (2007). Students' attitudes towards animated demonstrations as computer learning tools. *Educational Technology & Society*, 10 (1), 196-205.
- Dillenbourg, P. (1999). What do you mean by "Collaborative Learning"? In P. Dillenbourg (Ed.), *Collaborative learning: Cognitive and computational approaches*, (pp. 1 - 19). Amsterdam: Pergamon.
- Dominic J. Brewer, Catherine H. Augustine, Gail L. Zellman, Gery Ryan Charles A. Goldman, Cathleen Stasz, Louay Constant (2007). Education for a New Era: Design and Implementation of K-12 Education Reform in Qatar. *RAND-Qatar Policy Institute*. Available online at: [www.rand.org](http://www.rand.org)
- Dooley, K. (1999). Towards a Holistic Model for the Diffusion of Educational Technologies: An Integrative Review of Educational Innovation Studies *Educational Technology and Society*, 2(4)35-45.
- Drenoyianni, H. and Selwood, I. D. (1998). Conceptions or misconceptions? Primary teachers' perceptions and use of computers in the classroom, *Education and Information Technologies*, vol. 3, 87-99.
- Duchon, D. and Kaplan, B. (1988). Combining Qualitative and Quantitative Methods in Information Systems Research: A Case Study', *MIS Quarterly*, December 1988: 570 - 586.
- Dyrli, O. E. and Kinnaman, D. E. (1994). Integrating technology into your classroom curriculum. *Technology and Learning*, 14 (5), 38-42, 44.
- Earle, R. (2002). The integration of instructional technology into public education: Promises and challenges, *Educational Technology*, Jan-Feb, 5-13.
- Eaton, S. and Olson, J. (1986). Doing computers? The micro in the elementary curriculum. *Journal of Curriculum Studies*, 18(3), 342-4.
- Eisenhardt, K.M. (1989). Building Theories from Case Study Research, *Academy of Management Review*, 4(4): pp.532-550.
- Ely, M., Anzul, M., Friedman, T., Garner, D. and Steinmetz, A. (1991). *Doing Qualitative Research: Circles within Circles*. London: Falmer.
- Ennis, R. (1992). *Critical thinking: What is it?* Proceedings of the Forty-Eighth Annual Meeting of the Philosophy of Education Society Denver, Colorado, March 27-30. Retrieved February 1993, from [http://www.ed.uiuc.edu/PES/92\\_docs/Ennis.HTM](http://www.ed.uiuc.edu/PES/92_docs/Ennis.HTM). In (Huitt, W. (1998). Critical thinking: An overview. *Educational Psychology Interactive*. Valdosta, GA: Valdosta State University. Retrieved on 16/03/2007 from, <http://chiron.valdosta.edu/whuitt/col/cogsys/critthnk.html>. [Revision of paper presented at the Critical Thinking Conference sponsored by Gordon College, Barnesville, GA, March, 1993.] Available at:

<http://chiron.valdosta.edu/whuitt/col/cogsys/critthnk.html>, Accessed in May 13, 2007.

- Fabry, D., Higgs, J. (1997). Barriers to the effective use of technology in education. *Journal of Educational Computing, 17 (4)*, pp.385-395.
- Fahraeus, E. R. (2004). Distance Education Students Moving Towards Collaborative Learning - A Field Study of Australian Distance Education Students and Systems. *Educational Technology and Society, 7 (2)*, 129-140.
- Farnsworth, BJ., Shaha, SH., Bahr, DL., Lewis, VK., & Benson, LF. (2002). Preparing Tomorrow's Teachers to use Technology: learning and attitudinal impacts on elementary students. *Journal of Instructional Psychology, 29(3)*, 121(18).
- Fishman, B. and Davis, E. (2006). Teacher learning research and the learning sciences. In R. K. Sawyer (Ed.), *Cambridge Handbook of the Learning Sciences*, (pp. 535-550). Cambridge: Cambridge University Press.
- Fullan (1991). *The new meaning of Educational Change*. Cassell. London.
- Fullan, M. and Stiegelbauer, S. (1991). *The New Meaning of Educational Change*. 2nd edn. London: Cassell Educational Limited.
- Fullan, M.G. (1993). *Change forces probing the depths of educational reform*. London: The Falmer Press.
- Gaad, E. (1998). *Alison and Rasha, The experience of education of a child with Down's Syndrome in England and Egypt*, Unpublished PhD Thesis, University of East Anglia, Norwich, England.
- Gan, Y., and Zhu, Z. (2007). A Learning Framework for Knowledge Building and Collective Wisdom Advancement in Virtual Learning Communities. *Educational Technology & Society, 10 (1)*, 206-226.
- Garcia, Coll (2001). An instrument to help teachers assess learners' attitudes towards multimedia instruction. *Education, 122(1)*.94-101.
- Garrison, D. R., and Anderson, T. (2003). *E-Learning in the 21st Century*, London: Routledge Palmer.
- Gibbs, G.R. (2002). *Qualitative Data Analysis: Explorations with NVivo*. London: Open University Press.
- Gilbert, J., and Kelly, R. (2005). Frontiers and frontlines: metaphors describing lecturers' attitudes to ICT adoption. *Educational Technology and Society, 8 (3)*, 110-121.
- Glickman, C.D. (1992). The essence of school renewal: The prose has begun. *Educational Leadership, 50(1)*.

- Good, T. L. and Brophy, J. E. (2000). *Looking in classrooms* (8th ed.). New York, NY: Addison Wesley.
- Guba, E.G and Lincoln, Y.S (1994). *Competing Paradigms in Qualitative Research*, In (Denzin, Norman K. and Lincoln, Yvonna S. (1994). *Handbook of Qualitative Research* (2<sup>nd</sup> Edition). London: SAGE Publications).
- Guba, E.G. and Lincoln, Y.S (1989). *Fourth Generation Evaluation*. London: Sage Publications.
- Hall, Ian and Higgins, Steve (2005). "Primary school students' perceptions of interactive whiteboards", *Journal of Computer Assisted learning*, 21, pp102–117.
- Halsall, R. (1998). School improvement: an overview of key findings and messages. Halsall, R. (Ed). *Teacher research and school improvement: opening doors from the inside*. Buckingham: Open University press.
- Handzic, M. and Tolhurst, D. (2002). Evaluating an interactive learning environment in management education, *Educational Technology and Society*, 5(3)113-122.
- Harris, A. (2001). Contemporary perspectives on school effectiveness and school improvement. In (Harris, A. and Bennett, N. (Eds). *School effectiveness and improvement: alternative perspectives*. London: Continuum).
- Harrison, C, Comber, C, Fisher, T, Haw, K, Lewin, C, Lunzer, E, McFarlane, A, Mavers, D, Scrimshaw, P, Somekh, B and Watling, R (2002) *ImpaCT2: the impact of information and communication technologies on pupil learning and attainment: a report to the DfES*. London: DfES.
- Hartley J.F. (1994). *Case Studies in Organisational Research*, In (Cassell, Catherine and Symon, Gillian (1994) *Qualitative Methods in Organisational Research: A Practical Guide*. London: Sage Publications).
- Heeks, R. (2002) i-Development not e-Development: special issue on ICTs and development. *Journal of International Development*, 14, 1-11.
- Hepp, K. P., Hinostroza, S.E., Laval, M.E., Rehbein, L. F. (2004). *Technology in Schools: Education, ICT and the Knowledge Society*. [www.unesco.org](http://www.unesco.org), accessed in 30/03/2006.
- Hickey, M. (1990). Reading and social studies: The critical connection. *Social Education*, 54, 175-179.
- Hitchcock, G., and Hughes, D. (1995) *Research and the Teacher* (2<sup>nd</sup> Edition). London: Routledge.

- [HHPW2] *The personal Website of Her Highness Sheikha Mozah bint Nasser Al-Misnad*: <http://www.mozahbintnasser.com/output/page2.asp>, page 2, Accessed in the 15<sup>th</sup> of May 2005.
- [HHPW4] *The personal Website of Her Highness Sheikha Mozah bint Nasser Al-Misnad*: <http://www.mozahbintnasser.com/output/page4.asp>, page 4, Accessed in the 15<sup>th</sup> of May 2005.
- [HHPW10] *The personal Website of Her Highness Sheikha Mozah bint Nasser Al-Misnad*: <http://www.mozahbintnasser.com/output/page10.asp>, page 10, Accessed in the 15<sup>th</sup> of May 2005.
- Honey, M., Culp, K. M., Carrigg, F. (2000). Perspectives on technology and education research: Lessons from the past and present. *Educational Computing Research*, 23 (1), 5-14.
- Hong, K. S., Lai, K. W. and Holton, D. (2003). Students satisfaction and perceived learning with a web-based course, *Educational Technology & Society*, 6(1), 116-124.
- Howe, C. and Tolmie, A. (1999). *Learning with Computers, Analysing productive interaction*, Routledge, London.
- Huitt, W. (1998). Critical thinking: An overview. *Educational Psychology Interactive*. Valdosta, GA: Valdosta State University. Retrieved on 16/03/2007 from, <http://chiron.valdosta.edu/whuitt/col/cogsys/critthnk.html>. [Revision of paper presented at the Critical Thinking Conference sponsored by Gordon College, Barnesville, GA, March, 1993.] Available at: <http://chiron.valdosta.edu/whuitt/col/cogsys/critthnk.html>, Accessed in May 13, 2007.
- Hung, D. W., and Chen, D. T. (2001). Situated cognition, Vygotskian thought and learning from the communities of practice perspective: Implications for the design of web based e-learning, *Education Media International*, 38 (4), 281-28.
- Hung, D., Tan, S. C., Cheung, W. S., and Hu, C. (2004). Supporting Problem Solving with Case-Stories Learning Scenario and Video-based Collaborative Learning Technology. *Educational Technology and Society*, 7 (2), 120-128.
- Hung, Y.-W., and Hsu, Y.-S.. (2007). Examining Teachers' CBT Use in the Classroom: A Study in Secondary schools in Taiwan. *Educational Technology & Society*, 10 (3), 233-246.
- Hunter, B. (1993). NSF's networked testbeds inform innovation in science education. *T.H.E. Journal*, 21 (3), 96-99.
- Hwang, W.-Y., Chen, N.-S., Dung, J.-J., and Yang, Y.-L. (2007). Multiple Representation Skills and Creativity Effects on Mathematical Problem Solving

using a Multimedia Whiteboard System. *Educational Technology & Society*, 10 (2), 191-212.

Irani, Z., Ezingard, J.N., Grieve, R.J. and Race, P. (1999). A Case Study Strategy as Part of an Information Systems Research Methodology: a critique. *Int. J. of Computer Applications in Technology*, 12, Nos. 2/3/4/5, pp. 190-198.

[ISA04-05] Independent Schools Act, 2004-2005.

Irvine, Helen and Williams, Peter (2002). Internet use in schools: an investigation into the experiences, abilities and attitudes of teachers and pupils in junior schools, *Aslib Proceedings*, Vol. 54, No 5, pp. 317-325.

Jackson, A., Fletcher, B. C. and Messer, D. J. (1986). A survey of microcomputer use and provision in primary schools. *Journal of Computer Assisted Learning*, 2, 45-55.

Jackson, A., Fletcher, B. C. and Messer, D. J. (1988). Effects of experience on microcomputer use in primary schools: results of a second survey. *Journal of Computer Assisted Learning*, 4, 214-226.

Janicki, T (2003). Evaluation of a Computer-supported Learning System, *Decision Science Journal of Innovative Education*, Vol. 1(2) 203-223.

Jick, T.D. (1979). Mixing Qualitative Methods: Triangulation in Action. *Administrative Science Quarterly*, 24(4): pp.602-611.

John, P. and Sutherland, R. (2004). Teaching and Learning with ICT: new technology, new pedagogy? *Education, Communication and Information*, Vol. 4, (1) pp101-107.

Johnson, D. W., and Johnson, R. T. (1989). *Cooperation and competition: Theory and research*. Minneapolis, MN: Interaction.

Johnson, D. W., and Johnson, R. T. (1994). *Learning together and alone* (4th ed.). Englewood Cliffs, NJ: Prentice-Hall.

Johnson, R., Johnson, D. and Stanne, M. (1986). Comparison of computer-assisted, competitive, and individualistic learning. *American Educational Research Journal* 23(3): 382-92.

Jones, G. H., and Jones, B. H. (2005). A Comparison of Teacher and Student Attitudes Concerning Use and Effectiveness of Web-based Course Management Software. *Educational Technology and Society*, 8(2), 125-135.

Jung, I. (2005). ICT-Pedagogy Integration in Teacher Training: Application Cases Worldwide, *Educational Technology and Society*, 8 (2), 94-101.

Jung, I. (2005). ICT-Pedagogy Integration in Teacher Training: Application Cases Worldwide. *Educational Technology and Society*, 8 (2), 94-101.

- Kearney, M., and Treagust, D. F. (2001). Constructivism as a referent in the design and development of a computer program using interactive digital video to enhance learning in physics. *Australian Journal of Education Technology*, 17(1), 64–79.
- Kirkman, Colin (2000). A Model for the Effective Management of Information and Communications Technology Development in Schools Derived from Six Contrasting Case Studies, *Journal of Information Technology for Teacher Education*, Vol. 9, No. 1, p.37-52.
- Kirkman, Colin (2000). A Model for the Effective Management of Information and Communications Technology Development in Schools Derived from Six Contrasting Case Studies, *Journal of Information Technology for Teacher Education*, Vol. 9, No. 1, p. 37-52.
- Kirman, C. (2000). A Model for the Effective Management of Information and Communications Technology Development in Schools Derived from Six Contrasting Case Studies, *Journal of Information Technology for Teacher Education*, Vol. 9, (1), pp 37-52.
- Klein, H.K., and Myers, M.D. (1999). A set of principles for conducting and evaluating interpretive field studies in information systems. *MIS Quarterly*. 23(1): pp.67-93.
- Komis, V., Avouris, N., and Fidas, C. (2002). Computer-Supported Collaborative Concept Mapping: Study of Synchronous Peer Interaction. *Education and Information Technologies*, 7 (2), 169-188.
- Kumar, P., and Kumar, A. (2003). Effects of web-based projects on pre-service and inservice teachers' attitudes towards computers and their technology skills *Journal of Computing in Teacher Education*, 19, 87-92.
- Lawson AE, Abraham MR, Renner JW (1989). *A Theory of Instruction: using learning cycle to teach science concepts and thinking skills*. Cincinnati, OH, US: National Association for Research in Science Teaching.
- Lawson, T. and Comber, T. (1999). Superhighways Technology: personnel factors leading to successful integration of information and communications technology in schools and colleges, *Journal of Information Technology for Teacher Education*, Vol. 8 (1) pp 41-53.
- Lee, A.S. (1991). Integrating Positivist and Interpretive Approaches to Organizational Research. *Organization Science*. 2(4): pp.342-365.
- Lieberman, A (1990). *Schools As Collaborative Cultures: Creating the Future Now* London: The Falmer Press.
- Light, P. and Littleton, K., (1999). *Learning with Computers, Analysing productive interaction*, Routledge, London.

- Lim, Cher Ping (2007). Effective integration of ICT in Singapore schools: pedagogical and policy implications, *Education Tech Research Dev* (2007) 55:83–116.
- Lincoln, Y.S. and Guba, E.G. (1985). *Naturalistic Inquiry*. London: Sage publication.
- Lincoln, Y.S. and Guba, E.G. (2000). *Paradigmatic Controversies, Contradictions, and Emerging Confluences*, In (Denzin, Norman K. and Lincoln, Yvonna S (2000) *Handbook of Qualitative Research*, (2<sup>nd</sup> Edition), SAGE Publications).
- Lingard, B. (2001). Some lessons for educational researchers: repositioning research in education and education in research. *The Australian Educational Researcher*, 28(3), 1-46.
- Littlejohn, A. (2004). The Effectiveness of Resources, Tools and Support Services used by Practitioners in Designing and Delivering E-Learning Activities: Final Report. JISC available at: <http://www.elearning.ac.uk/resources/effectivefinal/view>, Accessed in December 5,2006.
- Liu, T. C. (2007). Teaching in a wireless learning environment: A case study. *Educational Technology & Society*, 10 (1), 107-123.
- Loveless, T. (1996). Why aren't computers used more in schools? *Educational Policy*, 10(4), 448-467.
- Loyd, B.H. and Gressard, C.P. (1985). *The computer Attitude Scale (Survey Instrument)*. Charlottesville, VA: University of Virginia, Curry School of Education.
- Marshall, C. and Rossman, G. (1999). *Design Qualitative Research* (3<sup>rd</sup> Edition). London: Sage Publications.
- Maxwell, T. W. and Thomas, A. R. (1991). School climate and school culture. *Journal of Educational Administration*, 29(2), 72-82.
- Mayer, R., and Goodchild, F. (1990). *The critical thinker*. New York: Wm. C. Brown.
- McCormick, R. (1991). Curriculum Development and New Information Technology, *Journal of Information Technology for Teacher Education*, 1, pp. 23–50.
- Merriam, S.B. (1988). *Case Study Research in Education: A Qualitative Approach*. San Francisco. CA: Jossey-Bass Publishers.
- Mertes, L. (1991). Thinking and writing. *Middle School Journal*, 22, 24-25.
- Miles, M.B. and Huberman, A.M. (1984). *Qualitative Data Analysis: A sourcebook of New Methods*. Newbury Park, CA: Sage.

- Miles, M.B. and Huberman, A.M. (1994). *Qualitative Data Analysis: An Expanded Sourcebook*. Thousand Oaks, Calif.: Sage.
- Miller, M. (2005). *Usability in E-Learning*. Available at: <http://www.learningcircuits.org/2005/jan2005/miller.htm> Accessed in 15/01/2007.
- Mistler-Jackson, M., & Songer, N. B. (2000). Student motivation and Internet technology: Are students empowered to learn science? *Journal of Research in Science Teaching*, 37(5), 459–479.
- Moldafsky, N, I., and Kwon, Ik-W. (1994). Attributes affecting computer-aided decision making – a literature survey. *Computers in Human Behavior*, 10 (3), 299-323.
- Monaghan, J. (1993). IT in mathematics initial teacher training – factors influencing school experience. *Journal of Computer Assisted Learning*, 9, 149–160.
- Mumtaz, S. (2000). Factors affecting teachers' use of information and communications technology: a review of the literature. *Journal of Information Technology for Teacher Education*, 9 (3), pp.319-341.
- Murphy, C. and Greenwood, L. (1998). Effective Integration of Information and Communications Technology in Teacher Education. *Journal of Information Technology for Teacher Education*, 7, 3, 413–429.
- Murphy, E. (2000). New Tools in an old Trade: Teachers talk about use of Internet in the teaching of French as a second or foreign language. *Canadian Modern Language Review*, 59(2), 215-235.
- Myers, M.D. (1997). Qualitative Research in Information Systems, *MIS Quarterly*. 21(2): pp.241-242.
- Myers, Nielson, Avison and Lau (1999). Action Research. *Communications of the ACM*. 4(1): pp.94-97.
- Myint, S. (2001). Attitudes toward computers among teacher education students in Brunei, *Darussalam issue of International Journal of Instructional Media*, Vol 28 (2).
- Nabil, A., Awerbuch, B., Slonim, J. Wegner, P. and Yesha, Y. (1997). Globalizing business, education, and culture through the Internet. *Communications of the ACM*, 40(2). (<http://www.acm.org/pubs/articles/journals/cacm/1997-40-2/p115-adam/p115-adam.pdf>)
- Neuman, W.L. (2000). *Social Research Methods: Qualitative and Quantitative Approaches*. Boston, Mass, Allyn and Bacon.
- Newmann, F.M. and Associates (1996). *Authentic achievement: Restructuring schools for intellectual quality*. San Francisco: Jossey-Bass.

- Newmann, F.M. and Wehlage, G.G. (1993). Five standards of authentic instruction. *Educational Leadership*, 50(7), 8-12.
- Nulden, U. (2001). e-ducation: research and practice. *Journal of Computer Assisted Learning* 17, 363-375.
- Oliver, K., and Hannafin, M. (2000). Student management of web-based hypermedia resources during open-ended problem solving. *The Journal of Educational Research*, 94(2), 75–92.
- Olson, J. (1988). *Schoolworlds=Microworlds: Computers and the Culture of the Classroom*. Oxford: Pergamon.
- Parr, J. M. (1999). Extending educational computing: A case of extensive teacher development and support. *Journal of Research on Computing in Education*, 31 (3), 280-291.
- Passey, D. and Samways, B. (1997). *Information Technology Supporting Change through Teacher Education*. IFIP . Chapman and Hall. London.
- Patton M. (1990). *Qualitative Evaluation and Research Methods*, (2<sup>nd</sup> Edit). SAGE Publications.
- Pelgrum, W. J. (2001). Obstacles to the integration of ICT in education: results from a worldwide educational assessment. *Computers and Education*, 37 pp.163-178.
- Perry, L. J. (1984). W.C.U. MicroNet: A state network for linking secondary science and math classrooms. *Journal of Computers in Mathematics and Science Teaching* (Summer): 16-18.
- Peters, M. and Lankshear, C. (1996). Critical literacy and digital texts, *Educational Theory*, 46, pp. 51–70. In John, P. and Sutherland, R. (2004) Teaching and Learning with ICT: new technology, new pedagogy? Education, *Communication and Information*, Vol. 4, (1) pp101-107.
- Pilkington, R., Bennett, C. and Vaughan, S. (2000). An Evaluation of Computer Mediated Communication to Support Group Discussion in Continuing Education, *Educational Technology and Society* 3 (3) 349-360.
- Roblyer, M. D., Edwards, J., and Havriluk, M. A. (2004). *Integrating educational technology into teaching* (4th Ed.), Upper Saddle River, NJ: Prentice Hall.
- Rogers, E.M. (1995). *Diffusion of innovations* (4<sup>th</sup> ed.). New York: Free Press.
- Rossett, A., Schafer, L. (2003). What to Do About E-Dropouts. *Training and Development*. 57(6): 40-47.

- Rupert Wegerif (2002). Report 2: Literature Review in Thinking Skills, Technology and Learning, School of Education, Open University, *FUTURELAB SERIES*.
- Ruthven, K. and Sara Hennesy, S.(2003). A teacher perspective on successful ICT use in secondary Mathematics teaching. *Micromath*, 19 (2), 20-24. available at: <http://www.educ.cam.ac.uk/research/projects/istl/WP031.pdf>, Accessed in February 12, 2007.
- Sadik, A. (2005). Factors influencing teachers' attitudes towards personal use and schools use of computers: New evidence from a developing nation. *Evaluation Review*, 2(1), 1-29.
- Salomon, G. (1991). Learning: New conceptions, new opportunities. *Educational Technology* 31(6): 41-44.
- Salomon, G. (1993). *No distribution without individuals' cognition*. In (G. Salomon (Ed.), *Distributed cognitions: Psychological and educational considerations* (pp. 111–138). New York: Cambridge University Press.)
- Salomon, G. (1994). Differences in patterns: Studying computer enhanced learning environments. In S. Vosniadou and E. DeCorte and H. Mandl (Eds.), *Technology-based learning environments* (pp. 79-88). Heidelberg: Springer-Verlag.
- Sawyer, R. K. (2006). *Explaining creativity: The science of human innovation*, Oxford, England: Oxford University Press.
- Sayer, J. and Jones, N. (1985). *Teacher Training and Special Educational Needs*, Kent: Croom Helm Ltd.
- Schein, E. H. (1996). Culture matters. *Demos Quarterly: The New Enterprise Culture*, 8 (337), 131-136.
- Schiller, John (2003). Working with ICT Perceptions of Australian principals, *Journal of Educational Administration*, Vol. 41 No. 2, pp. 171-185.
- Schlechter, T. (1990). The relative instructional efficiency of small group computer-based telecommunications for instruction. *Journal of Computer-Based Instruction* 6(3): 329-41.
- Schwandt, T. (1997) *Qualitative Inquiry: A Dictionary of Terms*. Newbury Park: Sage publication.
- [SECW] SEC website:  
[http://www.english.education.gov.qa/section/independent\\_schools/](http://www.english.education.gov.qa/section/independent_schools/), Accessed in the 13<sup>th</sup> of May 2005.
- See, J. (1994). Technology and outcome-based education: Connections in concept and practice. *The Computing Teacher*, 17 (3), 30-31.

- Selinger, M. (2001). Learning information and communications technology skills and the subject context of the learning, *Journal of Information Technology for Teacher Education*, 10, pp. 143–156.
- Shallcross, D.J (1981), *Teaching creative behaviour: how to teach creativity in children of all ages*, Prentice-Hall, Englewood Cliffs, NJ.
- Siegel, J. (1995). The state of teacher training. *Electronic Learning*, 14 (8), 43-45, 48-53.
- Silverman, D (1993) *Interpreting Qualitative Data: Methods for Analysing, Talk, Text and Interaction*. London: SAGE.
- Sime, Daniela and Priestleyw, Mark (2005). Student teachers' first reflections on information and communications technology and classroom learning: implications for initial teacher education, *Journal of Computer Assisted learning*, 21, pp130-142.
- Siraj-Blatchford, I., and Siraj-Blatchford, J. (2003), *More than computers: Information and communication technology in the early years*, London: The British Association for Early Childhood Education.
- Slavin, R. (1995). *Cooperative learning: Theory, research and practice* (2<sup>nd</sup> ed.). Needham Heights, MA: Allyn and Bacon.
- Slavin, R.E. (1983). *Cooperative learning*. New York, NY: Longman Publishing.
- Sliverman, D. (2000). *Doing Qualitative Research*. London: SAGE.
- Smeets, E. and Mooij, T. (2001). Pupil-centred learning, ICT, and teacher behaviour: observations in educational practice. *British Journal of Educational Technology*, 32(4), 403-417.
- Spiegel, J. (2001). The computer ate my grade book: Understanding teachers' attitudes towards technology. Retrieved on June 18, 2004, from <http://www.iona.edu/cs/gradpapers/2001spiegelPap.pdf>.
- Stake, R. (1994). *Case Studies*, in (Denzin, N. K. and Lincoln, Y. S. (1994) *Handbook of Qualitative Research*, eds. Sage Publications London, pp. 236-247).
- Stake, R. (1995) *The Art of Case Study Research*. , London: Sage publications.
- Steinberg, E. R. (1992). The potential of computer-based telecommunications for instruction. *Journal of Computer-Based Instruction* 19(2): 42-46.
- Sternberg, R. I. (2005). Producing tomorrow's leaders-in psychology and everything else. *PSI CHI National Honor Society in Psychology*, retrieved December 10, 2006, from, [http://www.psichi.org/pubs/articles/article\\_517.asp](http://www.psichi.org/pubs/articles/article_517.asp).

- Sternberg, R. J., Lubart, T. I., Kaufman, J. C., & Pretz, J. E. (2005). Creativity (Ch. 15). In (Holyoak, K. J., and Morrison, R. G. (Eds.), *The Cambridge handbook of thinking and reasoning*, New York: Cambridge University Press, 351-369).
- Storey, M.-A., Phillips, B., Maczewski, M., and Wang, M. (2002). Evaluating the usability of Web-based learning tools, *Educational Technology & Society* 5(3), p.91-100.
- Strauss, A. and Corbin, J. (1990). *Basics of Qualitative Research: Grounded Theory Procedures and Techniques*. London: Sage Publications Inc.
- Summers, J. A. (1991). Effect of interactivity upon student achievement, completion intervals, and affective perceptions. *Journal of Educational Technology Systems*. 19 (1): 53-57.
- Tama, C. (1989). Critical thinking has a place in every classroom. *Journal of Reading*, 33, 64-65.
- Taylor, D. R. (2000). Developing powerful learning communities using technology. *AACTE Briefs*, 21 (14), 4-5. Cited in Wang, Q., & Woo, H. L.. (2007). Systematic Planning for ICT Integration in Topic Learning. *Educational Technology & Society*, 10 (1), 148-156.
- Underwood, J. (1997). Breaking the cycle of ignorance: information technology and the professional development of teachers. In (Passey, D. and Samways, B. (1997). *Information Technology: supporting change through teacher education*. Chapman and Hall. pp 155 – 160).
- Walsham, G. (1995a). The Emergence of Interpretivism in IS Research. *Information Systems Research*. 6(4): pp.376-394.
- Walsham, G. (1995b). Interpretive case studies in IS research: Nature and method. *European Journal of Information Systems*. 4: pp.74-81.
- Walsham, G. (1996). The Emergence of Interpretivism in IS Research. *Information Systems Research*. 4: pp.376-394.
- Walsham, G. (1997). *Interpreting Information Systems in Organisations*. John Wiley and Sons, Chichester, UK.
- Walters, K. S. (1990). Critical thinking, rationality and the vulcanization of students. *Journal of Higher Education*, 61 (4), 448-467.
- Wang, Q., and Woo, H. L.. (2007). Systematic Planning for ICT Integration in Topic Learning. *Educational Technology & Society*, 10 (1), 148-156.
- Watson, D.M. (1993). *IMPACT - An evaluation of the IMPACT of the Information Technology on Children's Achievements in Primary and Secondary Schools*. King's College London.

- Wegerif, R. (2004). The role of educational software as a support for teaching and learning conversations, *Computers and Education*, 43 (1-2), 179-191.
- Wegerif, R. and Scrimshaw, P. (1997). In (Light and Littleton (1999). *Learning with Computers, Analysing productive interaction*, Routledge, London).
- Wickens, E. (1999), *Tourists' Voices: A Sociological Analysis of Tourists' Experiences in Chalkidiki, Northern Greece*, Unpublished Doctoral Thesis: Oxford Brookes University.
- Weiner, B (1990). The History of Motivational Research. *Journal of Educational Psychology*, Vol. 82. (4) 616-627.
- Weitzman, E.A. and Miles, M.B. (1995). *Computer Programmes for Qualitative Data Analysis*. Thousand Oaks, Calif.: Sage.
- Welle-Strand, A. (1991). Evaluation of the Norwegian Program of Action: the impact of computers in the classroom and how schools learn. *Computers and Education*, 16(1), 29-35.
- Wells, G., and Claxton, G. (Eds.) (2002). *Learning for life in the 21st century: Sociocultural perspectives on the future of education*, Oxford, UK: Blackwell Publishing.
- Wengraf, T. (2001). *Qualitative Research Interviewing*. London: Sage Publications.
- Wheeler, S., Waite, S.J., and Bromfield, C. (2002). Promoting creative thinking through the use of ICT. *Journal of Computer Assisted Learning*, 18(3).
- Whyte, M. M, Karolick, D. M., Nielsen, M. C., Elder, G. D., and Hawley, W. T. (1995). Cognitive styles and feedback in computer-assisted instruction. *Journal of Educational Computing Research*, 12(2), 195-203.
- Woodrow, J. (1990). Locus of Control and student teacher computer attitudes. *Computers Education*, Vol. 14. No. 4 pp 421-432.
- Yang, J.-C., Ko, H. W., and Chung, I. L. (2005). Web-based Interactive Writing Environment: Development and Evaluation. *Educational Technology & Society*, 8 (2), 214-229.
- Yildirim, S. (2000). Effects of an educational computing course on preservice and inservice teachers: a discussion and analysis of attitudes and use. *Journal of Research on Computing in Education*, 32(4), 479.
- Yin, R. (1984). *Case study research: Design and methods (1st ed.)*. London: Sage Publications.
- Yin, R. (1989). *Case study research: Design and methods*. (Rev. ed.). London: Sage Publications.

- Yin, R. (1993). *Applications of case study research*. London: Sage Publications.
- Yin, R. (1994). *Case study research: Design and methods* (2nd ed.). London: Sage Publications.
- Yin, R. (1998). *The Abridged Version of Case Study Research: Design and Method*, In (Bickman, Leonard and Rog, Debra J (1998). *Handbook of Applied Social Research Methods*, Sage publications, London).
- Zakaria, Zulkifli (2001), *Factors Related to Information Technology Implementation in the Malaysian Ministry of Education Polytechnics*, Unpublished PhD thesis, Blacksburg, Virginia.
- Zeinab Abu S. (2006). *An exploration of Jordanian English language teachers' attitudes, skills, and indicator of information and communication technology integration in Jordan*. Unpublished PhD thesis, the Florida State University, College of Education, 2006.
- Zhao, Y., Pugh, K., Sheldon, S. & Byers, J. (2002). Conditions for classroom technology innovations. *Teachers College Record*, 104(3), 482-515.

# **Appendix I: Interviews guide**

Guidance and Instructions:-

تعليمات وتوجيهات :-

- |                                                                                                                                |                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| 1. Give an overview of the study and its aim                                                                                   | ١- أعطى فكرة عامة عن الدراسة وهدفها                                                |
| 2. Ask for a permission to use the cassette recorder. Explain that a copy of the transcription will be sent to the interviewee | ٢- اطلب إذن بتسجيل المقابلة ، ووضح أن نسخة طبق الأصل ستُرسل للمشاركين في المقابلات |
| 3. Ask if further contact can be made afterwards for data saturation                                                           | ٣- أسأل عن إمكانية الاتصال لاحقاً للمزيد من المعلومات                              |
| 4. Explain the nature of confidentiality and the use of the quotes.                                                            | ٤- أشرح طبيعة وسرية استعمال المعلومات                                              |
| 5. Explain that the interviewee can refuse to answer any question                                                              | ٥- أشرح للمشاركين في المقابلات أن بإمكانهم ويحق لهم عدم الإجابة على أي سؤال        |
| 6. Explain that an opportunity will be available for comments off the record at the end                                        | ٦- وضح لهم أن هناك إمكانية للتعليق على موضوع المقابلة بعد الانتهاء من التسجيل      |
| 7. Take any questions regarding the nature of the interview                                                                    | ٧- خذ وسجل أي استفسارات تخص طبيعة المقابلة .                                       |

**Interviewee Demographics**

معلومات عن المشارك في المقابلة

- |                                          |                                       |
|------------------------------------------|---------------------------------------|
| <b>Title</b> .....                       | العنوان :                             |
| <b>Name</b> .....                        | الاسم :                               |
| <b>Age</b> .....                         | العمر :                               |
| <b>Education</b> .....                   | المؤهلات والتدريب :                   |
| <b>Position (or Subject taught).....</b> | الوظيفة أو المواد التي درست :         |
| <b>School</b> .....                      | المدرسة :                             |
| <b>Phone/E-mail</b> .....                | التليفون ، التلكس ، العنوان البريدي : |
| <b>Date of interview</b> .....           | تاريخ المقابلة :                      |
| <b>Venue</b> .....                       | مكان المقابلة :                       |
| <b>Duration (hours).....</b>             | فترة المقابلة :                       |

## Questions for Teachers

## اسئلة عامة على مستوى المدرسين

- How often do you use ICT within the context of:-
    - d) your lesson in classrooms
    - e) homework set
    - f) quiz/exams
  - What type of software/Hardware do you use in classrooms?
  - What are your perceived impressions of the impact ICT has had on pupil's learning process since its implementation, what have been the major changes in education?
  - What have been the successes for you with ICT as part of your subject?
  - How far do current ICTs tools impact on your ability to manage your classroom?
  - If ICT has struggled to be implemented into your school, then what were these reasons and why?
  - What are the limitations (if any) of ICT when trying to incorporate it into your subject in classroom?
  - Given the choice, what would you like to see in place to ensure that ICT needs of teachers in your school are met?
  - What types of learning enhanced by technology are most appropriate for the different age groups of children?
  - How can technology best be used to improve teacher personal productivity in the areas of student assessment, record keeping, and communications with colleagues, students and parents?
  - How do you evaluate the use of technologies available in your classrooms?
  - Do you receive adequate training or
- إلى أي مدى تستخدم تكنولوجيا المعلومات ضمن سياق
  - اعطاء دروسك داخل الصف
  - الواجبات المنزلية
  - الاختبارات والامتحانات
  - ما نوع البرامج التكنولوجية التي تستخدمها داخل الصف؟
  - مارأيك وإنطباعك في أثر التكنولوجيا على العملية التعليمية داخل الصف وبخاصة على التحصيل العلمي للطلاب وذلك منذ أن طبقت في مدرستك، ماهي التغييرات الأساسية التي أحدثتها على التعليم ؟
  - ماهي النجاحات التي تحققت لك بواسطة استخدام التكنولوجيا كجزء من المادة العلمية ؟
  - إلى أي مدى أثرت التكنولوجيا على مقدرتك في إدارة الفصل؟
  - إذا كان هناك تعثر لتطبيق التكنولوجيا في مدرستك، ما هي برأيك الأسباب التي أدت لهذا التعثر ولماذا؟
  - ما هي أوجه القصور (إن وجدت) في حالة محاولة دمج أو إدخال أو الاستعانة بالتكنولوجيا في تدريس مادتك داخل الصف؟
  - إذا خيرت، ماذا تريد أن ترى من تكنولوجيا بالمدرسة حتى تتأكد من أنها لبت احتياجات المعلمين؟
  - ماهي التكنولوجيا الأكثر ملاءمة للأطفال حسب أعمارهم المختلفة والتي حسنت من مهارات التعلم لديهم؟
  - كيف يمكن الاستفادة القصوى من التكنولوجيا في تطوير إنتاجية المدرسات فيما يخص تقييم أداء الطلاب، حفظ سجلاتهم، وكذلك تطوير مهارات الاتصال لديهن بزميلاتهن وبأولياء أمور الطلبة؟
  - كيف تقيم استخدامك للتكنولوجيا المتوفرة لك ؟
  - هل تلقيت تدريب كافي في مهارات استخدام التكنولوجيا المتوفرة في الصف الدراسي؟
  - هل تفضل إشراك التكنولوجيا في التدريس ؟
  - ماهي النجاحات التي حققتها بواسطة استخدام التكنولوجيا في الدراسة؟
  - ماهي المشاكل التي قابلتها باستخدام تكنولوجيا

support for being able to use technologies available in your classrooms?

المعلومات بشكل عام وبشكل خاص عند استخدام التكنولوجيا المتاحة في مدرستك أو في الصفوف الدراسية؟

- What sorts of successes you have achieved from using such technologies in your classrooms?
- In general, how often do you encounter barriers to ICTs use in your school, particularly in your classrooms ?

### The impact of using ICTs in ISs classrooms on students' attitude

### تأثير استخدام التكنولوجيا داخل صفوف المدارس المستقلة على سلوك الطلاب

- What is the impact of the used ICT technologies in ISs classrooms on students' attitude and behavior?
- Do students respond differently to or function differently in the new learning environments?
- What is the effect of the used ICT technologies on low achieving students?
- What is the effect of the used ICT technologies on high achieving students?
- Does creating a technologically rich learning environment handicap some learners?
- In what ways can technology serve as an extension of human capabilities and cognitive functioning?

- ما هو أثر استخدام التكنولوجيا في المدارس المستقلة على سلوك الطلاب؟
- هل هناك ردت فعل مختلفة للطلاب تجاه استخدام التكنولوجيا في بيئة التعلم المستحدثة؟
- ما أثر الفصول الغنية بتكنولوجيا التعليم على الطلاب ضعيفي المستوى ؟
- ما أثر الفصول الغنية بتكنولوجيا التعليم على الطلاب الموهوبين ؟
- هل إنشاء بيئة تعليمية غنية بالتكنولوجيا يعيق بعض التلاميذ ؟
- ماهي الطرق التي يمكن أن تخدم فيها التكنولوجيا كإمتداد لمقدرات البشر ومهاراتهم التعليمية؟

---

## The impact of using ICTs in ISs classrooms on students' learning skills

## تأثير استخدام التكنولوجيا على مهارات التعلم لدى الطلاب

- What specific learning skills are most likely to be acquired or enhanced by the use of ICTs in ISs classrooms?
  - What computer and related technology skills are most appropriate for the different age groups of children?
  - What effect does the use of technology have on the acquisition of content and subject matter knowledge?
  - Do the new learning environments result in greater learning depending on the subject matter?
  - Does the use of technology aid in the development or acquisition of the "basic skills" such as writing, and if so, how is this best achieved?
  - Do the new learning environments result in greater learning independent of student characteristics?
  - Do the cognitive tasks and skills differ by subject or content area?
  - How do these cognitive skills and tasks interact with subject matter knowledge?
  - How does the use of technology in the assessment situation affect the results?
- ماهي مهارات التعلم التي يمكن اكتسابها أو تطويرها بواسطة استخدام التكنولوجيا داخل صفوف المدارس المستقلة؟
  - ماهي المهارات والمهام الإدراكية الملائمة والمناسبة لكل مستوى عمري؟
  - ما أثر استعمال التكنولوجيا على اكتساب معرفة محتوى موضوع المادة؟
  - هل تختلف المهارات والمهام الإدراكية بواسطة الموضوع أو محتوى المجال؟
  - معتمداً على موضوع المادة هل تنتج عن بيئات التعلم الجديدة تعليم رفيع المستوى، في ضوء استخدام تكنولوجيا التعليم داخل الصف؟
  - هل ساعد وساهم استخدام التكنولوجيا في تطوير واكتساب المهارات الأساسية مثل الكتابة، إذا كان كذلك كيف يمكن إنجازه بطريقة أفضل؟
  - هل نتج عن بيئات التعلم الجديدة رفع لمستوى وخصائص الطلاب التعليمية؟
  - كيف تتفاعل المهارات و المهام الإدراكية بمعرفة مادة الموضوع في ضوء استخدام التكنولوجيا داخل الصف؟
  - ماهي الطريقة الأمثل للاستفادة من تكنولوجيا المعلومات في المساعدة على تقييم مستوى الطلاب وتحصيلهم العلمي؟

## Questions for Students

## اسئلة خاصة بالطالب والطالبات المشاركين في المقابلات

- How often do you use ICT within the context of:-
    - a) your lesson
    - b) homework set
    - c) quiz/exams
  - Do you prefer ICT being involved in your lessons?
  - What type of software do you use?
  - How do you rate the usability of the ICT available to you?
  - Do you receive adequate teaching of ICT skills for all subjects?
  - What have been the problems with using ICT?
- إلى أي مدى تستخدم تكنولوجيا المعلومات ضمن سياق
    - دروسك
    - واجباتك المنزلية
    - الاختبارات والامتحانات
  - هل تفضل إشراك التكنولوجيا في التدريس داخل الصف؟
  - ما نوع البرامج التي تستخدمها داخل صفك؟
  - كيف تقيم استخدامك للتكنولوجيا المتوفرة لك؟
  - هل تلقيت تدريب كافي في مهارات استخدام تكنولوجيا المعلومات ولكل المواد؟
  - ماهي المشاكل التي قابلتها باستخدام تكنولوجيا المعلومات داخل الصف؟

## Questions for Headmistresses

## اسئلة خاصة بمديرات المدارس

- What would you say are the most important issues to get right to successfully implement ICTs in ISS school life and which issues are best to avoid failure?
  - Do you believe ICTs do have a great effect on the learning process? (i.e. high versus low ICT use)
  - Do you have any proof or is it a general consensus amongst teachers that ICTs can be an effective tool for learning?
  - Is there dedicated management of ICTs resources? How successful has this been? What duties are they/you
- ماهي وجهة نظرك في القضايا المهمة التي تساعد في نجاح تطبيق التكنولوجيا في الحياة المدرسية، في المدارس المستقلة، وما هي القضايا الأفضل تفاديها حتى لا يحدث الفشل في تطبيق أو استخدام تلك التكنولوجيا؟
  - هل تعتقد أن للتكنولوجيا أثر كبير على عملية التعلم (على سبيل المثال مستوى عالي مقابل استعمال منخفض أو قليل للتكنولوجيا)؟
  - هل لديك أي دليل أو برهان أم أنها مجرد شعور عام بين المعلمين بأن التكنولوجيا هي أداة مؤثرة وفعالة في التعلم؟
  - هل لديكم فريق مفرغ لإدارة ودعم التكنولوجيا المستخدمة لديكم؟ ماهي المهام المنوطة بهم أو التي تتوقع منهم القيام بها؟

expected to carry out?

### Open Questions

### اسئلة عامة ومفتوحة

- Do you think that there is a relationship between the use of ICTs in ISs classrooms and the students' learning skills?
  - Do you think that there is a relationship between the use of ICTs in ISs classrooms and students' attitude inside classrooms?
  - Do you think that there is a relationship between students' attitude towards the use of ICTs and the acquired or enhanced learning skills due to the use of ICTs in ISs classrooms?
  - Is there anything else that you want to say or to add with regard to the use of ICTs in ISs classrooms?
- هل تعتقد ان هناك علاقة بين استخدام تكنولوجيا التعليم في صفوف المدارس المستقلة وبين مهارات التعلم والتحصيل العلمي للطلاب؟
  - هل تعتقد ان هناك علاقة بين استخدام تكنولوجيا التعليم في صفوف المدارس المستقلة وبين سلوك الطلاب داخل الصف؟
  - هل تعتقد ان هناك علاقة بين سلوك الطلاب داخل الصف ومهارات التعلم الممكن اكتسابها أو تطويرها نتيجة لاستخدام التكنولوجيا داخل صفوف المدارس المستقلة؟
  - هل هناك شيء آخر تريد التحدث عنه أو تظيفة فيما يخص استخدام التكنولوجيا داخل صفوف المدارس المستقلة؟

## Appendix II: Interviews notes' sample

## Interview guide

## دليل المقابلات

### Guidance and Instructions:-

### تعليمات وتوجيهات :-

1. Give an overview of the study and its aim
  2. Ask for a permission to use the cassette recorder. Explain that a copy of the transcription will be sent to the interviewee
  3. Ask if further contact can be made afterwards for data saturation
  4. Explain the nature of confidentiality and the use of the quotes.
  5. Explain that the interviewee can refuse to answer any question
  6. Explain that an opportunity will be available for comments off the record at the end
  7. Take any questions regarding the nature of the interview
- ١- أعطى فكرة عامة عن الدراسة وهدفها
  - ٢- أطلب إذن بتسجيل المقابلة ، ووضح أن نسخة طبق الأصل ستُرسل للمشاركين في المقابلات
  - ٣- أسأل عن إمكانية الاتصال لاحقاً للمزيد من المعلومات
  - ٤- أشرح طبيعة وسرية استعمال المعلومات
  - ٥- أشرح للمشاركين في المقابلات أن بإمكانهم ويحق لهم عدم الإجابة على أي سؤال
  - ٦- وضح لهم أن هناك إمكانية للتطبيق على موضوع المقابلة بعد الانتهاء من التسجيل
  - ٧- خذ وسجل أي استفسارات تخص طبيعة المقابلة .

### Interviewee Demographics

Title .....

Name .....

Age.....

Education.....

Position (or Subject taught).....

School .....

Phone/E-mail .....

Date of interview .....

Venue .....

Duration (hours).....

معلومات عن المشارك في المقابلة

العنوان:

الاسم:

العمر:

المؤهلات والتدريب:

الوظيفة أو المواد التي درست:

المدرسة:

التليفون ، التلكس، العنوان البريدي:

تاريخ المقابلة: ٢ / ٤ / ٢٠٠٥

مكان المقابلة:

فترة المقابلة: ساعة واحدة

## Questions for Teachers

## اسئلة عامة على مستوى المدرسين

• إلى أي مدى تستخدم تكنولوجيا المعلومات ضمن سياق

- اعطاء دروسك داخل الصف
- الواجبات المنزلية
- الاختبارات والامتحانات

أقوم باستخدام وسائل تكنولوجيا  
وذلك لخدمة جوهرية في  
خدمة على رفع الطلاب  
لديهم في التكنولوجيا على  
العصبات اطلاق العصفية

• ما نوع البرامج التكنولوجية التي تستخدمها داخل الصف؟

السيرة الإلكترونية  
الموسيقى / الفيديو  
المسرح / الإذاعة

• ما رأيك في أثر التكنولوجيا على العملية التعليمية داخل الصف وبخاصة على التحصيل العلمي للطلاب وذلك منذ أن طبقت في مدرستك، ماهي التغييرات الأساسية التي أحدثتها على التعليم؟

أثر التكنولوجيا على العملية التعليمية  
وأعلى الصف كبرجيت أنلي  
بسهولة الطالبات

أرى أن المدرسة تستخدم

التكنولوجيا بقوة

فهناك مشكلة

في التعامل التي تربط

بالوصول والتفاعل

مع الإنترنت

والتعامل المجتمعية

منها أو ديويو للرب

و... وعامل التكنولوجيا

• ماهي النجاحات التي تحققت لك بواسطة استخدام التكنولوجيا كجزء من المادة العلمية ؟

الإلحاح يا استخدام التكنولوجيا

وجعلت هناك تغيير

مع طريقة إعطاء الدروس

ووفرة على الكثير من المصادر

مع... كجهد في عملهم فيكون

إلى أي مدى أترك التكنولوجيا على مقدرك في إدارة الفصل؟

لديني كثير

هذه الأشياء التي كثير

مع الأشياء التي أشغل

التي يدور وأجلس في

أضرب السيد لم أوجه الطالبات  
فيل حرم... لا يمكنه...  
عندما كان هناك تعثر لتطبيق التكنولوجيا في مدرستك،  
ما هي برأيك الأسباب التي أدت لهذا التعثر  
ولماذا؟

في مدرستي تتغير

تغيرت الوسائل التكنولوجية

مثل السبورة الإلكترونية

وتغيرها مع الوسائل قانيا

أرى أنه قد سعى لتخدم

بالتكنولوجيا بوضوح

- ما هي اوجه القصور (ان وجدت) في حالة محاولة دمج أو إدخال أو الاستعانة التكنولوجية في تدريس مادتك داخل الصف؟

سأما كان عصر التكنولوجية

صحيحة في البداية

التكنولوجيا فيه كان

الأطفال تشتت تركيزهم

صحة المعلمين

التي بدأت لتأخر في قصور

في اطفال التكنولوجيا

تدريسيين ما وقي حيث أنه

والتي هلوا؟ بل ما اهلها به صر

مسا بل مريد

- إذا خيرت، ماذا تريد أن ترى من تكنولوجيا بالمدرسة حتى تتأكد من أنها لبت احتياجات المعلمين؟

التقديريين التكنولوجيين

- ماهي التكنولوجيا الأكثر ملاءمة للأطفال حسب أعمارهم المختلفة والتي حسنت من مهارات التعلم لديهم؟

الموسيقى والتدريس

السيور في الإلسترونية  
الحلقات بدمر

- كيف يمكن الاستفادة القصوى من التكنولوجيا في تطوير إنتاجية المدرسات فيما يخص تقييم أداء الطلاب، حفظ سجلاتهم، وكذلك تطوير مهارات الاتصال لديهن بزميلاتهن وبأولياء أمور الطلبة؟

حيث أشرنا لكم

التكنولوجيا يمكنها  
في رفع مستوى الطلاب

وتمكننا المدرسة من  
منهجها التعليمي

وتتميز بها

- إلى استقلالية وصحية  
من حيث تسهيل درجات  
الطلاب وتعمل مقارنة بين  
مستوياتهم فلا السه  
وكذلك من أجل الأثر  
• كيف تقييم استخدامك للتكنولوجيا المتوفرة لك ؟

جدياً هذا عبر  
نفسين

- هل تلقيت تدريب كافي في مهارات استخدام التكنولوجيا المتوفرة في الصف الدراسي؟

نعم. بالتأكيد بحسب خبرتي

المدرسة وتزودنا  
الإلتحاق بالمدرسة

- هل تفضل إشراك التكنولوجيا في التدريس ؟

نعم. أفضّل ذلك في

تكنولوجيا المعلومات

كأداة مثالية

في ثقافة الطالب

وتحقيقه الوبالين

حيث أن ~~تكنولوجيا~~

تطبيقات الإنترنت

نظرة مستقيمة

سلبية

الكمبيوتر ولولوقية

ليس بالسيء

أقامت ناصية تقنية المعلومات

مؤثرة تدير تغيير

### The impact of using ICTs in ISs classrooms on students' attitude

بعضها برمجيات الكمبيوتر

وكذلك يمكن هناك

مناقشة بين الطلاب

حيث أن كل طالب يريد

أنه يبين أنه يوصل إلى

معلومات سرطرية

- ماهي النجاحات التي حققتها بواسطة استخدام التكنولوجيا في الدراسة؟

تمت بعمل جيد

مناصرة للمدرسة

وعلاوة على المدارس

- ماهي المشاكل التي قابلتها باستخدام تكنولوجيا المعلومات بشكل عام وبشكل خاص عند استخدام التكنولوجيا المتاحة في مدرستك أو في الصفوف الدراسية؟

المشاكل التي قابلتها

عند استخدام

### تأثير استخدام التكنولوجيا داخل صفوف المدارس المستقلة على سلوك الطلاب

- ما هو أثر استخدام التكنولوجيا في المدارس المستقلة على سلوك الطلاب؟

يشجع الطلاب على العمل الجماعي

والعمل الجماعي كما يعرفونهم

من متأكد تبادل الخبرات

بشيء مثلاً بعضهن الصعوبات في

1. استخدام التكنولوجيا وضد

- هل هناك رنت فعل مختلفة للطلاب تجاه استخدام التكنولوجيا في بيئة التعلم المستحدثة؟

نعم هناك رنت فعل

فمنهم ما هو متحمس

حلا لا اعرفه ذلك

بل ان استخدمه

ويستدده تجاه استخدام التكنولوجيا

وهم لا ينجحون ويستمرون به

لا يؤيد استخدامهم ويتم المنهج

- ما أثر الفصول الغنية بتكنولوجيا التعليم على الطلاب ضعيفي المستوى؟

تعمق وصحة نظري على

أذا استخدم التكنولوجيا

صدا عمل كل مراعاة الفرد

الفردية

كل البعد بل على

استأهده على

فلا يتماقا

استخدام

التكنولوجيا يزيد

البيئة التعليمية غير

ويجيبها بالمراتب

العلمية

- ما أثر الفصول الغنية بتكنولوجيا التعليم على الطلاب الموهوبين؟

عمارة تنزيدي

الترقي بالمرتب العلمية

- هل إنشاء بيئة تعليمية غنية بالتكنولوجيا يعيق بعض التلاميذ؟

كذلك أيضاً  
المادة العلمية بشكل  
أفضل وأكثر ملائمة

• ماهي الطرق التي يمكن أن تخدم فيها التكنولوجيا  
كامتداد لمقدرات البشر ومهاراتهم التعليمية؟

تدريب المهارات التعليمية  
وتزويجها مع القدرات  
الاستراتيجية لترقيتها بالمهارات

التي تحسن فهمهم أكثر  
جاءة من طبيعة كل

The impact of using ICTs in ISs  
classrooms on students'  
learning skills

تأثير استخدام التكنولوجيا على مهارات  
التعلم لدى الطلاب

حلقة طالب ما قد يصحح  
ومشاركته في المناقشة  
وفي حل المتأخرين قد  
تفهمهم

• ماهي مهارات التعلم التي يمكن اكتسابها أو  
تطويرها بواسطة استخدام التكنولوجيا داخل  
صفوف المدارس المستقلة؟

الاعتمادية على النفس  
في الحصول على المزيد  
من المعلومات

بالموضوع أو المحتوى

المجالين فأما مهاريات

المقدمة لتسهيل فهم

المقدمة للفتنة غير

المقدمة كما لا بد من العلم

• ماهي المهارات والمهام الإدراكية الملائمة  
والمناسبة لكل مستوى عمري؟

بالسبب في الجدول

المرحلة الابتدائية، أكثر

ما يتناسبهم هو التحسين

حركي هي أفضل الطرق

في تعليم هذه المرحلة

• ما أثر استعمال التكنولوجيا على اكتساب معرفة  
محتوى موضوع المادة؟

يساعد في توصيل المحتوى

إلى أذهانهم الطلاب

وعسوة لهم بطريقة

سهلة وأسرع وكذلك

أكثر ترويحاً

• هل تختلف المهارات والمهام الإدراكية بواسطة  
الموضوع أو محتوى المجال؟

طبعاً تختلف المهارات

للمتدربة لها صلة

عوية

- معتمداً على موضوع المادة هل تنتج عن بيانات التعلم الجديدة تعليم رفيع المستوى، في ضوء استخدام تكنولوجيا التعليم داخل الصف؟

الطالب من ناحية  
 + لا يبدع في استخدام الإنترنت  
 خصوصاً في القلم  
 الذائبي ومجالات  
 الصور بديهيته  
 ومجمل الأبحاث القصيرة

تكتج رايها استروفا  
 الوسائل التكنولوجية  
 وخصوصاً على ما صالحو  
 ليست بسيطة

مجدل القدرة مع  
 التقويم البنائي ما عسكاره  
 مجي الأثر الجيد

- هل ساعد وساهم استخدام التكنولوجيا في تطوير واكتساب المهارات الأساسية مثل الكتابة، إذا كان كذلك كيف يمكن إنجازه بطريقة أفضل؟
- نعم وخصوصاً في تدريسنا

مع أهمية استخدام التكنولوجيا  
 في تدريس اللغة وكيفية  
 تدريسها.

- هل نتج عن بيانات التعلم الجديدة رفع لمستوى وخصائص الطلاب التعليمية؟

نعم فقد وكرنا كيف  
 ساعدت التكنولوجيا  
 في رفع مستوى

• كيف تتفاعل المهارات و المهام الإدراكية بمعرفة مادة الموضوع في ضوء استخدام التكنولوجيا داخل الصف؟

بإضافة ما  
عندما يعرض المدرس المعلمين الذين يغيرون  
في العملية التعليمية وليس في الأثر

• ما هي الطريقة الأمثل للاستفادة من تكنولوجيا المعلومات في المساعدة على تقييم مستوى الطلاب وتحصيلهم العلمي؟

الوسيلة  
التكنولوجية بطريقة متساوية  
بل يجب أن تكون متكاملة

استبانه الطلاب

و ما كان مهم إلا أنه

يركز في الممارسة وتدريبها

المتعلمين من حيث

التكنولوجيا التكنولوجية

والعملية التعليمية

تحت الربح بالعلمية

المعلم التعليمية

### Questions for Students

### اسئلة خاصة بالطلاب والطالبات المشاركين في المقابلات

- إلى أي مدى تستخدم تكنولوجيا المعلومات ضمن سياق  
 دروسك  
 واجباتك المنزلية  
 الاختبارات والامتحانات

ليس عدد استخدام

الابتزازية المبرجور

حج البيت أو حضر

إلى المعلمين في وقت العزيمة

و بعض البرهنتيات

يستخدم في دروسنا

أحياناً لتسهيل للبراهيات

عندهم بما يكون لدينا علم

دائماً في حضر

- هل تفضل إشراك التكنولوجيا في التدريس داخل الصف؟

نعم أنا أصغر المنحة

والتي عندما في بيئتنا

المدرسة الوسائل التكنولوجية

• ما نوع البرامج التي تستخدمها داخل صفك ؟

السيو، د. بيل، الكمبيوتر،  
الليبر، بيونست، الكمبيوتر

باستخدام التكنولوجيا

• كيف تقيم استخدامك للتكنولوجيا المتوفرة لك ؟

ممتازة

• هل تلقيت تدريب كافي في مهارات استخدام  
تكنولوجيا المعلومات ولكل المواد ؟

ليس تماما  
فيما يخص الميز

• ماهي المشاكل التي قايلتها باستخدام تكنولوجيا  
المعلومات داخل الصف ؟

التي لم يحرك  
انه قابلنا

- ماهي وجهة نظرك في القضايا المهمة التي تساعد في نجاح تطبيق التكنولوجيا في الحياة المدرسية، في المدارس المستقلة، وما هي القضايا الأفضل تفاديها حتى لا يحدث الفشل في تطبيق أو استخدام تلك التكنولوجيا؟

تجيب: استخدام التكنولوجيا

في المدارس قليلة

صحة الطلاب استفادتهم

الحاسبات الآخري

الاهلية مثل

والنماذج

وجودة مترجم

ومترجم فصحى

مساعدتهم في

التكنولوجيا في التعليم

مهم من أجل نجاح

تطبيق التكنولوجيا

في الحياة المدرسية بكل

الطرق وطرق التدريس

لا بد من استخدام بعض

الأدوات التي قد تكون مثل

الأسئلة

الأسئلة

- هل تعتقد أن للتكنولوجيا أثر كبير على عملية التعلم (على سبيل المثال مستوى عالي مقابل استعمال منخفض أو قليل للتكنولوجيا)؟

بالعقد وأهميه به

أكثر من أي وقت مضى هذا العصر

من أهم استخدام التكنولوجيا في

التعليم والتجارة ووسائل الترفيه

بشكل كبير

- هل لديك أي دليل أو برهان أم أنها مجرد شعور عام بين المعلمين بأن التكنولوجيا هي أداة مؤثرة وفعالة في التعلم؟

نعم، الدليل واضح في الطرق

التي تستخدم في التعليم

في الواقع الآن

منه استنبطت ان  
الاستنباط هو الاستدلال

منه استنبطت ان الاستدلال هو الاستدلال

- منه استنبطت ان الاستدلال هو الاستدلال

- منه استنبطت ان الاستدلال هو الاستدلال

### Open Questions

### الاستدلال عامة ومفترقة

منه استنبطت ان الاستدلال هو الاستدلال

- منه استنبطت ان الاستدلال هو الاستدلال

بينهم يعتمد على التكنولوجيا.

بشأن ذلك، يرجى الرد.

الاجتهاد من المحاسن  
الاعمال للعلم

- هل تعتقد ان هناك علاقة بين سلوك الطلاب داخل الصف ومهارات التعلم الممكن اكتسابها أو تطويرها نتيجة لأستخدام التكنولوجيا داخل صفوف المدارس المستقلة؟

نعم، نعم، تبين لنا أنه

أصبح الطلاب أكثر تفاعلًا

سريعًا وأسرع في فهم

لدرسه من قبل، ولو كان هناك المزيد من

- هل هناك شيء آخر تريد التحدث عنه أو تظيفة فيما يخص استخدام التكنولوجيا داخل صفوف المدارس المستقلة؟

نعم، أترجمها إلى

هناك مشكلة

تربط المدارس ببعض

العمل، ويهيئ صورة

## Appendix III: Observation sample

## Observation sample

Observation aim:

هدف الملاحظة: استخدام التكنولوجيا في عمليات

وتنظيم المدارس المستقلة (مدرسة: #####)

Observation Date/Time:

تاريخ ووقت الملاحظة: ١٩ / ٢ / ٢٠١٦

Observation venue:

مكان: ~~مدرسة مستقلة~~

Observation details/elements:

عناصر الملاحظة

إلى أي مدى تستخدم التكنولوجيا في:

- تنظيم الصفوف الدراسية
  - تقديم الدروس
  - جدول الحصص
  - دعم التغيير
  - استخدام الرسائل المختلفة
  - الكفاءة في كل مواقع المدرسة
  - تطبيق عملية روح الفريق
  - تفويض الصلاحيات والمسؤوليات
  - مستوى الترابط مع المجتمع الخارجي
  - هل هناك موارد كافية توفر الوصول بصورة أمثل للتكنولوجيا لكل الطلاب
  - هل الأهداف والنظم التي وضعت بواسطة المدارس المستقلة واقعية؟ هل توفر إرشادات كافية؟
  - مامدى حيوية المديرية ومدرسات المواد في معرفة دور ووظيفة التكنولوجيا
  - مامدى أهمية أن يعرف الطلاب دور ووظيفة التكنولوجيا في عملية التعليم
  - هل هناك إدارة مختصة بأمور تكنولوجيا المعلومات؟ وإلى أي مدى هي ناجحة؟ ماهي المسؤوليات التي يتوقع أن تتحملها؟
  - إذا لم يكن هناك دعم داخلي أو لا يستطيع الدعم الداخلي حل المشكلة ماهي سرعة إمكانية معالجة المشكلة بواسطة سودا
  - مواضع استخدام التكنولوجيا:
  - الدخول إلى الحاسبات في المختبرات
  - الدخول إلى الحاسبات في الفصول الدراسية
  - الدخول إلى الحاسبات والشبكة في الفصول الدراسية
  - التقنية منتهية وقديمة
  - البرامج غير كافية
  - الدخول إلى الحاسبات في مكاتب الموظفين
  - الدخول على الشبكة (www) من مكاتب الموظفين
  - توفر التليفون في الفصول الدراسية بهدف الإسراع في طلب المساعدة
  - توفر المساعدات الفنية (على سبيل المثال إصلاح الحاسبات والبرامج)
  - توفر الدعم التعليمي (على سبيل المثال دمج التكنولوجيا في التعلم)
  - المهارات الأساسية اللازمة لاستخدام تكنولوجيا المعلومات
  - أخرى
- المدرسة تستخدم البريد الإلكتروني في التواصل مع أولياء الأمور  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع المجتمع الخارجي  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الطلاب  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع المعلمين  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الإدارة  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الجهات الخارجية  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الجهات الحكومية  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الجهات الأكاديمية  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الجهات البحثية  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الجهات الإعلامية  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الجهات الثقافية  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الجهات الرياضية  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الجهات الفنية  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الجهات العلمية  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الجهات الاجتماعية  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الجهات السياسية  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الجهات الاقتصادية  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الجهات البيئية  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الجهات الصحية  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الجهات الأمنية  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الجهات القضائية  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الجهات التشريعية  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الجهات التنفيذية  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الجهات الرقابية  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الجهات الإعلامية  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الجهات الثقافية  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الجهات الرياضية  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الجهات الفنية  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الجهات العلمية  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الجهات الاجتماعية  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الجهات السياسية  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الجهات الاقتصادية  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الجهات البيئية  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الجهات الصحية  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الجهات الأمنية  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الجهات القضائية  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الجهات التشريعية  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الجهات التنفيذية  
 المدرسة تستخدم البريد الإلكتروني في التواصل مع الجهات الرقابية

# Appendix IV: Documentations samples

P.O. Box 35111, Doha, Qatar  
+974 4559361 tel  
+974 4659444 fax  
www.education.gov.qa.qa

ص.ب: ٣٥١١١، الدوحة، قطر  
+٩٧٤ ٤٥٥٩٣٦١ تليفون  
+٩٧٤ ٤٦٥٩٤٤٤ فاكس



**FOR IMMEDIATE RELEASE**  
**CONTACT:** Howaida Nadim

## **International and Qatari Experts Convene in Doha for Education Reform Dialogue**

**Doha, Qatar (March 15, 2005)** – International education experts joined with Qatari leaders today for a dialogue on education reform in Qatar and around the world. Entitled “Hiwar: Supreme Education Council Annual Symposium,” the event was conducted at the Ritz-Carlton, Doha, on the first anniversary of the launch of Qatar’s education reform effort.

“This unique event not only allowed us to mark the accomplishments of the SEC and its Institutes this past year but, given the participation of international experts, we were able to consider our progress in the context of what is happening elsewhere in the world,” said Dr. Sheikha Al-Misnad, member of the SEC Board. “Since our goal is to build a world-class school system in Qatar, we have to monitor trends in education around the globe so we can benefit from best practices and lessons learned by other nations.”

Qatari leaders started the discussion with a status report on the nationwide reform effort currently underway here. Sabah Al-Haidoos, Acting Director of the SEC Education Institute, provided a status report on the 12 innovative, child-focused Independent Schools established last September and plans to open 22 more this fall. She also discussed the teacher training programs that the Education Institute has developed to make sure that Independent School teachers are well-versed in the new curriculum standards and up to date on the latest teaching trends and methods.

Adel Al-Sayed, Director of the SEC Evaluation Institute, then presented an overview of the results of the spring 2004 assessment of all public and private Arabic school students, as well as the data gathered from the surveys distributed to students, parents, teachers, principals and school social workers (see separate press release on these results). These are tools developed by the Evaluation Institute and are respectively known as the Qatar Comprehensive Educational Assessment or QCEA, and the Qatar Comprehensive School Survey or QCSS.

Finally, Dr. Jehan Abdullah Al-Meer, Acting Director of the new SEC Higher Education Institute, gave an overview of the services to be offered by this Institute when it opens in the near future. The Institute is designed to provide counseling and

advice to students about colleges and careers, administer eight scholarship programs, and qualify and monitor universities and programs around the world to ensure that Qatari graduates are attending quality institutions.

Following their remarks, the speakers then engaged in a dialogue with the audience, providing attendees the opportunity to ask specific questions about Qatar's reform effort and the various elements of implementation.

International experts then took the stage for a more global discussion on education reform and student and school assessment around the world. The keynote address was delivered by Dr. Alejandro Tiana Ferrer, the Secretary General of Education for Spain and a renowned expert on student assessment. He was followed by a panel discussion with education experts from three continents:

- Dr. Barry McGaw, Director of Education, Organization for Economic Co-Operation and Development in Paris
- Dr. Tom Loveless, Director, Brown Center on Education Policy, Brookings Institution in Washington
- Dr. Hisham El-Sherif, Chairman and CEO, IT Investments in Cairo

Following their remarks, a second dialogue was conducted with the audience to allow participants to ask questions about education reform efforts elsewhere, the status of education on the world scale, and the value of student assessment as a quality assurance tool.

*The Supreme Education Council was established by Emiri decree in 2002. It serves as the primary authority on education policy in Qatar and, with its three Institutes, is leading the effort to transform the nation's schools into a modern, world-class education system. More information about Qatar's education reform effort, **Education for a New Era**, is available at [www.education.gov.qa](http://www.education.gov.qa).*

###

P.O. Box: 35111, Doha, Qatar  
+974 1659066 tel  
+974 1659111 fax  
www.education.gov.qa

ص ب: ٣٥١١١، الدوحة، قطر  
+٩٧٤ ٤٦٥٩٦٦٦ تليفون  
+٩٧٤ ٤٦٥٩٤٤٤ فاكس



المجلس الأعلى للتعليم  
SUPREME EDUCATION COUNCIL

### Heir Apparent Highlights “Education for a New Era” Education Reform Building World-Class School System in Qatar

FOR IMMEDIATE RELEASE

*Doha, Qatar (March 15, 2004)* – His Highness the Heir Apparent Tamim bin Hamed bin Khalifa Al-Thani announced today at a forum the forward progress of **Education for a New Era**, the education reform initiative dedicated to building a modern, world-class school system in Qatar.

Part of the larger social, economic and political reforms currently underway, education reform is particularly important to the future growth and development of Qatar.

“The children we teach today will teach *us* tomorrow. The children we lead today will lead *us* tomorrow. We have a duty to them – and to ourselves – to provide the best education possible,” said Dr. Sheikha Abdulah Al-Misnad, member of the Supreme Education Council (SEC).

The move toward comprehensive education reform first began in May 2001. After careful study, a November 2002 Emiri decree established the SEC to set education policy and oversee the reform effort. It also established the Evaluation and Education Institutes within the SEC and charged them with implementation.

Unprecedented in scope, **Education for a New Era** is based on four principles: Autonomy, Accountability, Variety and Choice. The goal is to create new learning opportunities for children that allow new schools – guided by performance standards and SEC oversight – to be innovative and independent. Parents can then select from a variety of schooling options, choosing the ones best suited to the needs of their children.

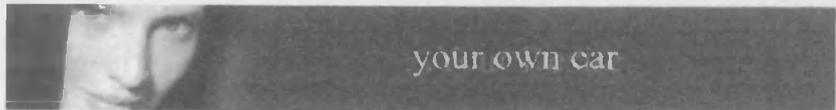
Preserving Qatari culture and values, reforms will be phased in over time in order to build local capacity. Implementation consists of two primary elements: (1) annual student assessments to monitor student and school progress and (2) modern, high quality Independent Schools funded by the government. The first assessment will take place in April-May 2004, followed by the opening of the first 15 Independent Schools in September 2004.

“**Education for a New Era** ensures that our children are learning and our schools are performing at the highest levels possible,” said Adel Al-Sayed, Director of the Evaluation Institute. “As our graduates go on to be leaders in business, government and academia, everyone will share in the success of education reform. It is therefore essential that all Qataris support and participate in the reform effort in this crucial implementation stage.”

For more information please contact: Howaida Nadim  
Communications Coordinator, SEC

عنه لم يرحب حسنة

١٤٢٤ هـ / ٢٠٠٤ م



- Qatar News
- World News
- Business News
- Sports News
- Entertainment
- Features
- Young Editors
- Commentary
- Editorial
- Photo Gallery
- Discussion Forum
- From Our Archives

#### Search

#### All Sections

Free Newsletter  
e-mail:

#### Contact Us

- Contact Details
- Advertising
- Newspaper Subscribe
- Letters To The Editor
- Site Feedback

## Education reform plan launched

Web posted at: 3/16/2004 6:54:57  
Source :: The Peninsula

DOHA: The Heir Apparent H H Sheikh Tamim bin Hamad Al Thani, who is also chairman of the Supreme Education Council, yesterday called upon all citizens in Qatar to support the education reform initiative being launched in the country with the objective of reforming the present school system to make it compatible with international standards.

While opening the forum titled "Education for a New Era" at the Ritz-Carlton Doha yesterday, that also marked the official launch of the reform initiative, Sheikh Tamim said: "The first seeds of education reform were planted a few years ago with the developed school programme. Then, since May 2001, after analysing the findings of the studies on our present school system, it was found that it suffers from centralization, limitation of reform mechanism and limited prospects for improvement. More importantly, the outputs of this system are inadequate for students and their families and do not meet the requirements of development in our country."

"After thorough evaluation and careful planning by all parties concerned with education, an Emiri decree was issued in November 2002, establishing the Supreme Education Council and the bodies affiliated to it, hence putting the reform effort into motion," he added.

The opening ceremony was attended by H H Sheikha Mouzah bint Nasser Al Missned, deputy chairperson of the Supreme Education Council, a host of dignitaries including ministers, the speaker of the advisory council, rectors of universities and education specialists.

Sheikh Tamim said the multitude of social, economic and political reforms that Qatar has embarked on recently could be realised only by the simultaneous upgrading of the educational system. "The reform that we seek, must be total and comprehensive involving all components of our educational system — students, human resources, curricula and buildings. Moreover, we want it to be continuous, and not to be subject to certain circumstances, and we want it to be qualitative, renewable and capable of adaptation with all variables and requirements," Sheikh Tamim said.

Highlighting the vision of the Emir H H Sheikh Hamad bin Khalifa Al Thani, in linking education and development, Sheikh Tamim said this linking "requires in the first place that the school must provide our children with the adequate skills that enable them to participate actively in the economic and social development. Skills such as critical thinking, communications, creativity, teamwork and problem-solving have become basic skills in modern education. Therefore, they should be considered as important as reading and writing."

Sheikh Tamim said the new reform initiative is based on four principles — autonomy, responsibility, variety and choice. Each of these represents a unique characteristic being introduced into the Qatar school system.

In the short run, the impact of the education reform plan will be deeper and more comprehensive, as teaching in the "independent schools" will



H H Sheikha Mouzah bint Nasser Al Missned, the Heir Apparent H H Sheikh Tamim bin Hamad Al Thani, and dignitaries at the opening of the education forum at the Ritz-Carlton Doha yesterday

#### Related Stories

- First Deputy PM in bid to salvage Arab summit
- Qatar calls for action to strengthen family values at Mexico meet
- Hospitality sector survey launched
- IGNOU topper honoured
- Ideal, Shantiniketan not to hike fees
- Proposed law aims at curbing under-hand deals
- Aviation panel takes up Kerala fare issue
- Arab Meeting for the Elderly opens
- Book release on April 2
- US firm hired to study problems facing private sector
- Qtel to warn GSM defaulter thrice before disconnection
- Kahramaa to introduce 'smart meters'
- New ICC managing committee takes over
- Doha to host global tourism meet in May
- Trauma care, emergency treatment meet from April 1

be according to international standards. "Our school graduates will be able to compete for admission in most prestigious universities and colleges, whether locally or abroad. In the long run, our citizens will achieve the highest standard of efficiency and motivation and will be equipped with the necessary skills and expertise for their success in their various jobs," he said.

The success of the reform plan requires the contribution of every individual and family in the Qatari society, he added.

"Today, I urge every one of you, citizens and leaders, to support this project which is the project of all of us, and commit ourselves, individuals and groups, to undertake this great task successfully. Once again I stress my deep conviction that through 'education for a new era' we will be able to establish an educational system that is not limited to learning only but will motivate our students to be innovative and creative to ensure a bright and prosperous future for our country, with God's will," Sheikh Tamim said.

---

[Qatar News](#) | [World Watch](#) | [Business News](#) | [Sports News](#) | [Entertainment](#) | [Features](#)  
[Young Editors](#) | [Commentary](#) | [Photo Gallery](#) | [Discussion Forum](#)

---

[Back to the Top](#)

© 2001 The Peninsula. All Rights Reserved.  
Contact Us for any content re-production.  
To advertise on the site, please get in touch with our **Ad. Manager**.

Site designed and developed by:  
**SiDSnetMinds**



April 19, 2004, 8:58 a.m.

## Model Reformer

Qatar has emerged as a leader of Arab reform.

By Steven Stalinsky

**D**iscussing the issue of reform in the Arab and Muslim world in his pre-press-conference speech last Wednesday night, President Bush stated, "A free Iraq will stand as an example to reformers across the Middle East. A free Iraq will show that America is on the side of Muslims who wish to live in peace, as we have already shown in Kuwait and Kosovo, Bosnia, and Afghanistan."

He explained that those working against reform are supporting "a fanatical, political ideology. The servants of this ideology seek tyranny in the Middle East and beyond. They seek to oppress and persecute women. They seek the death of Jews and Christians, and every Muslim who desires peace over theocratic terror...."

The tiny Gulf state of Qatar, best known for being the headquarters of al-Jazeera TV, has emerged as the most supportive Arab nation of American reform initiatives in the Middle East and opposing of the "fanatical" ideology President Bush alluded to in his speech.

As the Egyptian scholar Osama Al-Ghazali Harb wrote last week: "Reform on the regional level requires countries of a certain region to derive support, and receive inspiration from each other. In this respect, one 'model' country can play an important role in stimulating the region as a whole." The political and religious leadership in Qatar are, in fact, emerging as a progressive force in the Arab world that can serve as such a model. Qatar is setting the standard for other nations to follow with regard to democracy, reform in Islam, education, economics, and the rights of women.

In early 2004, Qatar announced it would host a series of conferences on the topic of reform in the Middle East. The first focused on educating Arabs about elections and the participation of women in politics. Another conference dealt with human rights in educational curricula. This was followed by another conference organized by the Qatari foreign ministry that focused on issues relating to development, strengthening economic growth, and fostering peace in the region.

Following up from a March 3 meeting of Arab foreign ministers in which Qatar defended American reform initiatives, Qatar's outspoken foreign minister, Hamad Bin Jassim Aal-Thani, explained two weeks later that Arab countries are not ready to carry out reform from within and would be better off following American reform initiatives. Speaking later at the Doha Cultural Festival, he added, "development will not be achieved...without enhancing democracy, human rights, equality and giving women their rights."

Aal-Thani referred to the Bush administration's democratization initiative for the Middle East, explaining, "We support reform, development, and promotion of human rights in the region." He added, "Each country [in the Arab world] can select its own model, but the basic principles of democracy, in our view, remain the freedom to choose, equality, prevalence of law, and respect for human rights."

Presenting the inaugural address at the Fourth Conference on Democracy and Free Trade in Doha on April 5, Aal-Thani said that the Arab world has been foolish to dismiss American reform initiatives. Countries in the region, he added, "can demonstrate that their efforts are not less than those countries like Malaysia, India, and Singapore, which suffered pains of the past but rose above them, and hence developed economically and politically."

He then went on to blast the Arab world for using the Palestinian issue as an excuse not to move forward. "Honesty obliges us to stress that the wrath in our region does not spring only from the Palestinian cause but goes deeper and is due to problems of our own creation that have nothing to do with the outside world

— problems we have allowed to grow unremedied and unchecked..."

Discussing the importance of bringing together those involved with reform, he explained, "We placed emphasis on opening the door for dialogue between all religions and civilizations, as well as on the role of education and the rights of women. The development of free trade and advanced technologies provide support for the development of democratic principles."

The Doha conference also brought together others supportive of reform, including former Pakistani information minister, Mushahad Hussein Sayed, who said: "Realization has dawned on the leadership of the region that its future lies in democracy.... Democracy can't be piecemeal or selective; it means respect for public opinion, the rule of law.... It also means protecting the human rights of all people, irrespective of age, sex, culture, or religion."

Another speaker, the Organization of the Islamic Conference Secretary General, Abdelouahed Belkaziz, said Islam is fully compatible with the concepts of democracy but that, in some countries, the law has diverged from the principles of faith.

He added, "Some reform is needed, and a lack of democracy also adversely affects economic performance. In order to attract 'economic actors' to the region, there must be justice, accountability, transparency, and the encouragement of investment."

— *Steven Stalinsky is executive director of the Middle East Media Research Institute.*

P.O. Box 35111, Doha, Qatar  
+974 4559361 tel  
+974 4659444 fax  
www.education.gov.qa

ص.ب. ٣٥١١١، الدوحة، قطر  
+٩٧٤ ٤٥٥٩٣٦١ تليفون  
+٩٧٤ ٤٦٥٩٤٤٤ فاكس



FOR IMMEDIATE RELEASE

CONTACT: Howaida Nadim  
Communications Coordinator

## SEC Signs Operators to Run New Independent Schools Education Institute to Monitor Compliance

Doha, Qatar (June 6, 2004) – The Supreme Education Council today signed agreements with the school operators who will be responsible for running the 12 new Independent Schools scheduled to open for the first time in September. The signing of the agreements marks another milestone in Qatar's sweeping K-12 (kindergarten through 12<sup>th</sup> grade) education reform effort called "Education for a New Era." The list of approved operators and the schools they will run for the 2004-05 academic year is attached.

The school operators were selected through a rigorous review and approval process conducted by the SEC's Education Institute over a period of several months. The Institute is responsible for supporting and monitoring the new Independent Schools. All applicants were required to form a legal corporation, submit comprehensive financial and educational plans, and undergo numerous evaluations. Of the 15 finalists, 12 operators were chosen and given 3-year agreements to run an Independent School. All those selected have a background in education or business and are committed to the goals of education reform. Many are current and former teachers and principals. In subsequent years, additional operators will be selected as more Independent Schools are established.

"I welcome and commend these operators as partners with the SEC in our effort to build an education system that engages and inspires our children," said Adel Al-Sayed, Director of the Education and Evaluation Institutes. "We have asked the people of Qatar to support education reform, and these individuals have stepped forward to commit their time, energy and expertise to this important cause. We will all benefit from their dedication."

Independent Schools are government-funded, public schools and are an essential part of the effort to establish a modern, world-class education system in Qatar. The goal of these schools is to better engage and motivate students by using innovation and creativity to make learning more exciting. Each Independent School is granted autonomy to determine its own mission and teaching methods and to hire its own teachers and staff, but will be subject to oversight by the Education Institute to ensure accountability and quality. The schools will have the freedom to design their own curriculums but must teach Arabic, English, mathematics and science at a level that meets international standards, as a means of ensuring that students are learning at a level comparable to their counterparts throughout the developed world. To ensure that Qatari culture and values are preserved, all 12 new schools will also teach religion and Islamic studies, in addition to other subjects. Tuition is free for Qataris and others eligible for public education.

- more -



Variety and choice are two key aspects of the education reform effort and will be phased in over time with regard to the new schools. As more Independent Schools are established in the coming years, the number of educational alternatives in Qatar will expand to ultimately provide parents with the opportunity to choose the schools that best meet the needs of their children.

More information about the Independent Schools, the new operators, and the education reform effort is available at [www.education.gov.qa](http://www.education.gov.qa).

*The Supreme Education Council (SEC) was established by Emiri decree in 2002 to serve as the leading authority on education policy in Qatar and to lead the effort to transform the nation's schools into a modern, world-class education system.*



## INDEPENDENT SCHOOL OPERATORS Academic Year 2004-05

The new Independent School operators approved by the Supreme Education Council for the 2004-05 academic year are as follows:

Sabah Al Haidous  
Al Bayan School  
(girls complex)

Fawzeyah Abdulla Al-Kuwari  
Jawaan bin Jassim School  
(boys primary)

Dr. Abdul Aziz Al-Horr  
Al Israa School  
(girls primary)

Awad Al-Zubaidy  
Khalid bin Ahmed School  
(boys preparatory)

Dr. Mohamad Al-Kilani and Saed Awani  
Al Khaleej School  
(boys primary)

Najla Al-Thawadi  
Khalifa School  
(girls primary)

Dr. Jabor Al-Noaimi and Afaf Al-Medadi  
Al Rafaa School  
(girls primary)

Sheikha Al-Mansoori  
Moza bint Mohammed School  
(girls primary)

Ibrahim Al-Eidan  
Al Yarmouk School  
(boys preparatory)

Tariq Al-Abdullah  
Omar bin Al-Kattab School  
(boys complex)

Ali Al-Boainin  
Ali bin Abdullah School  
(boys primary)

Dr. Mohamed Al-Anwari and  
Mohammed Al-Hashimi  
Secondary School of Industrial  
Technology  
(boys secondary)

P.O. Box 35111, Doha, Qatar  
+974 4559361 tel  
+974 4659444 fax

www.education.gov.qa

ص.ب: ٣٥١١١، الدوحة، قطر  
+٩٧٤ ٤٥٥٩٣٦١ تليفون  
+٩٧٤ ٤٦٥٩٤٤٤ فاكس



FOR IMMEDIATE RELEASE

CONTACT: Howaida Nadim  
Communications Coordinator, SEC

## Education Institute Director to Discuss Qatar Education Reform at International Conference

*Doha, Qatar (September 8, 2004)* – Adel Al-Sayed, Director of the Evaluation Institute, will present an overview of Qatar’s education reform effort – **Education for a New Era** – at the 47<sup>th</sup> session of the International Conference on Education in Geneva this week. The Evaluation Institute is one of three Institutes operating under the umbrella of the Supreme Education Council.

Mr. Al-Sayed will outline the K-12 education reform effort currently underway in Qatar, including the opening of the first group of new, innovative Independent Schools. These schools are designed to provide children with a world-class education by implementing new curriculum standards and allowing teachers to tailor their instruction to the individual needs of their students.

The Conference runs from September 8-11 and is an annual event organized by UNESCO’s International Bureau of Education. Since 1934, it has provided the opportunity for a worldwide dialogue between ministers of education and other partners in the education effort, including researchers, practitioners, and representatives of intergovernmental and non-governmental organizations. This year’s theme is “Quality education for all young people: Challenges, trends and priorities.” Mr. Al-Sayed is attending the conference as part of a delegation of senior education leaders from Qatar.

*The Supreme Education Council (SEC) was established by Emiri decree in 2002. It serves as the leading authority on education policy in Qatar and, with its three Institutes, is leading the effort to transform the nation’s schools into a modern, world-class education system. More information about Qatar’s education reform effort is available at [www.education.gov.qa](http://www.education.gov.qa).*

# The Peninsula

Qatar's Leading English Daily

## Arab education crying for reform, says expert

Web posted at: 6/10/2004 2:48:23

Source :: The Peninsula

DOHA: The most important aspect of education reform is to teach children how to think for themselves and to have confidence in their knowledge, Dr Farouk El Baz, a noted scientist, said at a guest lecture held at the Supreme Education Council (SEC) recently.

Dr Farouk was speaking to the students during the Teacher Preparation Certification Programme and to SEC staff during his first visit to Qatar since being named to the Rand-Qatar policy Institute board of overseers on June 7.

In his speech, Dr El Baz noted that education is critical to a nation's growth because it "develops young minds to be useful citizens." He stated that all the problems of the modern world can be traced to the failing of education.

A distinguished professor and scientist, Dr El Baz gave credit to his teachers for his many accomplishments in life. He said he was fortunate that his teachers were very good at communicating with their students and that they always made certain he clearly understood his lessons and could repeat the information back to them correctly.

More importantly, his teachers instilled in him a respect for himself and his mind, taught him to be loyal to his knowledge, and gave him the tools and desire to continue teaching himself throughout life.

Noting the tremendous impact that teachers have in the education of children, Dr El Baz said that teacher training and professional development programmes are critical to keep teachers current on new teaching methods and approaches to improve student learning.

Dr El Baz noted that the Arab world, in particular, is in great need of education reform, and that a large number of Arabs could flourish with a good education but that the current system does not allow it.

He expressed concern about the many missed opportunities that have resulted. According to Dr El Baz, this region has failed to play a role in the industrial, atomic and space ages, and is now being passed over by the technology age as well. When asked education reform could help stop the migration of Arab scientists the West, Dr El Baz said reform alone will not solve the problem.

A critical issue that must be addressed is the lack of funding in the Arab world for scientific research. Without changes in this area, Arab scientist will continue to leave the region in order to get support for their work.



Dr Farouk El Baz

## Deal for 12 'concept schools' in Qatar

Web posted at: 6/7/2004 10:9:16Source :: The Peninsula

DOHA: The Supreme Education Council (SEC) yesterday signed agreements with school operators who will be responsible for running the 12 new Independent Schools in Qatar, planned as part of the education reform process initiated by the Council. These new-concept schools are scheduled to open in September.

The ceremony held at the Council premises was attended by senior SEC officials, academics, the schools operators and a host of other dignitaries.

Independent Schools are government-funded public schools, being set up as a part of the ongoing reform efforts called "Education for a New Era" that aims at establishing a modern world-class education system in Qatar. The goal of these schools is to motivate students by using innovation and creativity and make the learning more exciting, said a press statement yesterday.

The school operators were selected through a rigorous review and approval process conducted by the SEC's Education Institute over a period of several months.

The Institute is responsible for supporting and monitoring the new Independent Schools.

All applicants were required to form a legal corporation, submit comprehensive financial and educational plans and undergo numerous evaluations.

Of the 15 finalists, 12 operators were chosen and given three year agreements to run an Independent School.

All those selected have a background in education or business and are committed to the goals of educational reform. Many are current or former teachers and principals. In subsequent years, additional operators will be selected as more Independent Schools are established.

"I welcome and commend these operators as partners with SEC in our effort to build an education system that engages and inspires our children," said Adel Al Sayed, Director of the Education and Evaluation Institutes, who supervised the signing ceremony. Ahmed Ibrahim Hassan, from the office of Independent Schools, in at the Education Institute briefed the gathering on the new school concept.

The operators and the 12 Independent Schools are: Sabah Al Haidoos (Al Bayan School-Girls Complex), Dr Abdul Aziz Al Horr (Al Israa School-Girls Primary), Dr Mohammed Al Kilani and Saed Awani (Al Khaleej School- Boys Primary), Dr Jabor Al Noaimi and Afaf Al Medadi (Al Rafaa School-Girls Primary), Ibrahim Al Eidan (Al Yarmouk School- Boys Preparatory), Ali Al Boainin (Ali bin Abdullah School-Boys Primary), Fawzeyah Abdulla Al Kuwari (Jawaan bin Jassim School-Boys Primary), Awad Al Zubaidy (Khalid bin Ahmed School-Boys Preparatory), Najla Al Thawadi (Khalifa School-Girls Primary), Sheikha Al Mansoori (Moza bint Mohammed School-Girls Primary), Tariq Al Abdullah (Omar bin Al Kattab School- Boys Complex), Dr Mohammed Al Anwari and Mohammed Al Hashimi (Secondary School of Industrial Technology- Boys Secondary).

Each Independent School is granted autonomy to determine its own mission and teaching methods and to hire its own teachers and staff, but will be subject to supervision by the Education Institute to ensure accountability and quality.

The schools will have the freedom to design their own curriculum but have to teach Arabic, English, Mathematics and Science at a level that meets international standards. To ensure that Qatari culture and values are preserved, all the 12 schools will also teach religion and Islamic studies in addition to other subjects, said the statement. "As more Independent Schools are established in the coming years, the number of educational alternatives in Qatar will expand to ultimately provide parents with the opportunity to choose the schools that best meets the needs of their children," the statement said.



The Independent School operators with Supreme Education Council officials at a ceremony

---

---

## Press Release

## بيان صحفي

P.O. Box: 35111, Doha, Qatar  
+974 4659666 tel  
+974 4659444 fax  
www.education.gov.qa

ص.ب: ٣٥١١١، الدوحة، قطر  
+٩٧٤ ٤٦٥٩٦٦٦ تليفون  
+٩٧٤ ٤٦٥٩٤٤٤ فاكس



هيئة التعليم

EDUCATION INSTITUTE

FOR IMMEDIATE RELEASE

CONTACT: Howaida Nadim

Communications Coordinator, SEC

### SEC Names Operators for 20 New Independent Schools

*Doha, Qatar (April 10, 2005)* – The Education Institute of the Supreme Education Council announced today the names of individuals selected to operate 20 new Independent Schools starting in academic year 2005-2006. This represents a major goal of the education reform effort known as **Education for a New Era**, bringing the number of Qatar's new Independent Schools to 32 in September.

The Education Institute began the recruitment effort for School Operators by holding an orientation session for interested parties in September 2004. This session provided participants with an overview of the reform effort, the role of the Independent School Operator, and the process for completing the application form. Over 200 applications were later received and carefully screened by educational experts at the Education and Evaluation Institutes. Based on this screening, the field was then narrowed to 60 applicants who were invited to participate in a three-week workshop to help them draft their school plans and academic, administrative and financial policies. Based on a final review and screening of applications, the Education Institute selected 20 applicants to become School Operators beginning this September.

“The evaluation process was very difficult given the high caliber of the candidates,” said Sabah Al-Haidoos, Acting Director of the Education Institute. “Because these Operators will be responsible for the education of our children, we took great care to establish quality guidelines for selecting the best applicants.”

The names of the 20 new Independent School schools and their Operators are attached.

*The Supreme Education Council was established by Emiri decree in 2002. It serves as the primary authority on education policy in Qatar and, with its three Institutes, is leading the effort to transform the nation's schools into a modern, world-class education system. More information about Qatar's education reform effort, **Education for a New Era**, is available at [www.education.gov.qa](http://www.education.gov.qa).*

###

## New Independent Schools to Open September 2005

### Model Schools:

1. Al-Khor Model School: Dr. Yousuf Moh'd Al-Hurr & Mrs. Zubaidah Abdullah Moh'd Ismail
2. Al-Qadeseya Model School: Dr. Ibrahim Saleh Al Noaimi, Mrs. Sarah Salem Moh'd Al Noaimi & Mrs. Asma Hamad Ali Al Badr

### Elementary Schools:

3. Al-Khor Girls Primary School: Dr. Hassan Issa Al-Fadalah & Mrs. Sheikha Ali Al-Fadalah
4. Safiya bint Abdul Muttaleb Girls Primary School: Dr. Khalifa Bin Nasser Al-Khalifa & Mrs. Arwa Misaad Moh'd Mosaad
5. Borooq Girls Primary School: Mr. Abdul Aziz Bin Moh'd Abdullah Al-Attyah & Mr. Khalid Moh'd Abdullah Al-Attyah.
6. Al-Markhiya Girls Primary School: Mr. Moh'd Saeed Al-Hajiri & Mrs. Samira Jawdat Al-Zuebi
7. Al-Wajba Girls Primary School: Dr. Hayat Abdullah Marafi & Dr. Ahmad Al Emadi
8. Khadeeja Girls Primary School: Mrs. Mariam Hassan Abdullah Al-Hajiri, Mr. Moh'd Khalifa Salem Al-Muftah & Mr. Khalifa Moh'd Al-Muftah.
9. Abu Bakr Al Sadeeq Boys Primary School: Mr. Ali Mohamad I. Al-Darbasti & Mr. Mohamad Ismail Al-Emadi
10. Al-Salam Girls Primary School: Dr. Amal Al-Mulla & Yousef Al-Abdullah

### Preparatory Schools:

11. Al-Duhail Girls Preparatory School: Eng. Moh'd Jassim Fakhroo & Mr. Muhana Yousuf Al-Sulaiti
12. Al-Wajba Girls Preparatory School: Mr. Rashid Ali Moh'd Al-Saadi & Mr. Yousef Ahmed Mohd Al-Emadi
13. Muaiter Girls Preparatory School: Mr. Moh'd Abdullah Al-Kuwari, Mr. Ahmed Abdullah Al-Kuwari & Mr. Wisam Moh'd Farouq Alsah.
14. Al-Wakra Girls Preparatory School: Mr. Majid Farhan Ibrahim, Mrs. Mona Abdullah Al-Attiyah & Mr. Al-Yas Nasif Abu Fadil.
15. Abdulrahman bin Jassim Boys Preparatory School: Mr. Adul Aziz Abdul Rahim Yousef Al-Sayed & Mr. Badr Abdul Raheem Yousef Al-Sayed.
16. Hamad bin Abdullah bin Jassim Boys Preparatory School: Mr. Rajih Shabeeb Al-Dosari & Mrs. Ghanima Saad Al-Dosari

### Secondary Schools:

17. Amna bint Wahab Girls Secondary School: Dr. Ahmed Moh'd Al-Marzouki & Dr. Zeyad Saeed Al-Any.
18. Al-Resala Girls Secondary School: Mr. Ahmed Moh'd Al-Darabasti, Mr. Ibrahim Moh'd Al-Darabasti and Mr. Hussein Al-Darabasti.
19. Al-Wakra Boys Secondary School: Mr. Ahmed Abdullah Al-Mustafawi & Mr. Bilal Saber
20. Doha Boys Secondary School: Mr. Ghaloom Abbas Moh'd Ali & Mrs. Kawthar Ali Ahmed Abdullah



### Supreme Education Council

The membership of the Council was drawn from Qatar's top leaders in government, business and academia. They are united in their commitment to building a modern, world-class education system for Qatari children.



Education reform will benefit everyone in Qatar.

We will all share in the success of education reform. Our children will grow up to become engaged citizens, innovative thinkers, and productive contributors to the economic life of our nation and the world.

This is education for a new era — starting now.

“ the best education for our children ”

“ the brightest future for our nation ”



**H.H. Sheikh Tamim bin Hamed bin Khalifa Al-Thani**  
Heir Apparent  
Chair, SEC

**H.H. Sheikha Mozah bint Nasser Al-Missnad**  
Consort of His Highness the Emir  
Vice Chair, SEC

**Sheikha Ahmed Al-Mahmoud**  
Minister of Education

**Mohammed Saleh Al-Sada, PhD**  
Director Technical, Qatar Petroleum

**Sheikh Abdulah bin Saud Al-Thani**  
Director, State Audit Bureau

**Mohammed Khaled Al-Mana**  
Chairman, Qatar Chamber of Commerce and Industry

**Sheikha Abdulah Al-Misnad, PhD**  
President, University of Qatar

**Bader Abdulah Al-Darwish**  
Chairman, The Modern Home

The Education Institute  
**Darwish Al-Emadi, PhD**  
Director

The Evaluation Institute  
**Adel Al-Sayed**  
Director

Supreme Education Council  
PO Box 35111  
Doha, QATAR  
Phone: +974-455-9555  
Fax: +974-465-9444, +974-467-4639

[www.education.gov.qa](http://www.education.gov.qa)

Education for  
a New Era





**E**ducation that engages the minds of our children ignites the growth of our nation.

Qatar has long reaped the benefits of its natural resources. But to sustain our nation's growth and prosperity in the global economy of the 21st Century, we must realize the full potential of our most vital resource: our children.

**“shaping the leaders of tomorrow”**

Every Qatar child deserves the best education possible. To ensure this, the State of Qatar has made education reform a national priority and has launched a plan for transforming its schools.

The goal of reform is an education system that:

- Makes classrooms exciting places to learn.
- Encourages all students to make the most of their talents.
- Holds schools measurably accountable to high performance standards.
- Involves and is responsive to parents.
- Graduates young men and women who are in demand with universities and businesses — at home and abroad.
- Nourishes our faith, values and national aspirations.

Unprecedented in its scope and ambition, education reform will not be quick or easy. But its rewards will be lasting and far-reaching — for our families and our nation.



Four principles guide education reform in Qatar: **Autonomy, Accountability, Variety, Choice.**

Reform will encourage innovation and improve student outcomes through school autonomy. New government-funded Independent Schools will be free to determine their own teaching philosophy and methods, provided they meet a new set of rigorous curriculum standards in Arabic, English, mathematics and science.

Reform will hold all schools accountable. A series of reliable, standardized tests will measure student and school progress on a regular basis. Test results will enable everyone to objectively evaluate school performance.

Reform will offer a variety of alternatives, but maintain consistent performance standards. Parents, educators, businesses and others interested in developing high-quality educational options can seek approval to operate an Independent School. It can have a particular focus, such as math and science, as long as it adheres to curriculum standards and submits to regular oversight.

Reform will give parents a choice and a voice. Over time, the Independent Schools will grow in number and offer families a wide range of alternatives. Parents will be able to choose schools based on the best match for their child's distinctive needs and talents. Reform will also encourage parental participation in important school decisions.

**“engaging parents to improve learning”**



Qatar is making reform a reality.

The State of Qatar has established four new organizations to oversee education reform, help it grow, and objectively monitor its progress.

The Supreme Education Council is the nation's leading authority on education policy and is responsible for setting broad and comprehensive goals for the school system.

**“pursuing excellence and innovation”**

The Education Institute directly oversees the Independent Schools and supports them in a variety of ways — from drafting curriculum standards to encouraging “best practices” through professional development programs for teachers.

The Evaluation Institute develops and conducts periodic, standardized assessments of student learning, monitors student progress, and evaluates school performance.

The Post-Secondary Education and Career Development Institute advises individuals about career options and opportunities for higher education in Qatar and abroad, and administers scholarships and grants for further study.



## Independent Schools

Independent Schools are government-funded primary, preparatory and secondary schools established by the Supreme Education Council and overseen by the Education Institute. They are designed to provide more innovative, child-focused education and to allow parents the opportunity to select the school that best fits their child's needs.

Each Independent School will develop its own education plan and teaching methods and will encourage parental participation and engagement. These schools will also recruit and hire their own staff.

To ensure accountability, Independent Schools will be continuously assessed by the Education and Evaluation Institutes using a variety of tools. This will include financial audits; surveys of principals, teachers, school social workers, parents and students; and mandatory annual student assessments aligned with new curriculum standards in four subjects – Arabic, English, mathematics and science. Data from these resources will help schools facilitate improvements and help parents make informed school choices.



## **Professional Development**

Teachers are at the core of education reform. The new Independent Schools will rely on classroom leaders who possess a deep understanding of subject matter, employ proven techniques in contemporary teaching, and can motivate students to perform to their highest potential. Each Independent School will have the freedom to hire its own staff.

To support Independent School teachers in their professional growth and development, the Education Institute offers a variety of teacher training programs. Topics being addressed include "best practices" for teaching the new curriculum standards, preparing students for annual assessments, and the special needs of new teachers. There are also programs designed to enhance the skills and knowledge of experienced teachers, who may then be invited to develop coursework, lead training, mentor new teachers, and become master teachers.



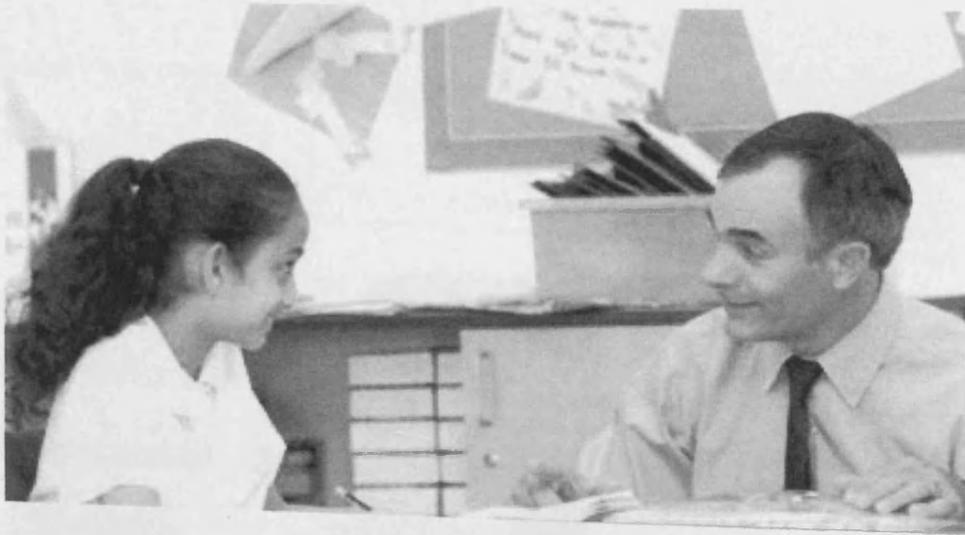
## Curriculum Standards

Curriculum standards are the academic goals and expectations for each grade level – what students should know, understand and be able to do.

The Education Institute has developed curriculum standards in four subjects: Arabic, English, mathematics and science. These standards are based on international benchmarks, which means they have been aligned with the curricular expectations of countries that achieve consistently high performance rankings on international tests.

Provided they adhere to curriculum standards, Independent Schools will have considerable latitude in determining how they teach and can use any materials and learning resources. They also can determine the order and grouping of content and the length and number of lessons. The Education Institute will offer Independent Schools support and guidance on all these issues.

Each student's mastery of the knowledge, concepts and skills established in the curriculum standards will be evaluated through mandatory annual assessments. Because the standards are tied to international benchmarks, students who perform well on these tests should also score well on qualifying examinations for admission to top ranking universities around the world.



### **Student Assessment**

The best way to ensure that students are learning is through periodic assessment. Beginning in spring 2004, students enrolled in all public and private Arabic schools will take an annual series of standardized tests called the Qatar Comprehensive Educational Assessment. These tests will assess and monitor the learning of students in grades 1 through 12 in Arabic, English, mathematics and science.

The Assessment is unique and differs in significant ways from the national exit exam and other tests currently administered in Qatar. It will use a multiple choice format and, for some grades, an additional essay format. Other formats may be developed for future tests. Student test scores will be reviewed individually and collectively, and are essential to the Evaluation Institute's ability to measure student progress and school performance. The Assessment will not be used to determine promotion or graduation.

In addition to providing vital feedback to schools and teachers to improve student learning, annual assessments will help parents make educated and thoughtful decisions about the education of their children.



## Data Collection & Management

Data collection and dissemination are crucial components of successful education reform. Data can be used to track the progress of individual children, aid parents in making appropriate school choices, identify weaknesses and strengths of schools, improve programs and teaching methods, and evaluate school quality and the overall educational system.

The Evaluation Institute is responsible for data collection and will be using various tools for information gathering, including surveys of students, parents, principals, teachers and school social workers. The Institute also will conduct and score the Qatar Comprehensive Educational Assessment, which is a series of standardized tests given annually to students in grades 1-12 in all public and private Arabic schools.

The Qatar National Education Database System will serve as the "data warehouse" for storing, analyzing and disseminating the data collected from the tests and surveys. To ensure confidentiality, the Institute's Data Collection and Management Office is building a secure production center with facilities for printing and document storage. They also are designing and building a Web portal which eventually will provide all Qataris with a comprehensive picture of student and school performance.



## School Evaluation

The school evaluation process is intended to ensure that schools are accountable for providing quality education and to assist them in their development and improvement.

The Evaluation Institute's School Evaluation Office has responsibility for designing, implementing and overseeing processes for evaluating all public and private Arabic schools in Qatar. Data will be obtained from many sources including students, parents, teachers, principals, school social workers and school reports, as well as information independently obtained by Evaluation Institute staff during school visits. This data will be used to analyze, evaluate and report on the overall performance of schools, individually and collectively.

On an annual basis, the Evaluation Institute will publish a school report card with comprehensive information about each school's performance and characteristics. It will also include the collective tests scores of the students at each school. This information will allow for the review and comparison of each school's accomplishments and the collective performance of its students, as an indication of the quality of teaching and the level of learning at each institution. Eventually, these report cards will be available to the public through a Web portal.

السائل ثم يتقلص مرة أخرى في شكل حلز  
الفراشة طعامها. وتفضل الفراش رحيق ا  
بعض الفراش على السوائل الموجودة في ا  
الأشجار وهي تفضل تناول طعامها في ضوء  
الهواء الطلق.

المتبع للأمر يعتقد أنه لا توجد حياة بهذا الكيس نسبة لعدم  
وجود حركة ولكن على عكس ذلك فإن عملية التغيير من  
مرحلة الحشرة إلى مرحلة الفراشة تتم في هذا الطور، وعلى  
ذلك الكيس. والفراشة لا تأكل، وبدلاً عن ذلك تعتمد في  
الحصول على الغذاء المتوفر من المرحلة اليرقية.

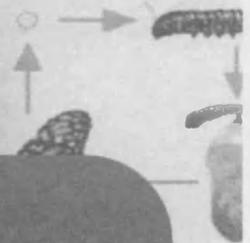


فراشة هي مرحلة من المراحل الحياتية ال  
التي تنتمي إلى مجموعة ذوات الأجنحة  
الأجنحة هذا النوع من الفراش عدد هائل م  
المصطفة في أشكال جميلة والأوان ناصعة. و  
جماله من أشكال هذه الحراشف. وككافة  
سنة أرجل ويتقسم جسمها إلى ثلاثة أجزاء  
والهظن ولديها قرني استشعار و هيكل ع  
حياة الفراشة على المراحل الحياتية من ال  
وتتم الفراشة بمرحلتها التسعة.

وتتم  
ب  
الشتا  
من المراحل الحياتية التي تمر بها الحشرات  
مجموعة ذوات الأجنحة التي  
من الفراش عدد هائل من الحراشف  
جميلة والأوان ناصعة. وقد اكتسب الفراش  
هذه الحراشف. وككافة الحشرات، للفراش  
جسمها إلى ثلاثة أجزاء هي الرأس والصدر  
يا استشعار و هيكل عظمي.  
دورة حياة الفراشة  
تتكون من عدة مراحل تبدأ بالبيضة  
التي تضعها الأنثى في مكان مناسب  
لحضانة البيض. وبعد فترة من الزمن  
تخرج اليرقة من البيض وتبدأ في الأكل  
وتنمو. وبعد فترة من الزمن تتحول اليرقة  
إلى كوكبة (أو كوكبة) وهي مرحلة  
التحضير للحياة الجديدة. وبعد فترة  
من الزمن تخرج الفراشة من الكوكبة  
وتبدأ في الطيران.

من المراحل الحياتية التي تمر بها الحشرات  
مجموعة ذوات الأجنحة التي  
من الفراش عدد هائل من الحراشف  
جميلة والأوان ناصعة. وقد اكتسب الفراش  
هذه الحراشف. وككافة الحشرات، للفراش  
جسمها إلى ثلاثة أجزاء هي الرأس والصدر  
يا استشعار و هيكل عظمي.

دورة حياة الفراشة



## Education for a New Era A Brief Outline on Reform Policy

Change is everywhere in Qatar. From sparkling new buildings that seem to appear overnight to thousands of first-time visitors from all over the world, the country is alive with innovation and fresh ideas. The world is watching Qatar's unprecedented political, social, and economic reform. Everybody is benefiting, but the smallest citizens are poised to gain the most from reform. Children are a country's most vital resource; the future leaders who will continue Qatar's transformation throughout the 21st century.

الفراشة  
الفراشة  
غير في  
ة بأربعة  
الأولى  
لوان ور  
وتبيض  
نجات الت  
ة الفراشة  
جل غي  
ت لكي  
جي الغلي  
طرح ح  
لرح قبل

In 2001, the State of Qatar declared education reform a national priority and launched a comprehensive education reform initiative.

It sought sustainable, Qatari-driven change that models and instills the highest civic ideals of cooperation, reciprocal respect, and popular participation.

The government envisioned an education system that:

- Makes classrooms exciting places to learn
- Encourages all students to make the most of their talents
- Holds schools measurably accountable to high performance standards
- Involves and is responsible to parents
- Graduates young men and women who are in demand with universities and businesses – at home and abroad
- Nourishes faith, values, and national aspirations

The centerpiece of the reform would be new government-funded Independent Schools. These schools, run by operators under contract to the Supreme Education Council, would determine their own teaching philosophy and methods – and hire their own staff, as long as the schools meet rigorous curriculum standards in Arabic, English, mathematics, and science. The government is determined to offer a variety of school alternatives, but to maintain consistent performance standards. In the future, parents would have the freedom to choose the schools that best suit the needs of their child.

The dream is already reality. In September, 2004, Qatar opened the first of 12 Independent Schools. Today children are learning at more

than 30 such schools throughout Qatar. In these classrooms, students don't merely memorize information and listen to teachers read aloud from textbooks. Through hands-on-learning, debate and lively discussion, they are learning to be creative and critical thinkers.

Classrooms and hallways are full of energy, purpose, and the joy of learning. Parents know they are partners in their children's education. And teachers and administrators are collaborating in new ways—from choosing textbooks to making joint budgeting decisions. The State of Qatar has established four new organizations to oversee education reform, help it grow, and objectively monitor its progress—

The Supreme Education Council is Qatar's leading authority on education policy and is responsible for setting broad and comprehensive goals for the school system.

The Education Institute directly oversees the Independent Schools and supports them in a variety of ways — from drafting curriculum standards to encouraging “best practices” through professional development programs for teachers.

The Evaluation Institute develops and conducts periodic, standardized assessments of student learning, monitors student progress, and evaluates school performance.

The Higher Education Institute advises individuals about career options and opportunities for higher education in Qatar and abroad, and administers scholarships and grants for further study.

In addition to Independent Schools, the cornerstone of reform, other key elements of K-12 education reform include:

### Curriculum Standards

Curriculum standards are the academic goals and expectations for each grade level – what students should know and understand.

The Education Institute has developed curriculum standards in four subjects: Arabic, English, mathematics and science. These standards are internationally benchmarked, based on academic expectations of countries where students achieve at high levels.

For example, first graders studying science should be able to collect and classify simple sets of data; they might be asked to group, identify, and label pictures of native animals and plants.

Provided they adhere to curriculum standards, Independent School administrators have considerable latitude in determining how teachers help their students learn, with the freedom of using any materials and learning resources.

Each student's mastery of the knowledge, concepts and skills established in the curriculum standards will be evaluated through mandatory annual assessments. In fact, in the spring of 2004, 80,000 Qatari students participated in the first-ever assessment – four different tests in Arabic, English, mathematics, and science. Assessments are not intended for determining promotion or graduation. Rather, the assessment provides educators, parents, and the government with a clear picture of educational progress.

**Parental involvement is crucial to education reform**

### **Student Assessment**

Periodic assessments are the best way to ensure that students are learning. Starting in Spring 2004, all students enrolled in all public and private Arabic schools took an annual series of standardized tests, the Qatar Comprehensive Educational Assessment. These tests assess and monitor the learning of students in grades 1 through 12 in Arabic, English, mathematics and science. The unique Assessment differs from the high school seniors' national exit exam and other tests currently administered in Qatar. It uses a multiple choice format and, for some grades, an additional essay format. Other formats may be developed for future tests. Student test scores are essential to the Evaluation Institute's ability to measure student progress and school performance. The Assessment will not be used to determine promotion or graduation. In addition to providing vital feedback to schools and teachers to improve student learning, annual assessments will help parents make informed and thoughtful decisions about the education of their children.

### **School Evaluation**

The Evaluation Institute is also responsible for another massive project: ensuring that schools are accountable for providing quality education. This involves a program of surveys seeking the views on Qatari education of principals, teachers, social workers, parents and students.

The Evaluation Institute's School Evaluation Office has responsibility for designing, implementing and overseeing processes for evaluating all public and private Arabic schools in Qatar. Data is obtained from many sources including students, parents, teachers, principals, school social

workers and school reports, as well as information independently obtained by Evaluation Institute staff during school visits. This data is analyzed and evaluated as part of a report on the overall performance of schools, individually and collectively.

On an annual basis, the Evaluation Institute will publish a school report card with comprehensive information about each school's performance and characteristics, as well as collective tests scores of the students at each school. This information will allow review and comparison of each school's accomplishments and student performance, as an indication of the quality of teaching and the level of learning at each institution. These report cards will be available to the public online.

### **Professional Development**

Teachers are at the core of education reform. The new Independent Schools will rely on classroom leaders who possess a deep understanding of subject matter, employ proven techniques in contemporary teaching, and can motivate students to perform to their highest potential. Each Independent School will have the freedom to hire its own staff.

To support Independent School teachers in their professional growth and development, the Education Institute offers a variety of teacher training programs. Topics being addressed include "best practices" for teaching the new curriculum standards, preparing students for annual assessments, and the special needs of new teachers. There are also programs designed to enhance the skills and knowledge of experienced teachers, who may then be invited to develop coursework, lead training, mentor new teachers, and become master teachers.

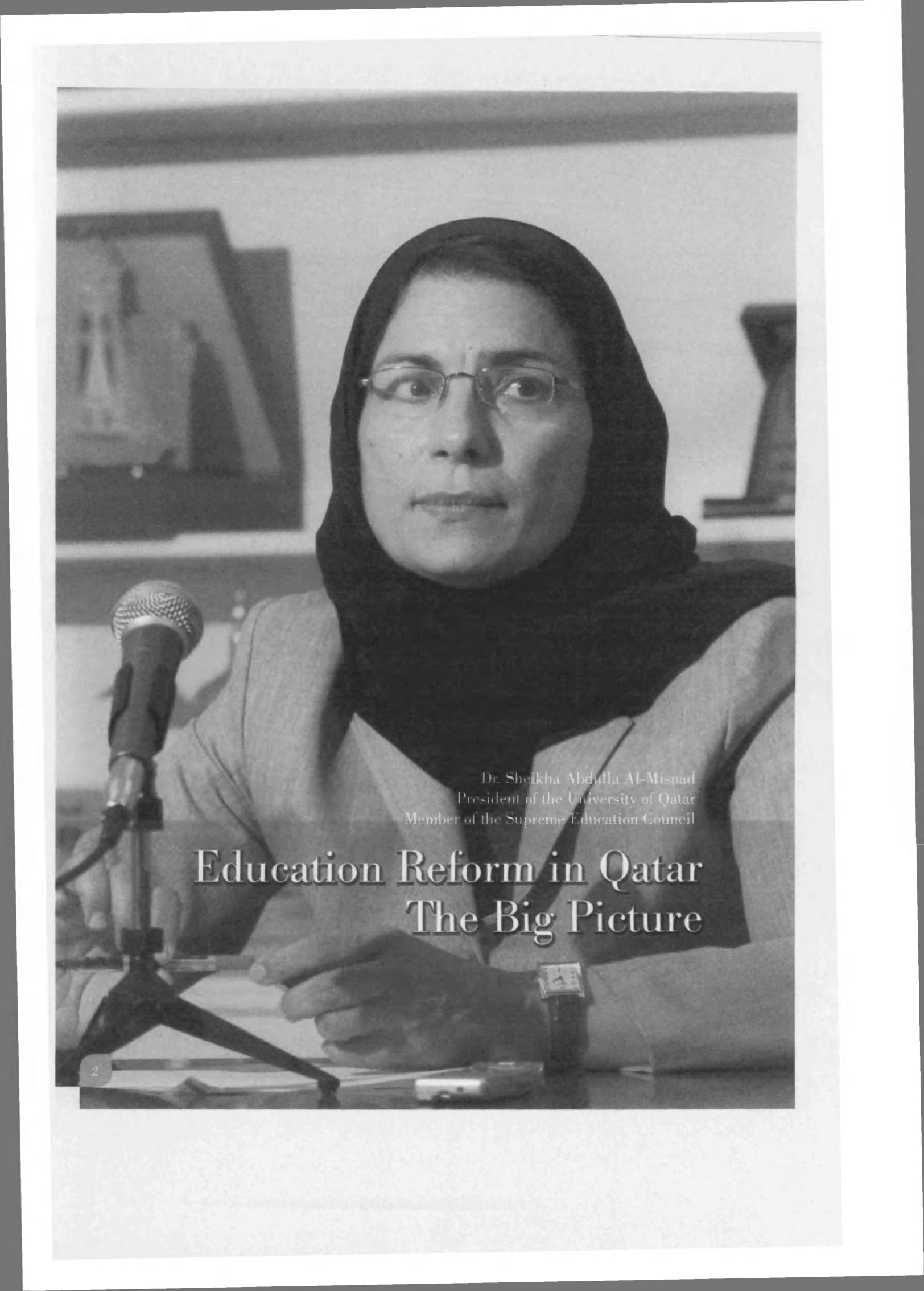
### **Data Collection and Management**

Data collection and dissemination are crucial to successful education reform. Data can be used to track progress of individual children, aid parents in making appropriate school choices, identify weaknesses and strengths of schools, improve programs and teaching methods, and evaluate school quality and the overall educational system. The Evaluation Institute is responsible for all data collection, while the Qatar National Education Database System will serve as the "data warehouse" for storing, analyzing and disseminating collected data from tests and surveys. To make sure documents and information remain confidential, the Institute's Data Collection and Management Office is constructing a secure production center with facilities for printing and document storage.

### **All Qataris have a stake in reform**

One of the major goals of reform is to better engage parents in the education of their children. For the first time, Independent Schools have elected boards of trustees, composed of parents and other members of the community, to help oversee and provide support to these schools. Parents and other community members now have a say in all aspects of school policy.

Although Qatar's historic K-12 education reform is still in its infancy, the government is proud of the progress made so far and impressed with the energy and enthusiasm that infuse how children learn at Independent Schools. Qatar remains convinced that the creative and critical thinking skills embedded in students' curriculum will engender intellectual curiosity, solid decision-making, and confidence to last a lifetime.



Dr. Sheikha Abdulla Al-Misnad  
President of the University of Qatar  
Member of the Supreme Education Council

## Education Reform in Qatar The Big Picture

Dr. Sheikha Abdulla Al-Misnad is a leading proponent of education reform in Qatar. A nationally known academic who holds a PhD in education from the University of Durham (U.K.), she is president of the University of Qatar and a member of the Supreme Education Council (SEC). In an exclusive interview with the SEC publication "Education for a New Era", Dr. Al-Misnad addresses a wide range of educational issues. Following are excerpts of the interview:

"The initiative to reform the education system in Qatar was not an overnight decision... It was a well thought out plan emanating from a firm belief and aimed at finding a substitute to the existing system."

**Q. What is the role of the SEC in the K-12 reform effort?**

The SEC is the leading authority responsible for directing the nation's education policies and overseeing the implementation of the K-12 reform initiative. This reform is an integral part of the country's comprehensive strategy to improve its education system. There were clear areas in need of improvement, such as the need to graduate more students with the necessary skills to continue with higher education. Hence, the government commissioned an international team of experts who conducted a two-year study to evaluate the education system. The team met with stakeholders at the Ministry of Education, University of Qatar and other sectors. The team's findings and recommendations were the basis of the comprehensive reform initiative "Education for a New Era" launched nearly three years ago.

**Q. What is the role of the Ministry of Education in the reform?**

Actually, the Ministry of Education (MOE) plays a major role in the education reform effort. MOE personnel worked alongside the team who conducted the preliminary study that analyzed our existing system. So, they have been involved in the entire process, but the responsibility to implement the K-12 reform lies with the SEC and its institutes.

**Q. There seems to be growing public engagement and dialogue on education issues in Qatar. What role does public opinion and dialogue play in the reform?**

Public engagement is healthy because it will put pressure on the concerned officials to find suitable solutions. We can't deny that there is a public concern about this initiative – which is natural and legitimate. We would be really worried if the society felt left out and watched the reform from afar

in silence. That would mean that our people are passive. But we know that Qatari people are responsible citizens who actively engage in all issues concerning their society. And education is an issue of deep concern to the people in Qatar and abroad. It also impacts all sectors of the society. I am personally convinced that the whole society has recently become more engaged in the reform effort and we are likely to see them more involved as long as they see the outcomes of this change.

**Q. The reform is being implemented as swiftly as possible. Do you feel things are moving too quickly?**

**Public engagement is healthy because it will put pressure on the concerned officials to find suitable solutions**



The operator concept is new to our people but once the reform builds more momentum and people become more familiar and involved with the process, they are likely to accept it and scrutinize it objectively

I don't feel so, although I quite understand the viewpoint of those who feel we are in a hurry. Over two academic years, only 33 schools have been converted into Independent Schools and I think this amply demonstrates that we are in no hurry. On the other hand, currently, there are people who would like to send their children to Independent Schools but there are no seats available. So, we are caught in the cross fire between these two views.

Q. Teachers are critical to the education reform effort. What is the SEC doing to ensure that there are enough teachers in the Independent Schools?

This is a strategic initiative pursued by the State of Qatar, so there is absolutely no question of reversing the policy on this issue

Currently, we are working on two fronts to resolve this issue. The Education Institute is conducting comprehensive on-the-job training programs for MOE and IS teachers. On the other hand, the University of Qatar is providing pre-service training programs to graduate trained teachers for primary schools. There is no quick solution to the problem of a teacher shortage. Independent School teachers should be well qualified, and clearly they need more time to be able to master the curriculum standards philosophy and develop the necessary skills and best practices in teaching.

Q. Is there any concern that the SEC may reverse major components of Education for a New Era like the establishment of Independent Schools?

The initiative to reform the education system in Qatar was not an overnight decision. It is an integral part of our education policy. It was a well thought out plan emanating

from a firm belief and aimed at finding a substitute to the existing system. This is a strategic initiative pursued by the State of Qatar, so there is absolutely no question of reversing the policy on this issue.

Q. Are you aware of any similar reforms in other GCC states or internationally?

Every country is striving to build a good and solid education system but no country can claim to have the best education model. So you will notice varying efforts to improve the education systems worldwide and this is quite natural. If Qatar succeeds in reforming its education system as envisioned, then it would be a great accomplishment and we will be happy if others try to learn from our model.

Q. Did you anticipate any challenges with implementing Education for a New Era?

Yes, we did expect major

challenges. It is quite natural that a bold initiative with such scope and ambition be challenging. Personally, I believe the main challenge is developing and supporting a qualified workforce – teachers, administrators and others. The other challenge is one that will take some time. This reform is a structural transformation in managing and overseeing the education system and the society will need more time to understand this big change, accept it and fully support it.

Q. What kinds of international expertise has the SEC sought in the reform effort?

This question is not specific to the education sector only but to all other sectors in Qatar. Since the discovery of oil in this country, we have depended on expatriates, whether in the oil industry, education or any other field. The country continues to hire international experts but this has not come at the expense of our own people. With respect to the K-12 reform, we are keen to employ highly skilled individuals who can help this reform move forward. Qataris are deciding and setting the policies and directing and carrying out the implementation process. All the SEC members and the directors of the institutes are fully involved in the reform and are well-known individuals in the community. We will continue to develop our local capacity.

Q. Can you talk about Independent School Operators and the mechanisms in place to monitor their performance?

The operator concept is new to our people but once the reform builds more momentum and people become more familiar and involved with the process, they are likely to accept it and scrutinize it objectively. We must create an incentive mechanism in the system to attract qualified Qataris to participate in this effort and for that reason operators must be financially compensated for their efforts. But at the same time, we want to assure the public that we have a profit mechanism in place, which is highly monitored.

Q. What is the evaluation system in place to ensure the quality of outcomes?

Evaluation is key and essential in this initiative to demonstrate the progress of the reform over time. Any education system must have a built-in mechanism to measure outcomes and improve performance. Each system must conduct annual assessments and release results. Without such a mechanism in place, it will be extremely difficult to identify weaknesses in the system.

Evaluation is the instrument that will explain to parents, students, teachers and the SEC, the strengths and weaknesses in the system and how it can be improved. Evaluation will also hold all stakeholders accountable.

Q. In your opinion, how can the SEC continue to engage the public on education issues?

The SEC should continue with its communications effort to increase public awareness about the importance of this K-12 reform. Over time, people will be able to understand how the Independent School system operates. I also believe that if we succeed in attracting more MOE administrators and teachers to become operators, we are likely to improve people's perception about the reform and gain more support.

Q. What are some of the challenges that lie ahead?

This initiative aims mainly to improve the performance of our schools. The improvement lies in teaching delivery, the learning process, parental involvement and student engagement.

During the implementation, we are likely to be faced with issues that we were unaware of at the outset. But we have the mechanisms and the willingness to resolve all issues as they surface. This reform is in constant change and by design is subject to annual review and gradual



implementation to ensure adaptability and consistency with global development.

Q. Does the University of Qatar have a role in K-12 reform?

We at the University of Qatar do our utmost to support the K-12 reform effort because it will alleviate a lot of the burdens that we are currently enduring at this transitional or setting-the-foundation phase. Currently, public education is not 12 years of schooling but it extends to 13 or 14 years, and this is not in the benefit of anyone.

The role of the College of Education, for instance, has become very critical in this new education era. Successful K-12 reform requires large numbers of qualified teachers and administrators. The college has therefore geared most of its programs to serve the K-12 reform in anticipation of preparing qualified teachers and school leadership. We currently have a graduate program to prepare primary school teachers.

Q. Do you face any competition from the universities at Education City?

The international campuses at Education City have many advantages and have contributed positively to the reform effort at the University of Qatar. Education City has opened many avenues for our faculty in terms of research, exchange and networking. We alternate faculties and conduct joint research projects.

It is now our turn at the University of Qatar to prove that our outcomes are competitive with those graduating from Education City. We welcome the competition because a monopoly is likely to be a barrier rather than an opportunity.

With regard to competing for students, I don't think that is an area of contention. Education City campuses are highly selective and the University of Qatar is a public institution with the capacity to serve larger numbers.

Q. What programs do you have for teacher preparation?

We have a number of programs such as the Primary Teacher Preparation Program – a pre-service diploma which is administered in cooperation with the University of Texas A&M. We offer a diploma in Special Education and a diploma in Early Childhood Education.

We also have plans to offer a

masters degree in Education Leadership, which is targeted at educators to manage schools. We intend also to offer graduate diplomas to prepare teachers for the preparatory and secondary schools.

Hopefully all these programs will help in preparing highly qualified educators. But we must realize that this issue will take time, particularly since Qatar is in an economic boom and most graduates are unlikely to opt to work in the education field. We are noticing this trend nowadays, particularly among female graduates, who 20 years ago were only allowed to work in the education sector. Now, they have more opportunities and thus the issue of a teachers shortage may extend from 5 to 7 years.

Q. What kinds of funds have been allocated to the K-12 reform effort in order to help it meet its goals?

Our education system is funded from the State's national budget. Projects like the K-12 and University of Qatar reforms require billions of dollars and our government is fully committed. You can't reform without allocating sufficient funds. Education is one of the public services that require continuous funding. Most nations are convinced that education is an investment for the future. Since the State of Qatar is on a threshold of economic prosperity, we must prepare future generations to be in charge of their own destiny and that can happen only through good education.

## **Appendix V: the use of NVivo software in the data analyses processes**

## Using NVivo in the data analysis

With the help of IT specialist, NVivo software was used in this study with the aim of getting help of the available technology in analysing mass qualitative data. According to (Bazeley and Richards 2000, p.1), NVivo enables researchers “*to manage, access and analyse qualitative data and to keep a perspective on all of the data, without losing its richness or the closeness to data that is critical for qualitative research*” (Bazeley and Richards 2000, p.1). NVivo is also encourages an exploratory approach to analysis and helps to manage and synthesise the researcher’s ideas (Gibbs, 2002). Although NVivo did not support the researcher by giving automatic analysis of the data, it did help in the interpretations and structuring the study findings. It does fit well with this research’s objectives and the approach to data analysis as it provides a powerful way to carry out sophisticated data coding. The following sections explain the data analysis process in more detail.

### **Analysis steps**

The first step that was to transfer interview notes, observations notes and other field documents into an electronic format and to store them in the researcher’s computer as MS Word documents. In other words, the documents were transferred into the MS word processor as it has a much wider range of facilities for editing than NVivo which requires files to be in rich text format in order to make sure that no information is lost. Therefore, the files (documents) were converted from word document format into rich text file format. Then, each document was divided into sections by use of heading styles (e.g. Heading 1, Heading 2, etc.) with the aim of using these sections in performing automatic coding in case the researcher wished to do. Furthermore, NVivo requires all the pictures and tables to be removed because it only accepts text. Thus, those tables that needed to be coded into text format were converted and all the meaningful information related to pictures and tables was described in the text so the loss of information was minimal. In addition, it was possible technically to link any information from pictures, tables, etc, to the documents or nodes in the NVivo software if it was necessary for the analysis. Figure

1 illustrates the NVivo document explorer that shows some of the transferred the files.

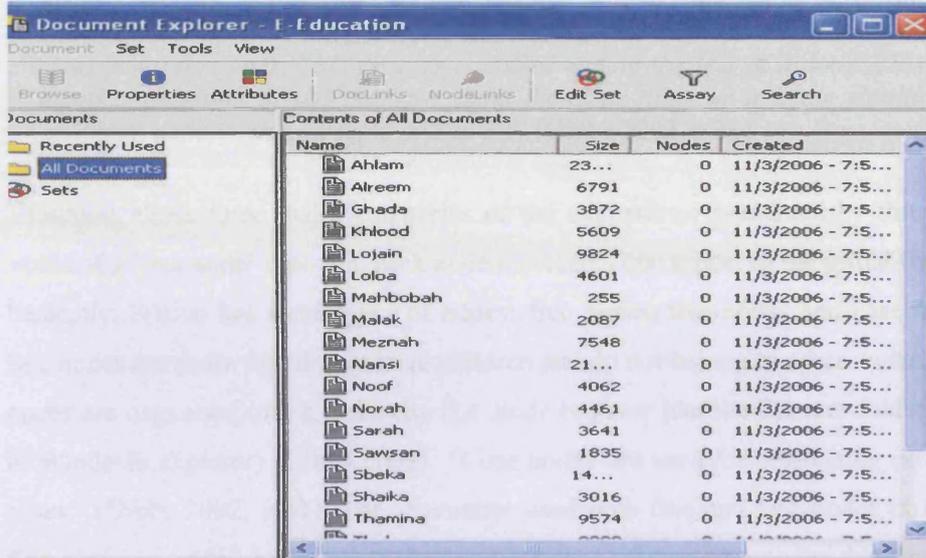


Figure 1: Examples of the transferred files into NVivo document explorer

## Data coding and interpretation

Figure 1 showed the imported the documents to NVivo before starting the analysis process by using NVivo facilities. After that, the analysis process started by reading, through all the documents to gain deep understanding about the collected data. As mentioned in Chapter 2, the initial framework aims to understand the efficacy of using ICTs in classrooms on the learning and teaching processes. In other words, it focuses on three main aspects: the conditions that must be in place in order to optimise the use of ICTs in classrooms (i.e. key factors that affect the use of ICT tools in classrooms), the impact of use ICTs tools on students attitudes, and the key learning skills that might be acquired by using ICTs tools. Thus, the initial framework helped the researcher in dividing the analysis into three major categories.

NVivo uses the term “nodes” to refer to specific codes that related to certain categories of the data, specifically:

*“A node in NVivo is a way of bringing together ideas, thoughts, and definitions about your data, along with selected passages of text. Passages of text from one or more documents are connected to a node because they are examples of the idea or concept it represents. This process is called coding the text at a node. This brings together passages of text that are about the same thing or indicate similar ideas, concepts, actions, descriptions and so on” (Gibbs 2002, p.31)*

Therefore, those three major categories of the data were represented by three separate nodes of a ‘tree node’ type (i.e. each node represents one aspect of the initial framework). Basically, NVivo has three types of nodes: free nodes, tree nodes and case nodes. The free nodes are those that do not have children and do not belong to other nodes while tree nodes are organised into a hierarchy (i.e. node browser like the file and folder hierarchy in Windows explorer) (Gibbs 2002). *“Case nodes are used for organising coding about cases”* (Gibbs 2002, p.31). The researcher used both free and tree nodes in this study. The analysis started by creating three main nodes of type tree nodes that represent the three major aspects of the initial framework (i.e. of this study). Figure 2 shows the nodes that were created under the main project node (i.e. ‘E-education’ node).

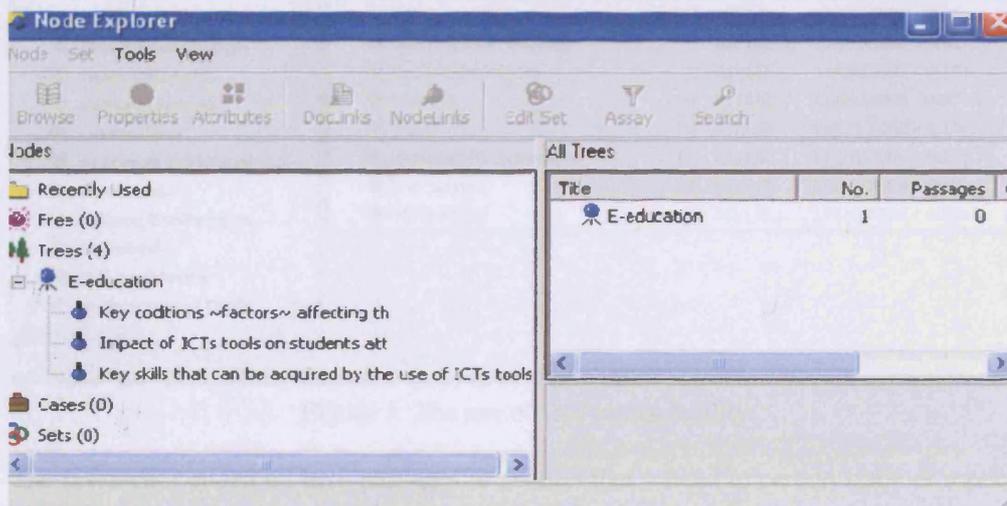


Figure 2: The major classifications of the collected data

As shown in Figure 2 above, there are three key nodes under the research project node, namely the ‘E-education’ node. The analysis of each node (i.e. each aspect of the research) took place separately. The researcher started first with the node that represents the key conditions that must be in classrooms in order to achieve effective teaching and

learning. At the beginning of analysing the data that related to this issue, the researcher did not try to classify those conditions (or factors) based on the initial framework classification. This is because she did not want to be confused by the issue of how many factors need to be identified. In other words, she aimed to deduce those factors (conditions) from the collected data and then compare them with what was found in literature. To achieve this aim, the researcher started by developing free nodes that represent different factors (conditions) found in the study findings. Figure 3 shows those free nodes that were created based on the research findings with the aim of gathering codes that related to each factor. It also shows the number of passages that were coded at each node (i.e. factors) and the creation date of each node as well as the modification date (if any).

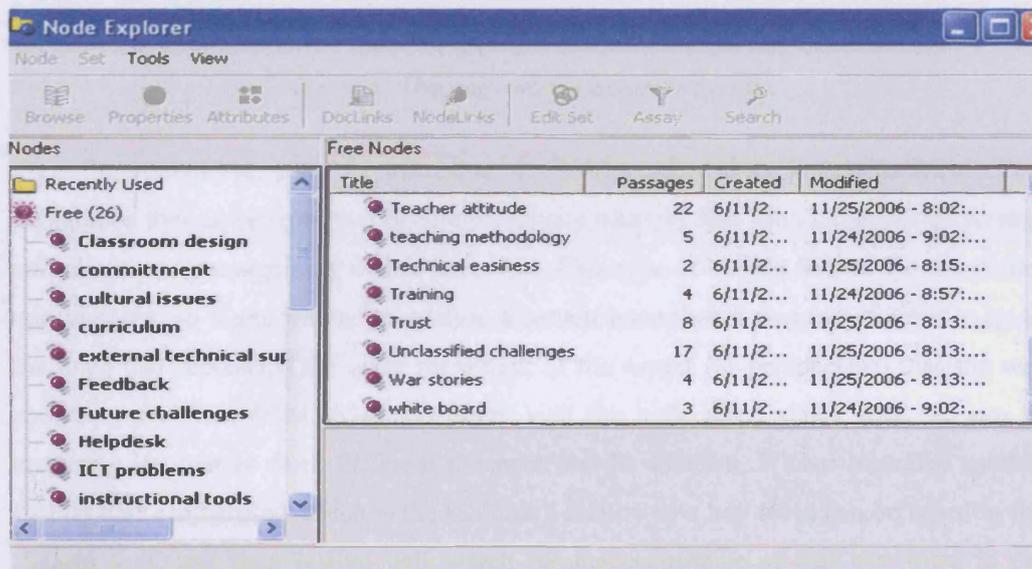


Figure 3: The use of free nodes facility

The researcher coded all text, passages or section that related to certain issue or aspect to its respective node. For example, in Figure 3 above, there is a free node that is called 'teacher attitude' and which contains 22 passages. By exploring that node using its browser, all the text coded (i.e. passages) at that node will be displayed as shown in Figure 4 below:

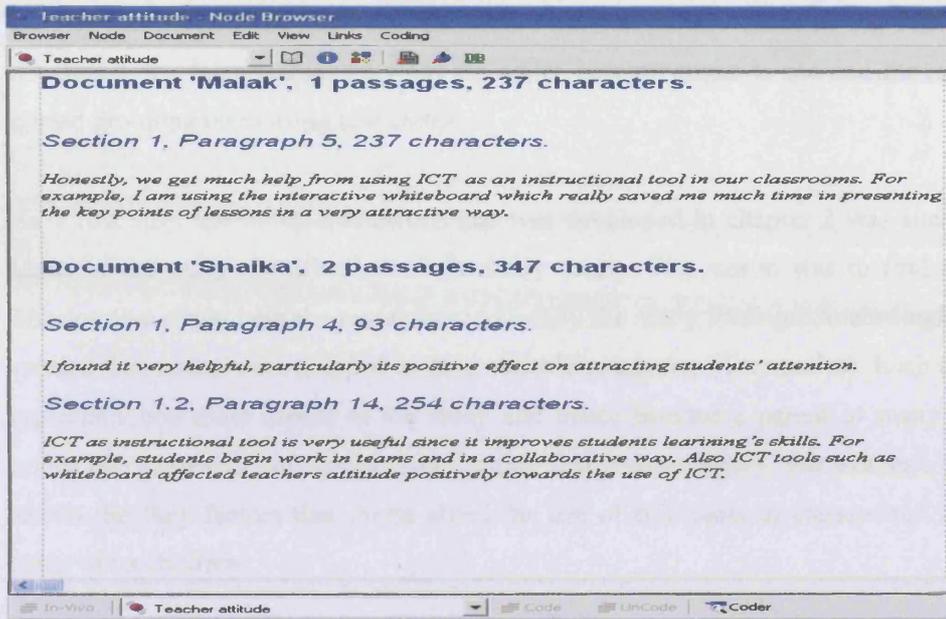


Figure 4: The use of node explorer facility

From Figure 4 above, it can be noted that Mrs Shaika talked about teacher attitude in two paragraphs that came from two different sections whereas Mrs Malak mentioned teacher attitude in one passage only of her interview. This type of coding helped the researcher considerably, so if she wanted to analyse a certain issue then it was easy for her to go to the node that represents the issue regardless of the aspect (or perspective) that she was analysing the issue from. Also she might visit the node many times with the aim of analysing its content from different perspectives. In addition, NVivo provides another facility that can be used which is the searching facility so a key word can be typed in the 'Search tool' and then NVivo will search for the occurrence of that key word in the created nodes. The result of the search is stored as a separate node so the researcher can go back and visit the node many times. With the present of such wide range of facilities that NVivo can provide, it was found a very useful tool that indeed supported the researcher to reduce the time needed to go through all the documents should she want to investigate certain topic.

After analysing the free nodes that related to certain aspect (e.g. the conditions or factors that might affect the use of ICT tools inside classrooms), it was striven to find a way to

classify those free nodes and link them to wider categories. Thus, as the data analysis developed, the relationships between the codes became easier to see and the researcher started grouping them using tree codes.

As a first step, the initial framework that was developed in chapter 2 was simulated in terms of the main classification of the study theme. The reason was to find an initial division that might help the researcher to classify the study findings. Accordingly, all the created free nodes were mapped to their suitable categories (Tree nodes). Each tree node represents one main aspect of the study and hence became a parent of many children nodes that represent the certain issues within that main category. For example, Figure 5 shows the 'key factors that might affect the use of ICT tools in classrooms' node and some of its children.

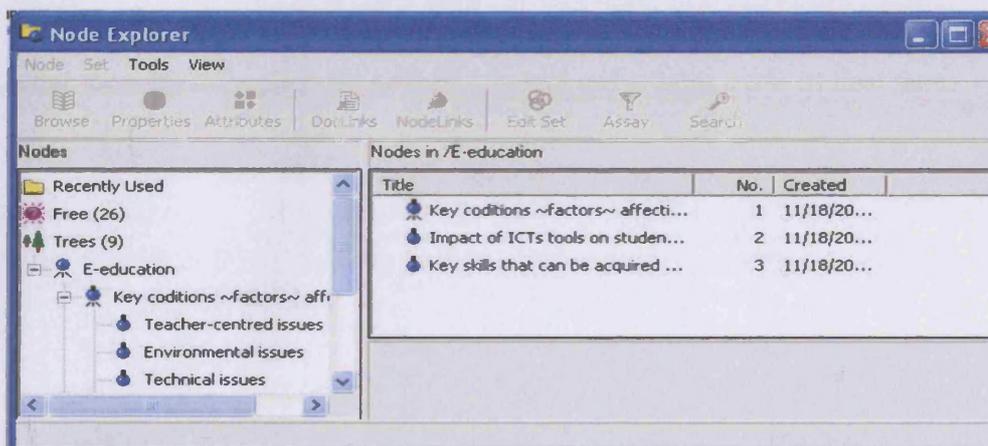


Figure 5: The use of tree nodes in classifying the key factors (i.e. conditions) that affect the use of ICTs in classrooms

Having classified the factors that might affect the use of ICT in classrooms into groups, the researcher started comparing these categories to what had been found in the literature. The key issue of the comparison was 'what are the factors that might affect the use of ICT in classrooms', 'what is the students' attitude towards the use of ICT and 'what are the main learning skills that might be acquired by the use of those tools'. In other words, the researcher started comparing these classifications with the e-education literature and

refining the research findings. In addition, she was always sharing the analysis findings with her supervisor who was critically analysing and discussing the study findings with the aim of further refining them and drawing the attention of the researcher to any unclear points.

In summary, every time the researcher want to analyse a certain issue, she performed the following steps: (1) Read all codes that related to that issue thoroughly and carefully, (2) Cross check those codes that come from different interviewees' notes, (3) Compare all codes with what had been found from the other sources of evidence such as observation notes, official documents, brochures, local newspapers articles and other fieldwork notes, (4) Compare the findings with what had been found in the literature through the initial framework that had been developed in Chapter 2, (5) Critically analyse the issue, (5) Discuss the issue with the researcher's supervisor, (6) Communicate the result of the analysis with the reader through a written piece of work, and finally (7) Finalise and refine the analysed topic in the initial framework and presented it in its final form.