MANAGING CHANGE IN KING ABDULLAH PROJECT SAUDI SECONDARY EDUCATION: PARTICIPANT PERSPECTIVES

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Abstract

This is a study of how head teachers, teachers and students have responded to a radical pedagogical change: replacing traditional note-taking and verbal memorization with independent thinking, collaborative learning and computer-based research. This pioneer study is the most detailed investigation to date of the King Abdullah Project, which is being trialled in schools in the Kingdom of Saudi Arabia. The research explored perceptions of participants of the major strengths and weaknesses and ways to improve the King Abdullah Project in four secondary schools.

Mixed approaches, quantitative and qualitative, were used to collect data from 852 students, 105 teachers and 5 head teachers. The study uses descriptive analysis, which is used for quantitative data and using grounded theory techniques (qualitative) approaches for analysis.

My contribution to understanding the issues of managing change in the context of King Abdullah Project is through its focus on the perceptions of the project, rather than on outside measurements of compliance with the new teaching techniques or of educational achievement. The experiences of participants shed light on the dynamics of the successes and failures of the project, as defined by the various groups. This approach is in accord with the value given by organizational change experts to widespread communication and sharing of opinions in a changing organization; as well as to the value given to collaborative learning and planning within the new curriculum.

The study reveals that the Project has been well received and has led to improved student and teacher performance, the participants have also perceived some serious weaknesses. These weaknesses include: training which has been poorly implemented, which leads to a lack of understanding and mastery of Project teaching techniques, among students and teachers; a lack of mastery of the electronic equipment; problems with timely equipment repair, which interferes with the new teaching techniques and leads to a lack of sufficient head teacher and teacher initiative in solving problems locally; and lack of resources. In addition, there were failures of planners and managers to foresee problems leading to difficulty with the new science and mathematics material. There were problems with class size. There was too much work for the time available. There was massive educational change over too short a time. Furthermore, a lack of communication in the educational system may have kept managers and planners from learning enough about the cultures they were attempting to change.

Therefore, open communication and wider distribution of decision making, with a large bottom-up component in both cases, would probably help to solve current problems. Having a project steering committee, including members from all levels of the system will facilitate the voices of those most impacted by the changes so that they could play a larger role in the dialogue. To make the program work better, planning should involve all. By addressing the identified challenges the creativity of planners, managers, head teachers and teachers it is argued, have a better chance in being effective if they share their knowledge and work together.

Acknowledgement

I would like to start by thanking Allah for giving me the opportunity of carrying out this study. Without Allah, I would not have reached the point I have now. Allah has given me patience in the most stressful days and most definitely guided me through the most difficult days.

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Over the course of my research, I thank all my sisters-in-law and my parents-in-law for their kind and heart-warming prayers.

Finally, I would like to thank my father, Abdulaziz who passed away. He was always in my thoughts as one who encouraged and supported me to achieve my goals academically from a young age.

Dedication

During the course of this study, I have stumbled on many difficulties that affected me emotionally. I had reached the stage where I could not cope as the work became too overwhelming. For the help of my husband Dr. Abdulaziz Almusa, and my 4 children, Layan, Sultan, Jawan, Lamaa, and my sister Rohasih, who were always there for me, who always did their best to improve my mood, but after Allah's wishes, I dedicate this thesis to them.

Chapter One

Introduction and Background to the Study

1. Introduction and Background to the Study

1.1 Introduction

"*Students in the 21st century face higher expectations and more challenges than ever before. These students are also the beneficiaries of educational technology and instructional resources only dreamed of a decade ago. Teachers and administrators are also faced with new challenges to increase student learning, often with fewer resources and higher accountability measures*" (Nedra et al., 2008).

This assessment above encapsulates the types of issues that currently arise in today's world of education. These issues relate to change and how to handle it. It would appear to be a fitting starting point from which to report my research, in that it concerns curriculum change, improving teaching and learning methods including the use of electronic technology, and school management. As a starting point, I want to comment on Educational change as it relates to the context of this research.

Fullan and Stiegelbaure (1991, p. 37) proposed that at least three key elements may be involved in educational change and its management: (1) 'new curriculum materials or new technology'; (2) 'new teaching approaches'; and (3) 'changes in beliefs' emerging from ideas relating to the new programme. In the context of the proposed study, all three elements are present. New curriculum materials and new technology are involved. There has been the change from the traditional textbook approach to learning, involving new teaching approach/approaches. Given the range of changes underway, it would seem reasonable to suppose that these will impact on beliefs held by participants.

This study explores the management of change in Saudi Arabian Secondary Schools. Some 50 of those schools have embarked on a trial programme, called the King Abdullah Project. It involves large-scale systems change in its delivery of the school curriculum. I focus on the impact of that change on students, teachers and head teachers. Accustomed to traditional, rather abstract chalk-and-talk lectures, essentially learned by rote, they have had to switch to visually interesting lectures using practical, real-world examples to explain the concepts in the lessons. Instead of learning the concepts in each lesson by verbal recitation, the students are now expected to learn them through online research and creation and presentation in class of individual projects. This has been facilitated by modern electronic technology, with which some participants were more familiar than others. Instead of competitive individual efforts, the new methods encourage cooperative learning and teaching and greater support of students' learning by teachers and parents. Thus, major changes in habits and attitudes were needed to

teach or learn using the new system the purpose of the introduction to describe the research question and give a background to the study.

1.2 Significance of the Study

In the Saudi context, the researchers have conducted several studies on the issue of implementing new curricula like using ICT in schools in the Kingdom of Saudi Arabia as I discuss in Chapters Two and Three, but they do not discuss how to manage it. My research is significant, because it is one of the first studies focusing on the advantages and disadvantages of implanting new change in Saudi schools and how to manage it.

I have tried to show how managing change needs to evolve, if it is to cope with the demands of change and to best serve the interests of head teachers, teachers, students and their future development. I consider that the topic was of particular interest to me as a Saudi teacher, because Saudi schools have operated exclusively using a transmission model (where the teacher tells the student information and there is usually no further dialogue or discussion about it) until the recent introduction of an experimental programme in 50 secondary schools. This, it is hoped, will provide the stimulus for greater participation by Saudi participants in the school education process and lead to qualitative improvement in the education it offers to Saudi youngsters.

It is hoped that the findings from this study will:

1. Help inform the Saudi Ministry of Education about the experience of the head teachers, teachers and head teachers working on the King Abdullah Project;
2. Draw attention to the current strengths and weaknesses of the Project's operation, enabling those responsible for managing the project to avoid the same problems when, as is intended, use of the project is extended into schools across the Kingdom;
3. Stimulate other researchers to study the experiences of other schools across the Kingdom. (The present study has focused on four schools in two cities.)

1.3 Statement of the Research Problem

This research arises from the problem that there has been insufficient enquiry into participants' experiences in Saudi Arabia in new programmes of education. We need to find the best ways to undertake such a major changes and to better understand the issues involved in making serious national educational changes. In order to advance these goals, this thesis explores the experiences of head teachers, teachers and students taking part in the major educational changes introduced by the King Abdullah Project.

I set out to determine the responses, reactions and experiences of these immediately involved participants (head teachers, teachers and students) as they responded to the challenges of educational change and its management. A number of reasons prompted me to undertake this study:

1. Doing an assignment on managing change as part of my master's degree;
2. The experience of working in Saudi secondary schools as a teacher of Arabic and in school management;
3. Doing the research project for my master's degree; my study concluded by urging the Saudi Ministry of Education to improve the quality of facilities in its classrooms and its in-service training provision.

1.4 Research questions

The research questions sought to answer the following:

1. What are the strengths of the Project as perceived by participants?
2. What are the weaknesses of the Project as perceived by participants?
3. What do participants suggest might be causes for the perceived weaknesses and how do participants suggest managing them?

These were the initial research questions that motivated my research and they will be developed and supplemented after the review of the literature in chapter 3, particularly in section 3.7, in order to prepare for questions to be asked in the fieldwork.

1.5 Research objectives

The research objectives were as follows:

1. To identify the strengths of the Project as perceived by participants.
2. To identify the weaknesses of the Project as perceived by participants.
3. To explore the suggestions of participants concerning what might be causes for the perceived weaknesses and how do participants suggest managing them.
4. To consider the educational and managerial implications for rolling out the programme nationally.

1.6 Secondary Education in Saudi Arabia

This section provides a brief context for the present study by outlining the organisational structure of state secondary education in Saudi Arabia. It also provides the broad context in which the project schools are seeking to bring about educational change.

The secondary education stage in Saudi Arabia is a three-year programme for students normally aged between 15 and 18/19 years. Those wishing to enter secondary school must have been awarded the Intermediate Education Certificate. Under the traditional education system, all secondary school students follow a common study programme in their first year. Passing the end-of-year examination in all the subjects studied enables them to progress to Year Two, where they will follow a sciences-based or an arts-based programme. (Some schools also offer a technical education–based programme). Passing the end-of-year examinations enables students to progress in the same specialisms in Year Three. Successful completion of the final examinations leads to students being awarded the Secondary Education Certificate and therefore qualified for entry into Further or Higher Education.

Despite secondary education being notionally a three-year programme, some students have to repeat a year in order to pass the examinations. It was also of concern to parents and others that success or failure in the end-of-programme examinations rested heavily on examination performance. Recently, however, some Saudi secondary schools have been trying out a credit hours system to see whether this type of programme might improve students' performance by reducing the pressure of successful graduation resting on the end-of-year examinations and avoiding the need for students to repeat a year's study. The credit hours system allows students to meet graduation requirements working at their own pace and it is a flexible one.

With the help of their academic guide, students can decide which modules to study in each semester, and whether they should drop any module if they are having great difficulty with it and replacing it with another module. There is also the summer school option, where students can choose to study during their summer vacation. Typically, the Saudi secondary school year consists of two semesters, each of 16 weeks of classes and two weeks of examinations. In the summer semester the school day might begin at 7.45, ending at 12.30. In the winter semester, the day might start earlier at 7.15, ending at 1.30.

Saudi schooling is organised in single sex schools (with the exception of kindergartens) and through separate systems. However, the General Presidency for Girls' Education is accountable to the Ministry of Education for its delivery. Although there are female head teachers in Saudi Arabia, their appointments as head teachers are purely a product of the Islamic cultural system of 'gender separation', and not the product of an open system of head teacher appointments, as is the case in England and elsewhere. From an Islamic point of view, it would be unthinkable for a female to be appointed to headship of a boys' school any more than for a male to be appointed to headship in a girls' school.

1.7 The King Abdullah Project

This project consists of new curriculum materials - maths and science textbooks - provided by the publisher McGraw Hill and tailored to the needs of the Saudi education system, together with the introduction of new technology and software to support curriculum delivery. Radical changes have been made to the traditional didactic approach to learning, involving approaches such as active learning, independent thinking, collaboration and problem solving. Given the range of changes underway, it would seem reasonable to suppose that these will impact on beliefs and practices held by participants, and such change has been supported by training for teachers and head teachers.

Despite the lack of published information regarding the work of the project; descriptions of it can be identified through the features of some of the statements in newspaper releases. The King Abdullah Project is run by the Tatweer Education Company. The project is independent of the Ministry of Education, and operates in a setting currently available through the main components, which are: the school buildings, teachers and students; and completion of school buildings and government projects to computerize schools' operations, and various other projects, including the development of science and mathematics curricula (such as the McGraw-Hill project).

"*The philosophy of the McGraw-Hill project depends on the implications of global value chains of mathematics and the natural sciences, through a deep understanding of their contents. It is based on active learning (Active Learning): experimentation, investigation and reasoning. The purpose is to meet the needs of individuals, taking into account individual differences among learners, and to develop skills, the application of technology in the classroom, the integration of science and employment in other branches of knowledge. Therefore, the philosophy of this project stems from the advanced educational theories of teaching and education which were built by the global chains*" (Alagaili, 2008).

The King Abdullah Project has four lines of approach: (1) Curriculum development in the comprehensive sense of responding to the developments in modern scientific and technical knowledge and also meeting the student needs, namely: values, professional, psychological, physical and mental knowledge; (2) the retraining of teachers, to enable them to properly discharge their professional duties and thereby achieve the objectives of curriculum development, for which they are prepared by the training programmes; (3) to improve the education environment so as to make the classroom and school to be conducive to learning; (4) as well as strengthening the capacity for self and skill development and creative talents, hobbies and psychological gratification for male and female students, and to deepen the concepts and national associations and social activities during out school curriculum (Altwogaery, online).

Little mention has yet been made to matters of school management and leadership and particularly the role of the head teacher. One might perhaps begin by contrasting two stereotyped views of head teachers, one traditional and one modern. The traditional view of the head teacher is of a father figure who demands respect and who rules not just the pupils (and their parents) but also the staff. Such a head teacher would probably have begun his/her career as a classroom teacher and, over time, developed the experience, wisdom and authority to impress those with the power to appoint him/her. Promotion to head teacher came after a number of years of being a teacher and the job was his/hers for the rest of his/her working life. However, "the idea of the school leader as a 'monarchic', 'autocratic' or 'paternal' executive of the school has increasingly been seen as inappropriate" (Huber, 2004, p. 672). Making the shift from a 'transactional' leadership to a 'transformational' one when seeking to promote change would involve a harnessing of a new dynamic to the leadership of schools.

The current Saudi school system exemplifies leadership of the transactional type, which is about "seeing the school as a stable system where the existing structures need to be

administered as well as possible to effectively and efficiently achieve fixed results. A static concept of leadership may work very well, with the school leader first and foremost ensuring that the school as an organisation functions well and smoothly" (Huber, 2004, p. 672). For example, the creation of teaching team/subject departments could bring about further progress towards the development of a distributed type ('top down') model or group ('team-led') model. However, given the tradition in the Saudi school system of close control (as in the individual model), if it were to be a model suited to the Saudi culture, a model of the distributed type might the best starting point towards reform. However, even such a model of leadership "implies a redistribution of power and a re-alignment of authority within the organisation (Harris and Muijs, 2002, p. 1)". It would mean, as Harris and Muijs (ibid) argue, "Creating the conditions in which people work together and learn together, where they construct and refine meaning leading to a shared purpose or set of goals" (p. 1).

Better-trained head teachers and deputy head teachers ought to result in improvements in the ways that schools function. However, arguably the most important single output of a school is the quality of its student outcomes. Attention should be given to the creation of a middle management structure in Saudi schools. This is something which English secondary schools have had for many years, before attention was rightly turned to the professional training of head teachers. Such a scheme would aim to improve the quality of the teaching by getting the teachers to plan their work together. It could help them deliver the curriculum on time and encourage them to develop materials to support the textbook content. They could also share tasks such as setting regular internal tests and examinations.

Over the last 60 years or so, since the creation of a national Ministry of Education in 1953, a universal education system has developed in Saudi Arabia (Alafnan, 2000; Alshowaye, 2002). Until recently, the primary focus has been on quantitative development (Alafnan, 2000; Abatain, 2001). Now, the focus is switching to qualitative improvement of the system (Aboulfaraj, 2004). Evidence of that can be found in a recently introduced secondary education improvement programme (the King Abdullah Project). This is being trialled in 50 schools across the Kingdom. The project seeks to create 'schools of dreams' (Almulise, 2008). The project has a budget of 9 billion Saudi Riyal (30 million US dollars). The funds are being used to improve school buildings, facilities and equipment (especially for IT). It is also introducing a computer-led curriculum to replace the traditional textbook-led one. Teaching/learning is being supported by an internet network provided by the Ministry of Education. To assist delivery, new managerial structures in school are needed, ones emphasising partnerships between head

teachers, teachers (and students). Extensive training for the parties involved is also required. Currently, the project is to run for six years, with a view to extending the programme to all Saudi secondary schools.

A study by Alzaidi (2008, pp. 328, 329) of job satisfaction of male secondary school teachers in Saudi Arabia called for changes to the existing system to meet serving schools' needs to overcome 'bureaucratic obstacles'. According to Alzaidi the following strategies should be put in into effect: channels of communication between head teachers and administrators in the Ministry of Education should be developed; Head teachers should have greater autonomy in the running of their schools, especially in their day-to-day operations. Head teachers should be listened to, especially with regard to issues relating to teacher under-performance or lack of commitment; Better in-service provision should be made especially for head teachers and their professional development; Schools should be given a bigger share of the profits from their school's canteen, to increase their financial resources; A rewards system should be introduced to recognise 'outstanding performance' through offering special awards and incentives (2008).

For schools trialling the new programme, this is bringing about considerable changes in the roles of head teachers, teachers and students. As Oyaid (2009, p. 70) pointed out: "Teachers play a fundamental role in the education system and as future scenarios suggest a major change in the future of education and increased ICT usage; these will inevitably affect their role and their status in this system". The student's role is changing from being the passive recipient of knowledge to one of active participant in the teaching learning process. Babeer (2010) sought "to show that changing perceptions of the role of the learner (as well as the teacher) are critical in initiating reform and require access to Technology". She suggested that, "the primary focus should be the role of technology to change existing concepts surrounding both learning and teaching and the implications of this for schools, teachers and students". She makes this distinction between the traditional classroom where a teacher 'instructs' a student as to what s/he should do and the computer lab 'which is a different environment where different rules apply'. She goes on to assert that, "the contrast between the more traditional approaches to learning and computer based approaches to learning therefore could not be greater and it was likely to culminate in a re-evaluation of roles by teachers in the light of greater autonomy being granted to students". As for the teacher, her/his role in this process appeared to be the facilitation of this trend through 'encouraging them to learn in a variety of meaningful ways'.

"High levels of adaptability are a prerequisite for this type of learning as it necessitates the teacher adopting the role of 'guide', 'facilitator' and 'co-learner' as and when required" (Babeer, 2010, pp. 220, 221). Becta (2002, p. 3) found 'a recognition among teachers that a more flexible approach is required if ICT is to be effective. Changes in lesson style to allow a less formal classroom atmosphere, greater pupil autonomy, differing modes of teacher/pupil interaction, and flexible study space are all recognised as key success factors for effective use of ICT. Further good practice should also be developed in facilitating greater links between home and school use of ICT".

1.8 The Argument of the study

The argument for this research is that to integrate effective change in schools, the following serious problems with the Project need to be addressed: 1. Inadequacy of the project training (Subtheme 1: Lack of understanding and mastery of Project teaching techniques among students and teachers, Subtheme 2: Lack of mastery of the electronic equipment) 2. Inadequacy of equipment maintenance and repair (Subtheme 1: Lack of resources, Subtheme 2: Failure to take initiative in solving problems shown by head teachers and teachers). 3. Inadequate foresight on the part of planners and managers (Subtheme 1: The difficulty of the new science and mathematics material, Subtheme 2: Problems with class size, Subtheme 3: Too much work for the time available, and Subtheme 4: Massive educational change over too short a time) 4. Inadequate bottom-up communication and shared decision making. As explained below, each of the following chapters will explore these issues in the following ways.

1.9 Organisation of the Thesis

The reporting of this research is organised in eight chapters. The first, Introduction, offers the background to my study, and sets out the research problem, research questions, objectives, and the structure of the thesis.

The second chapter addresses Background to Teacher and Learning in Saudi Arabia in Relationship to the King Abdullah Project in which my research study is located. (This is aimed at any readers unfamiliar with Islamic education, to help them better understand the setting and participants' responses.)

Chapter Three presents a Literature Review of materials relating to my findings and argument. The literature surveyed in this chapter covers theories on the management of schools and the management of educational change, obstacles encountered in earlier stages of the Saudi

experiment, work in other countries that have introduced similar changes and, finally, management strategies that have been applied to this situation. This material gives us a better sense of how the Saudi changes might be handled.

Chapter Four discusses the research design and methodology and how this has influenced my study, both theoretically and operationally. Quantitative and qualitative data will contribute complementary information on (a) the reactions and opinions of the participants in conversations and (b) on the proportions of participants who hold different views. Grounded theory analysis will supply tentative answers to the research questions in the form of themes. Triangulation between each of the two quantitative data samples and, separately, each of the three qualitative samples, will reveal similarities and differences between these demographic samples. Finally, triangulation between the results from the quantitative and the qualitative data will shed more light on both, leaving us with a deeper understanding of the opinions and reactions of the larger sample.

Chapter Five and Six will present the fieldwork data gathered and my grounded theory analysis of them. Questionnaires filled out by students and teachers are analysed in Chapter 5; opinions and reactions in open-ended questionnaires by all students and teachers; and opinions and reactions in Purposeful interview samples of students, teachers and head teachers are analysed in Chapter 6. The final triangulation will result in a number of themes: some describing strengths of the Project and others describing weaknesses.

Chapter Seven will offer a discussion of ways to manage the Project's weaknesses, in the light of the literature; the change management literature; and the management suggestions made by the participants, in the course of ended questionnaires and interviews. Chapter 8, the Conclusion, will summarise the most promising management ideas, both for dealing with immediate problems and for preventing similar problems in the future. The implications of this study are discussed and suggestions and recommendations are put forward for additional study. This chapter will also evaluate research methods and strengths and weaknesses of the study, in order to offer recommendations for other students of these questions.

Chapter Two

Background to Teaching and Learning in Saudi Arabia in Relationship to the King Abdullah Project

2. Background to Teaching and Learning in Saudi Arabia in Relationship to the King Abdullah project.

2.1 Introduction

As established in the previous chapter, the central focus of my research is on the responses of teachers and students to the introduction of a new approach to secondary education in Saudi Arabia being trialled in some 50 schools across the Kingdom. The present chapter addresses the background to teaching and learning in Saudi Arabia of my research. It begins by offering a first-hand perspective on 4 Saudi secondary schools, illustrating this with evidence drawn from the growing number of Ph.D. research studies conducted by Saudi students under supervision in England (see, for example, Alsaif, 1996, Alafnan, 2000; Ababatain, 2001; Alshowaye, 2002; Aboulfaraj, 2004, Alalwani, 2005; Al-Maini, 2011; Alsharidah, 2012; Alsolami, 2013).

Attention then turns to the issues relating to teaching style and classroom facilities in Saudi Arabia. It then considers the case for increased ICT facilities in schools and greater usage of such facilities by both students and teachers. The methodology and requirements to implement this particular change will also be discussed. This is followed by an examination of formal education, its organisation, policy and vision. Finally, the chapter looks at Saudi secondary school education and its objectives, preparing the ground for the literature review, which will be the subject of the following chapter.

2.2 Work in Saudi schools: a first-hand perspective

From my own experience as a teacher in Saudi schools it seems that the new methods being trialled in the programme schools are very different from the traditional ones. Firstly, they encourage the integration of managerial structures within schools, which often result in partnerships between head teachers, teachers and even, in some circumstances, students. Secondly, a computer-led curriculum has been introduced to replace the traditional textbook-led one. Indeed in many schools there is a dedicated web network which supports teaching and learning. These can have a big impact on teachers' and students' performance, as I found from my previous study (Alkahtani, 2009). This was a questionnaire survey conducted in April/May 2009, undertaken in two major cities in Saudi Arabia with an opportunistic sample of teachers (n = 445) drawn from twenty-two schools. Examination of responses to the final question, an open-ended one, which aimed at finding out about how teachers reacted to their

working conditions, showed that two issues seemed be of particular concern to the teachers: (1) a lack of modern equipment and facilities in classrooms, and (2) a lack of availability/relevance of suitable in-service training programmes, especially ICT ones.

I was told that teachers might 'attend a programme designed to develop their teaching skills or techniques, and then find that there was no equipment in their school to practice and develop those skills'. My study concluded by urging the Saudi Ministry of Education to improve the quality of educational facilities in its classrooms, such as computers, interactive learning tools etc., and to re-examine its in-service training provision. This, I considered, would help teachers develop their teaching skills and help provide a better quality of education for their students. I argued that it was important that teachers' views and opinions were sought regarding improvements. This, I considered, would help teachers develop their teaching skills and help provide a better quality of education for their students. I found it a matter of regret that little progress had been made, since previous studies, such as those by Alafnan (2000) and Aboulfaraj (2004). These pointed out the need for improving the delivery of education in the Kingdom, especially in the secondary school education sector. In conclusion, I called on the Ministry of Education when developing its provision, to take more account of the views of teachers: 'They have first-hand experience of working in Saudi classrooms. As such, they represent a valuable resource, which should be supported and encouraged' (Alkahtani, 2009, pp. 5, 6).

In the current study, I found that the questionnaire responses of teachers and students, were similar to those of my previous study (Alkahtani, 2009), as outlined above. Again, their responses emphasised that the new methods were bringing progress for teachers and students. As one student said, 'using new methods of teaching helps to improve student performance, so it's easy for students to understand and increase their self-confidence and help their teacher'. Another student said that 'the strong point in this project is the smart board because it makes the explanation of lessons very easy and decreases the time needed to teach the topic. In addition it can make the lesson more attractive and interesting'.

2.3 Issues relating to teaching style and classroom facilities

Many studies have reported on the importance of using modern facilities in order to improve teaching in Saudi schools (Alkahtani, 2009; Oyaid, 2009; Al-Buraidi, 2006). With regard to buildings, facilities and equipment in schools, it was revealed that many teaching facilities, such as reprographics that were necessary for teachers' day-to-day work, were either not

available or inadequate for their purpose. This added to teachers' feelings of disappointment and frustration. However, head teachers and teacher-supervisors generally took the view that more newly built schools tended to have the necessary facilities and equipment for successful teaching in the classroom (Alkahtani, 2009, p. 21). Both Abatain (2001) and Alshowaye (2002) reported on ICT provisions and facilities in different parts of Saudi Arabia. They found that some schools were poorly equipped to deliver ICT, not least because they were operating in 'rented houses' (this term refers to buildings that were not purposely built to serve as schools). Similarly, both studies picked up on the theme of heavy teacher workloads. For example, one of participants said that "teacher performances can be weak due to the class size, heavy workloads and the breakdown of equipment."

Heavy workloads can lead to excessive amounts of pressure and stress for teachers, which would only add to their negative feelings of being ignored. Furthermore, it was reported that opportunities for teachers to receive ICT training were poor. There were shortages and poor training opportunities for teachers to develop necessary ICT skills. There was a lack of computer equipment and concerns about the computer education study programme being too theoretical. This, the respondents reported, focused on computer programming rather than developing basic computer literacy skills. The latter would have enabled students, and staff, to develop the skills necessary to use computers as information sources and as work tools.

Writing in the *Alriyadh Newspaper*, Alauthman (2008) reported that there was an excessive reliance on the use of traditional teaching methods, despite the fact that modern methods could be more efficient, reduce the burden on teachers and improve academic performance. For example, sufficient reprographics facilities like printing, scanning and photocopying could save teacher's planning and preparation time and reduce the time students must spend on copying out material allowing more time. Allowing more time to be spent actually learning and teaching. He goes on to say that 'Today, teachers are encouraged to integrate technology into their personal and professional performance in order to complement the subject matter and to facilitate the teaching process.' Although they are noticing the positive aspects which, consequently will make things more efficient in addition to reducing burdens and so forth; however when you looking at it as an overview, it doesn't actually change the pedagogy.

As Albright (1999) noted: 'the knowledge explosion has required teachers to increase the effectiveness and efficiency of their teaching and learning, accomplishing more learning in less time; and this has been done through the use of ICT. Teachers have found much to commend

in ICT as an educational tool. First, it is a remarkable source of information for research and for class assignments. Second, technology offered the means for interpersonal communication to broaden teachers' experience through interactive collaboration with others around the globe' (Albright, 1999, cited in Al-rajih, 2008, p. 61). Indeed over half of the study's participants saw integration of modern equipment and the use of new technology as the strongest reforms in the project.

2.4 The case for ICT in schools and its requirements

In this section I consider some of the research findings on the integration of ICT into the school curriculum, in order to highlight some of the issues that have emerged. These may have a bearing on the findings from my fieldwork on teachers and students working with the programme.

From their research, Granger *et al.,* (2002) identified key factors necessary for the successful integration of ICT into the curriculum. These could be listed as follows:

- Access to up-to-date equipment that works
- Suitable materials/resources to support learning. Otherwise, frustrations and resistance can occur
- Suitable full-time technical support
- Ample learning opportunities for teachers to enable them update their knowledge and skills.

Clearly factors like these relate to the mechanics of the teaching learning process. Granger *et al.,* (2002, p. 487) also rightly pointed out that 'these findings suggest that the relationship between teachers' ICT skills and successful implementation is complex and not obviously predictive: attitudes, philosophies, communication, and access to skills training are also contributing factors, which both inform and are implicated in the notion of commitment'. This is a reminder of the complexity of the interactions between teacher, students and ICT and successful programme outcomes. Interestingly, in the context of the present research, they also found that '…computers have not transformed the teaching practices of a majority of teachers, particularly teachers of secondary academic subjects'. A paper by John offers an overview of presentations made to a symposium on 'teaching and learning with ICT, New Technology: new pedagogy?' He reports that:

1. 'The literature dealing with technology and pedagogy attests to the powerful impact ICT can have on the teaching and learning process.'
2. 'In various subject areas, there is also evidence that new technologies afford a range of opportunities for learning that can transform teaching and offer improved possibilities for learning .
3. 'It has also been claimed that using technology well in classrooms can even enable teachers to be more successful in helping students to be more effective citizens.'
4. 'In various subject areas, there is also evidence that new technologies afford a range of opportunities that can transform and offer improved possibilities for learning' (John, online, undated).

Accepting that there were some questions relating to methods used in this type of research, John suggests that the introduction of ICT into classroom settings 'can and does alter the traditional balance between teacher and learner' (John, online, not dated).

Cradler et al., (2002) also stressed the importance of the use of technology in enhancing students' education. They suggested that research is throwing more light on how to use technology effectively in schools in the support and enhancement of young people's academic performance. To stimulate that performance, 'collaborative activities and formative feedback are key components of instructional strategies that accompany effective technology implementation' (Cradler *et al.,* 2002, p. 49). They also stressed the crucial role of leadership in harnessing the technological resources available and fitting these with school improvement goals. Research, the writers suggested, points to the need to appreciate the necessity of combined efforts, if technology is to impact positively on students' academic performance. Furthermore they assert, 'Research and evaluation shows that technology can enable the development of critical thinking skills when students use technology presentation and communication tools to present, publish, and share results of projects' (Cradler et al., 2002, p. 48).

Demetriadis et al., (2003, p. 35) reported on their initial findings concerning how teachers in their study reacted to ICT being introduced into the curriculum. The teachers endorsed the training provided but pointed out that consistent support and training were necessary if they were to develop ICT into their teaching methodologies. The teachers were interested in using ICT to improve their professional profile and to gain from any possible learning benefits offered

by the use of ICT in schools. Grégoire et al., (1996, cited in John, online, not dated, p. 2) suggested that new technologies and student learning could 'stimulate the development of intellectual skills', 'contribute to the ways of learning knowledge, skills and attitudes, although this is dependent on previously acquired knowledge and the type of learning activity', and it could 'spur spontaneous interest more than traditional approaches'. They also found that 'students using new technologies concentrate more than students in traditional settings.' Commenting on these 'positive images', John (online, not dated, p. 2) expressed two important related reservations.

Firstly, what students gain from the use of new technologies was, at present, dependent 'on the technological skills of the teacher and the teacher's attitude to the presence of the technology in teaching?' Secondly, these depended largely on the training received by staff in this area' (p. 2). A real change was underway in some classrooms 'from seeing technology less as a patient tutor and more as a tool which can facilitate inquiry and critical thinking'. One consequence of this was teachers having to 'accept that learning in such an environment is often chaotic, messy (and might) have no tangible beginnings and ends'. This might create 'more confusion before genuine understanding occurs' (John, online, not dated, p. 13) (this view has been expressed however, people require a clear research to grounded) which could be an unfortunate disadvantage of the reform if the teacher is not adequate prepared to cope with its various measures.

As can be seen a number of issues arise regarding the integration of ICT into study programmes. These include providing appropriate training, especially for teachers, before the programme starts and on an on-going basis, as required (Goktas et al., 2009; Wright & Macrow, 2006). This training needs to be related to the operation of the equipment and to the curriculum, in terms of content and methods. There is also the matter of equipment. This needs to be available and in good working order. Easy access to technical support to keep equipment working is a vital necessity, in supporting teachers and students; this is a shift from transmission to enquiry. However, there are issues in association to ICT but that by itself does not underpin a change from transmission to enquiry; all it does is make the ICT very efficient but that efficiency in ICT can support transmission as much as it can support enquiry, something else needs to be undergone in order to make that shift from transmission to enquiry (Ihebereme, 2010). It cannot be done without the efficient resources and other contributing elements to the change. But of course support by itself does not make all the differences

between the transmission model and enquiry learning. Next I will be exploring the formal education: its organisation and resourcing, policy and vision.

2.5 Formal education: its organisation and resourcing, policy and vision

Education is a key factor in the development of any country, both for the individual citizens, in term of the opportunities and self-advancement it provides, and the overall country's needs. As a result of this many policy-makers give careful attention to trying to find the best appropriate forms of organisation and resourcing for the implementation of particular education policies. The success of individual policies, overall education standards and the success of attempts and policies aimed at reform and improvement can act as a sign of a country's evolution.

Robinson (2009) saw education as serving four basic functions: individual, cultural, economic and social. It seems to me that we should include political, ethical, and radical education. Radical democratic education would make a distinction as does Freire (1972) between it and the so called 'banking module'. The latter offers the image of education as designed to handle money. Just as one might deposit money in the bank or draw money from it, the educational process trades in information and knowledge. The emancipatory is tied up with freedom and democracy in contrast to the banking and transmutation modules which sets out to filling people with the necessary information and skills so that they can later function effectively with knowledge and skills for the world of work, for citizenship and so forth. It also served to see education as preparing people to have a free or equal part to play in a democracy therefore education a little bit different for those who favour a more emancipatory radical democratic framework that people, like Freire, talk about, and Fielding and Moss.

As Robinson (2009, p. *x*) argued, 'effective schools sit at the heart of strong communities. Through outreach programmes, work with adults, and partnerships with parents and families, schools must foster the spirit and practice of community life and responsibilities'. This recognises the need for strong partnerships between schools and the communities they serve. Effective schools, in managerialistic terms, are ones that meet the objectives they have been set.

Bassett (2002, online) believed that every school had to create its own policy, if it was to achieve the best outcomes by enabling all participants to work together to make the best possible use of its human resources. Yet in many countries, including Saudi Arabia, the

national Ministry of Education is in charge of and produces (or closely controls) this policy, together with an appropriate vision for the nation. He considered that:

> *"Many independent schools … are already ahead of the curve in creating a vision for the 21st century schools. I think, in particular, of those independent schools that are: exploring and transforming their approaches to education via technology (especially the 'laptop' schools); examining new strategies for allocation of time (such as block scheduling, the four-day class week, the twelve-month school); integrating community service into the curriculum via service-learning programmes; experimenting with and adopting or modifying new educational philosophies (for example, the Reggio Emilia approach to elementary education or "problem-based learning" at the middle-school and secondary-school levels); adopting performance standards for learning (as done, for example, by schools in the Coalition of Essential Schools) and new curriculum structures for organizing the delivery of educational services (through mapping curriculum initiatives, for example, or through use of the multiple intelligences approach)" (Bassett, 2002, online).*

With reference to the last point, Bassett addressed the question of what a school should do to enhance its pedagogy and its curriculum, he suggested the setting up of a taskforce whose remit it was 'to answer one question': "What skills and values will students need to be successful in future educational settings, as employees in the workplace, as family members, and as citizens?"' He considered that "the answers gathered will point schools in the direction of more emphasis on - and more curricular programming for - different pedagogical approaches to problem-solving, ethical decision-making, accessing and discriminating knowledge via the new technologies, working effectively in teams, leadership development, communications skills (including public speaking), and conflict-resolution" (Bassett, 2002, online).

2.6 Competing Visions of Education

According to Marshall and O'Day (1990, p. 235) 'Two points affect the vision of education. Firstly, there are school outcomes". It has been observed that many see this kind of term as implying a neoliberal, new managerialistic vision of how schools may be used to shape populations for elite purposes. Marshall and O'Day (1990, p. 235) suggested that: 'If our goal is to improve student outcomes and we believe that to accomplish this goal we must change what happens in the school itself, one obvious place to begin a discussion of strategy is with a picture of the kind of schools we would like to see in the future'. Marshall and O'Day further suggested that a variety of characteristics should drive such a vision. They also argued that 'schools within a state should operate within a coherent set of policies and practices that encourage and support a challenging and engaging curriculum and instructional program.

State vision statements would clearly go far deeper than these general statements' (Marshall and O'Day, 1990, p. 246).

Furthermore, the policy typically addresses the issue of preparing a nation's youth for the work market. As Hannan and Smyth (not dated, online) pointed out: 'The relationship between education and employment, and school-to-work transitions has been the subject of substantial research over the last decade and has formed a large part of the European Union's 5th Framework Programme (1998-2002 and the following frameworks until the current arisen 2002). High unemployment rates for young people have caused concern for twenty years or more, leading researchers and policy-makers to focus on the school-to-work transition stage of young people's lives'.

In global terms, Robinson shared the same idea: the (school) system evolved through the first half of the twentieth century and it focused on providing education for children in order to prepare them to fill new roles in the growing workforce, which saw a move from an agricultural-focused to an industrial-driven economy' (Robinson, 2009, p. 5). This has led to problems in Saudi Arabia, such as low employment amongst young people. In this respect, the *Aleqtisadiah* newspaper reported the results of a survey which showed that unemployment in the Kingdom was nearly 12% in 2013. Furthermore, 46.2% of those unemployed had a Bachelor's Degree. From this, it was argued that the output of education in Saudi Arabia does not fit with requirements of the labour market" (Alabdulah, 2014, online).

Mills (online, undated) shared the same idea, and stressed the importance of curriculum change. He argued: 'Curriculum innovation is important for other reasons too, not least because 'the practice of teaching has changed little over the past century'.

For example, Mills argued that developments in neuroscience and cognitive psychology offered new insights into how children learn. He then goes on: 'new technology offers new ways to enhance and extend when, where and how learning takes place'.

Globalisation and the economic challenges it brings mean that certain skills and mind-sets need to be more explicitly developed in schools if children are to flourish in an uncertain future. Any new curriculum should build on the best advantages from the past but should also be oriented towards the future. We had a 'responsibility to keep the way we organise learning under review and to bring to bear the potential benefits of new knowledge and new ways of doing things' (Mills, online, undated, p. 2).

In contrast, in *Democracy and Education*, Dewey views one such approach to the study would focus on schools as 'laboratories of social innovation'. Dewey argued that it was 'not the target but hitting the target had become the end in view' (2011, p. 81). I think what he means by education and thereby the policy implication what he means by education is inextricably linked to democracy so education and democracy are very closely allied. Part of the purposes for him about education is to get young people enlivening the experience of democracy. He set in motion progressive discovery learning approaches to education, focussing on the individual as 'an active discoverer of things'. In his view, policy and visions were definitely critical for students. Educators, parents and policymakers should seek to prepare them for the future. In recent decades there have been a vast number of developments in education. As such when comparing the education across the generations, the educational experience of the adults of today's society is very different, because of the advances in computer technology. However, how that technology is being used may be remarkably similar to old uses of technology, like blackboard and chalk and so forth. The challenge is to explore how, in democratic terms, technology is used or can be used to allow young people to be more in control of their learning.

Both the traditional and the modern classroom are associated with passing on knowledge and skills, promoting learning and preparing students for adult life. Both types will have tables and chairs, but the difference would lie in the layout of the furniture. In the traditional classroom, one might find the desks arranged in rows facing the blackboard and the teacher. The modern classroom might well have the tables and chairs arranged in clusters, facilitating group work activities. Relationships are different, with the traditional teacher giving the lesson from the front. In the modern classroom, however, learning may well involve partnerships. The modern teacher may thus have a facilitator role to play, guiding and helping the students to find out the information they need, perhaps using ICT and the Internet and reporting back to the class, using the whiteboard.

A lot has changed in the classroom since the 1970's and 1980's, when I attended school, and the 2000's, when my children went to school. There was the massive difference when the computer came in. Currently the teacher has the smart board to work with, but it is still basically a board for focusing the students' attention in the way that the blackboard used to do. The children might get called to the board to make changes or move something on the smart board. However the teacher is still in charge of the smart board but the relationship is different. Moreover as John (not dated) noted, 'incorporating ICT into classroom situations can and does

alter the traditional balance between teacher and learner'. Amongst other things, ICT has been added to the curriculum.

Facer argued that 'for the last two decades, the ideas of the future that have dominated educational policy have been structured around two stories of the relationship between education and socio-technical change' (Facer, 2011, p. 2). She argued that 'rapid technological change in the 21st century will lead to increased competition between individuals and nations; education's role is to equip individuals and nations for that competition by developing "twenty-first century skills" that will allow them to adapt and reconfigure themselves for this new market'. However, she considered that education and educators were 'ill-equipped to make those changes, as they have failed to adapt successfully to technological developments over the last 100 years. Educational change therefore needs direction from the outside' (Facer, 2011, p. 3).

The main aim here is to prepare students for the future. This may involve issues such as developing their skills, knowledge and aptitudes to enable them to develop in their country in different fields, which eventually will help them to become better citizens. However, what might be considered suitable for use in English schools might not be so for Saudi schools or ones in another country due to the cultural context in which they operate. Here, some may have thought about the future, but in every country and in every cultural context there are issues. Consequently, I need to explore the voices of people in Saudi in order to see how they are interpreting these big technological changes within their practice.

> Robinson's principles are:
> "Each school is different and every child is unique. Consequently, there isn't a single model of this new paradigm of education that will work everywhere. The task for educators is to apply these principles creatively with their own communities, to find what works best in their own here and now. It's the only approach to education that really works, and the only one that ever has" (Robinson, 2009, p. xi).

Moving on, in this next section, I will be explaining the background of Saudi Education.

2.7 The Saudi Secondary Education Context and its Objectives

It is now appropriate here to focus on the Saudi curriculum, its conception and its objectives. Consideration of any school system would be incomplete without reference to the Government policy to be made for its students and for the broader society it serves. These are set out in

the form of objectives. They characterise the expected outcomes of the school system, with regard to the behaviours, skills and knowledge to be developed by its citizenry and in helping prepare young people for their adult lives. As the following will show, Saudi education is closely bound to Islam, which underpins all aspects of Saudi life and society.

Education in Saudi Arabia operates under a highly centralized system. This means that it is the policymaker who is in charge produces the curriculum. Although Hopkins (2002, p. 15) was talking about western countries their views hold true also for Saudi Arabia as he reported: 'in most Western countries there appear to be seemingly contradictory views on centralisation (that is, increasing government control over policy and direction) on the one hand, and decentralization (that is, more responsibility for implementation, resource management and evaluation at the local level) on the other, often making it very difficult for schools and local authorities to implement successfully innovations that make a real difference to the quality of schooling and pupil achievement'.

2.8 The Objectives of Secondary Education in Saudi Arabia

The objectives of secondary education are set out in an official document issued by the Supreme Committee of Education Policy in Saudi Arabia in 1390AH (1970). From my review of the literature, I've only found this critique of Saudi Secondary Educational objectives which are in the words of Alshimairi (my translation from the Arabic; Alshamiri, not dated, online).

1. The pursuit of loyalty to Allah alone.
2. To support the Islamic faith which helps students to have positive views on the universe and human life, and provide them with fundamental basic concepts and Islamic culture.
3. To enable them to belong to the nation of Islam.
4. Achieve the fulfilment of the Islamic nation and of the motherland (Saudi Arabia).
5. Looking after students' talents, which appear in this age, and guide them to achieve the objectives of Islamic education in general.
6. Developing logical thinking in students, developing in them research and experimentation skills, including library reference skills and developing good study methods.
7. Preparing them for further study at various levels in higher institutes and university faculties in various disciplines.
8. To prepare all students to enter the world of work at a decent level.

9. To train skilled workers and professionals to meet the country's needs through education, to perform the religious functions and provide personnel for fields of activity, such as agriculture, commerce and industry, and others.

10. To develop awareness of the family and to build an Islamic one.

11. To provide care for young people based on Islam, and treat their thinking and emotional problems and help them to go through this critical period in their lives successfully and peacefully.

12. Develop their reading and encourage them to increase their knowledge, good work and utilise their leisure time profitably to develop their personalities and society, as a whole.

13. Develop a positive awareness in students to enable them to resist any subversion or misleading trends (Alshamiri, not dated, online).

Alshamiri (not dated, online) discusses the objectives of Saudi secondary education.

I have chosen here to refer to some of the objectives, as they seemed to be especially relevant to the present study. However, first I intend to make reference to objective 2, namely *to strengthen Islamic doctrine*, and which is a reminder of the importance attached by Islam to all aspects of life in Saudi society (and other Islamic societies) (Alshamiri, not dated, online).

Alshamiri added that since the traditional secondary education is for all students, the clever students and average ones and even students with learning difficulties; all of them must study the same curriculum in mixed ability classes. It may be said the traditional curriculum has been designed to suit the average students in their education ability because they represent the majority of students, but in fact this is not fair and is detrimental to the skills and talents of other highly intelligent students. From this point of view, it is clear that traditional secondary schools are unable to offer differentiation to cater for variations in students' abilities and needs. It is necessary to create new schools which are capable of providing different and varied methods of learning. In the schools of the King Abdullah Project every class is made up of children of mixed abilities. The intention then will be to orient the students gradually enabling them to find the best programme for each student, one that is appropriate to meet their abilities and aspirations on the one hand and their social needs on the other (Alshamiri, not dated, online).

I will now make a reference based on Alshamiri's work to three further the objectives, ones which closely relate to the work of the King Abdullah Project schools in developing their students.

Objective 6: *Developing logical thinking in students, developing in them research and experimentation skills, including library reference skills and developing good study methods.*

The traditional secondary school curriculum is incapable of delivering independent thinking and problem-solving skills to students. It seems to me that these skills are very important and required for successful studies in university. In order to ensure that students have the abilities required to continue their studies at higher levels, both scientific and academic skills need to be developed with regards to all different fields of study. Developing their skills base would mean students would develop their ability to think critically and creatively. This could come about by enhancing their solving problem skills, improving the way they cooperated with one another, helping their communication skills and refining their writing skills, so they could write effectively, developing their reading skills, enabling them to read and understand the meaning in depth, and guiding students on how to solve problems through research (Alshamiri, not dated, online, *my* translation from Arabic).

Objective 8: *Preparation of students for the world of work.*

As Alshamiri (not dated, online) noted, the learning-based curricula does not bring students face-to-face with real-life problems. Young adults must also be equipped with the basic practical skills and functional preparation required for the world of work. According to Alshamiri a new approach which combines both theoretical and curricula-based learning with more practical and functionally- based learning is needed in order for the education system to more effectively meet the needs of the labour market (not dated, online). Indeed, Allen and DeWeert argued that the link between higher education and the labour market can be understood and viewed against the knowledge and skills that higher education had on offer for its graduates to fulfil employment requirements (Allen and DeWeert, 2007).

In my view, comprehensive modernization and ongoing revision of the contents of the secondary study curriculum requires serious attention. In this respect Thomas (2005) argued that ongoing modernization and revision prompted thoughts of easy access to ICT. However, according to Thomas the use of ICT was challenging, allowing a glimpse of wider resource options arising from the development. It can provide learning support. In Thomas's view this was a huge advantage of the development. It helps create a positive environment with the staff and brings with it respect and fairness between both teachers and support staff, another benefit of redevelopment. This creates many paths for the benefit of the students and the staff

in order to prepare the students for working in real life situations and training them in what may approach them in the future, but which also has the chance to give them a productive life.

In Mustfa's (2006) view, secondary schools needed to be oriented to developing more practical characteristics and also be more coherent with real life in Arab countries and production operations in each local environment. The secondary curriculum must be supported by practical programmes and activities. Schools must be micro civilisations and learning centres and be open to the surrounding community. Academic learning and production work must be considered as one and integrated into the curriculum. The school day must be made longer (Mustfa, 2006, *my* translation from the Arabic). Byrne (2013) reports that many countries are seeking to bring in changes in order to meet that objective. For instance, recent research presented from a study on the UK education system reported that changes were being made in order to address the challenges they faced in planning and implementing competence-based curricula (CBC). As he noted, these curricula were "based on the rationale that they better prepare all students for the constant changes in human knowledge and understanding. They develop transferable skills rather than subject-specific content and are considered necessary requirements for learners as future productive members of society in the twenty-first century" (Byrne, 2013, p. 335).

> Objective 12: *Develop their reading and encourage them to increase their knowledge, good work and utilise their leisure time profitably to develop their personalities and society, as a whole.*

In order to develop an optimum level of interest from students in reading useful books and to develop a desire to read more, the provision of a good library is essential: It must contain many books and reference sources. It must be able to enhance students' reading skills, and encourage them to look for other scientific achievements, to help them how to get knowledge and what they look for from facts and information to be added and to support what they already have. But unfortunately the existing secondary school libraries are just displays, administered by untrained staff. Good utilisation of students' free time requires schools to be open all the year round, morning and evening, and throughout the summer holidays. Entertainment facilities must be provided in addition to cultural competitions between students (Alshamiri, not dated, online, *my* translation from Arabic). Alshraqawi pointed out, the general aims of General Education in the Gulf States, including Saudi Arabia, need to focus on the following:

1. A real functional framework to meet all the demands of the curriculum;
2. The aims must be changed into real action, be clear, and take account of the student

as a whole person;

3. Provision for students with all necessary practical skills to meet the needs of society, helping them to engage effectively in different production operations and creating balance and integration among all subjects (Alshraqawi, 2004, *my* translation from the Arabic).   Al Shamiri (2006), however, highlights some weaknesses in the current objectives of Saudi education and calls on the Ministry of Education to change the curriculum for Saudi students to allow them to learn how to research and gain skills that will prepare them for the world of work in the 21st Century.

2.9 The traditional Saudi curriculum and the new programme

Based on my reading, there are a number of significant problems that need to be dealt with in the Saudi traditional secondary school curriculum(see, for example, Alsaif, 1996, Alafnan, 2000; Ababatain, 2001; Alshowaye, 2002; Aboulfaraj, 2004, Alalwani, 2005; Al-Maini, 2011; Alsharidah, 2012; Alsolami, 2013; Alhawiti, 2013;). These include: traditional teaching relies on providing students with a myriad of information, and having to memorise facts without any student participation in their learning, with little regard for developing research skills, learner autonomy or critical thinking skills. In addition, teachers concentrate on covering the content of the textbook and presenting the lesson.

Some aspects are missing from the traditional curriculum, such as creative and practical work. On the traditional view's; the teacher feeds students with the required information from the textbook and then sets the questions for the next examination from the previous one. Testing does not include any questions or items designed to show creativity or thinking. The teacher's job is to get the students to listen and to transfer the information from the blackboard to their files, and ultimately to their test or exam paper. The traditional curriculum does not help raise the level of thinking in students, nor encourage them to be critical, creative, or express their opinions and explain things, developing their reasoning and problem-solving skills, through making presentations to their fellow students.

In Shatah's (2003) opinion, a reduction is needed in the volume of curriculum content and greater attention needs to be given to grasping concepts and solving problems and for these reasons. The students are the main focus of the education process within the tradition of (Dewey, 2011) student-centred education. They should are viewed from two angles: Firstly, there is the investment angle, because human resources have a vital role to play in the development process; and secondly, they represent the nation's future, as they will be

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responsible tomorrow for managing the country and its available resources. New concepts should are constantly be introduced into the curriculum, ones that relate to the realities of the present day and those of the future. This contributes to developing students' characters. Such concepts could include the environment and how to care for it and to retain its resources, and political concepts. Extra-curricular activities should be introduced, such as independent thinking skills, artistic ones, by presenting suitable practical technology skills according to their abilities and aptitudes (Shatah, 2003).

The Saudi project programme aims to develop students' learning skills, and to contribute to the building of a knowledge-based society. It also seeks to promote care, values, positive trends and practices, as well as developing social skills including communication skills. Thinking skills and problem-solving skills should be developed. The project curriculum also seeks to develop leadership skills and foster the building of community partnerships (Tatweer, online). Bascia and Rottmann (2011) see educational reform 'as a major political platform', attracting the attention of politicians and educational researchers world-wide. They further point out that a fundamental shift is needed to ensure that such reforms actually improve education. It requires, they argue, abandoning the factory model paradigm in favour of 'a different conceptualization of the connections between teaching and learning, and the regulatory, organizational, material, and normative factors that influence them'. Policy-makers and researchers need to recognise 'the centrality of teaching conditions and the need to better understand their role in educational reform' (Bascia and Rottmann, 2011, p. 798).

2.10 Final thoughts

Although, very little has been mentioned about the shift from transmission to an enquiry-based approach including resources, objectives, and so forth, all of them are vital to undergo this change. Nonetheless, this calls for more awareness on how to bring out the adjustment from transmission to enquiry; and without this step not much is going to change.

According to Alhagil (2011), Saudi Arabia, like other countries around the world, is drawing up policy documents in the attempt to bring about changes and he argues that these changes are intended to give education a high priority because it is one of the most important factors in the renewal of a nation. Indeed this is true of many other countries, and society more widely, with many sociologists seeing the role of schools in education as being to reproduce the social order rather than change it.

A successful education system is based on the application of a strategy requiring clear decisions in line with the needs of the Saudi national development plans. Alhagil pointed out that the Ministry of Education in Saudi Arabia is aware of that and is seeking to make changes to shape young people so that they can meet the needs of the social, political and economic order of their society (Alhagil , 2011,my translation from the Arabic).

In summary, as Alhagil (2011) argues, reform of the Saudi curriculum is imperative so that improvements in education can help young people to develop the necessary skills needed to cope economically, politically and educationally in today's complex society. Indeed, the current economic climate has already negatively affected today's generation. Any additional setbacks such as an inadequate education would only disadvantage them further. The hardships such individuals face, for instance, delays, or in some cases the inability to enter the property market, marry, reproduce and find fulfilling careers, could have a detrimental economic and social impact on society more generally (*my* translation from the Arabic).

The use of ICT provides an opportunity for everyone to learn according to their ability and improve the methods of teaching and learning and brings scientific research and independent study to education. The introduction of ICT involves equipping schools with new facilities to increase the effectiveness of the curriculum. In order to make changes in the education system, then there needs to be a clear policy, based on clear decisions not only with national development plans but also with the future vision (in consideration) for the country, but also with the resources to make it happen. If the aim of government policy is to create an agricultural society the curriculum should transfer to encourage an agricultural, economic or commercial focus, as in South Korea, where the aim of government policy is to create a modern society, you might note that this is in addition to learning to think for themselves, which is one of the skills that they will probably need. It can be argued that students should reason out the educations they need, students should also learn which their country wants them to learn to move the country forward. Singapore also applies the same application to make its nation become an industrial society (Shatah, 2003). Malaysia owes a lot to the drive of their leader, Mahathir Mohamad. 'His essentially pragmatic policies at home helped transform Malaysia into an Asian economic tiger' (BBC, online, 2003).

As Yusof (1998, online) argued, 'For any proposal to improve the education system, a clear understanding on the current national policy is vital'. Since its initiation, 'Vision 2020 has

become a major guideline for any policy formulation in the country, not excluding the education policy'.

Its basic aim was to create a 'developed Malaysia' by the year 2020… covering overall achievements in terms of national unity, social integration, economic standards, social justice, political stability and improving the quality of life, both in the social and spiritual aspects as well as in instilling pride and confidence in the nation. The essence of creating a progressive society with high level scientific and technological achievement demands quality human resources with a base of a quality education system (Yusof, 1998, online).

An official from the Saudi Ministry of Education set out the reasons for developing the Saudi curriculum, stating that the Saudi project aims to 'to develop comprehensive educational curricula to make a qualitative leap forward in education through radical change in the curricula to cope with the rapid pace of local and global developments, and the provision of effective means to achieve the objectives of education policy in a complementary manner, and to determine the important skills that students should learn from each academic year and connect all the knowledge they have taken into the real world, and develop critical thinking skills and performance, and the development of skills and attitudes and values needed for productive work'. 'Nowadays, after the rapid developments in Saudi society in terms of contemporary cultural, economic and technical matters, the ways of daily life required corresponding changes to prepare Saudi young people in readiness to deal with the communications revolution, knowledge, and globalization, economics. As result of that the Ministry of Education should address the international technological revolution which will affect Saudi students enabling them to benefit from the technological outcomes.

The current curriculum needs qualitative development to be appropriate for scientific progress, social and economic transformations will continue to bring changes both in the present time and in the future' (*Asharq Al awsat* newspaper, Alshamari, 2006, *my* translation from the Arabic).

The characterisation of curriculum change which I have been considering provides only an outline for the setting of my research. If we are to understand better the experiences and reactions of the participants working with the programme, then it is useful to consider the climate in these Saudi schools and to see how these might also be reflected in studies exploring curriculum change in other schools. How well is the new curriculum received by teachers and students? Are they more comfortable working with it now, or not, and in what

ways? How are they coming to terms with the demands of the programme, as in the case of the Saudi schools, as regards new working relationships between teachers and their students? How easy (if at all) is it for teachers to take on the role of learning facilitator instead of that of the traditional teacher who controlled the classroom and its students?

Do teachers find that the training they received before they started teaching the programme was helpful to them? How does the Saudi experience of curriculum change compare (if at all) with that in other schools working with a new curriculum, especially one involving the use of ICT? Finally, what lessons, if any, might be learned from the experience of other countries, as regards coping with curriculum change?

This chapter has addressed the Background to Teaching and Learning in Saudi Arabia in Relationship to the King Abdullah project. In the next chapter attention turns to the literature review.

Chapter Three

Literature Review

3. Literature Review

3.1 Introduction

The previous chapter set out to characterise the Saudi background to teaching and learning of this study. Providing such a context, as was explained, would help the reader (especially the Western reader) to better understand the setting in which my study was set. The present chapter presents a review of literature relating to change and its management in institutional contexts. This is illustrated with reference to the work of Lewin, Kotter and Fullan. Lewin's pioneering work on motivation and group interaction has provided the foundation for the field of social psychology and for studies of the dynamics of social change. Lewin also developed the method of Action Research, by which educators and others can analyse their own actions at work, develop hypotheses about the effects of these actions and then experiment with new actions, to see if they result in different effects. Following this method, a single teacher in a classroom may develop original teaching techniques (Sagor, 2000).

Kotter and Fullan have been influential in recommending ways of introducing change into social structures, such as corporations and educational systems, based on Lewin's model of change by unfreezing traditional practices and views. Kotter's method maintains control very much in the hands of the top management, but it introduces enough distribution of authority at other levels to enable change to take place. Fullan's method allows far wider distribution of authority and potentially may take decision-making away from top management.

In the latter part of the chapter, attention then turns to reviewing change in the classroom by reference to studies relating to the integration of independent thinking into school and the integration of ICT skills and equipment into the curriculum. The chapter then turns to a discussion of literature relating to the Saudi education experience of curriculum change and the challenges posed. Finally, I discuss the research questions in light of the literature review.

3.2 Strategies for Managing Change in Education

As is now established, this study addresses how the King Abdullah schools in Saudi Arabia are going about managing change in order to give Saudi young people an education appropriate for the twenty-first century. Hence the importance of well-organised support and direction for those involved. As the research literature shows, managerial style impacts on the reactions and behaviour of participants, especially within organisations such as schools. I begin by considering the contribution of Lewin to this work.

3.2.1 Lewin's continuum of distributions of centralization of decision-making

In a famous experiment which has special relevance for education, Kurt Lewin, a pioneer of experimental social psychology, studied the effects on students activity groups of three different types of manager: the ***autocratic*** manager, who made decisions about the what the groups would do with essentially no input from the students; the ***democratic*** manager, who empowered the students to participate as groups in making decisions about their activities, although the leader offered guidance; and the ***laissez-faire*** manager, who provided little or no leadership and left decision making to the boys. ***Autocratic*** organizations are also often referred to as ***top-down,*** because decisions and power tend to flow from top management down, and democratic organizations, in which many decisions are made at the lower levels, are referred to as ***bottom-up***. Lewin found that students with ***autocratic*** managers were more productive than boys in other types of groups; that is, by unquestioningly following orders, they accomplished more of their assigned tasks. But they were also more dissatisfied and either more aggressive or more apathetic than boys with other types of managers. Students with ***democratic*** managers were more cooperative and enjoyed their activities more.

There were less productive than boys in autocratic groups, but produced creative work of a much higher quality, probably because their own interests and thinking were invested in the work. Students with ***laissez-faire*** managers were not dissatisfied, but were less productive than either of the other groups; they made more demands on the leader because they were unable to work independently and they were also unable to cooperate. These three managerial types—on a continuum from highly centralised authority to completely decentralised authority—provide a useful structure within which to discuss different styles of centralisation of power in teaching and educational decision making (Neumann, undated, on line; Cherry, undated, online).

Lewin and subsequent students of the social and psychological processes of education have found that higher student morale, creativeness and in-depth learning tend to result from systems with more elements of Lewin's *democratic* managerial style, which encourages decision-making by students with guidance from the teacher. It is also generally agreed that failure to learn or to be enthusiastic about learning is a common result when students have extreme licence to do whatever they want, as in Lewin's *laissez-faire* model, in which the teacher has no role or almost no role at all. Lewin's *autocratic* style, which allows very little freedom to question or speculate, is believed to result in extremely successful rote learning,

but failure to understand in depth or remember well, and it sometimes leads to apathy or resentment (Burnes, 2004; Schein, 2010; Steele 1986, 2000; Weick and Quinn, 1999).

In studying changes of habits and values, Lewin found that subjects were more likely to change if they discussed the pros and cons of the change with each other rather than if they made the decisions individually. Presumably, in talking about them, they thought about the issues more deeply and came to "own" the viewpoints that they arrived at and defended in discussions. This understanding in depth and investment in ideas was probably an important reason why the students in Lewin's *democratic* groups, who made many plans together in group discussions, produced more creative outcomes.

It is now recognized that students who research topics of their own choosing, and then discuss and explain their findings to the class (as in the King Abdullah Project) are more likely to remember and use their findings than students who only take notes during lectures. A similar finding is that students, who learn collaboratively, just with each other or with the teacher, also learn in more depth and remember better. In both cases, the students think about the subject matter more deeply if they have to explain it to other students (Neumann, undated, on line; Schein, 1996; Weick and Quinn, 1999). These findings are the basis for the independent thinking, presentation of research results and collaborative learning aspects of the King Abdullah Project.

Contemporary independent thinking teaching and learning programmes, like the King Abdullah Project, are normally not as far toward the decentralised side of Lewin's continuum as his *democratic* model, in which the students plan their own activities with only slight guidance from their leader. Even schools that incorporate quite a large number of the *democratic* elements usually leave it to their managers to set their rules and the material that is studied. A recent movement in Western schooling, however, called *radical education* (Fielding and Moss, 2011), is probably closer to the *democratic* style than most other Western school methods. Students share in running these radical schools (which are often fairly small). They learn to discuss and decide issues by taking part in class and school elections and they learn to negotiate compromises between different viewpoints by sitting on committees, often with teachers or members of the community.

Teachers also collaborate with heads in planning school policies and projects, and there seems to be little influence of extra-school management. Students tend to have considerable freedom to choose and change classes and major fields and they are not held in age grades. Unlike most schools, the radical "common schools" see themselves as embedded in the surrounding

community, sharing authority with it, offering an open door and specific services of many kinds—economic and educational support, family support and support of diverse cultures, languages, genders and ages. Fielding and Moss (2011) say, "Rather than the school as business or the school as high-performance organisation, we have the school as a forum or place of encounter between citizens young and old, a space where all citizens for an important part of their lives come together; and as a collaborative workshop full of potential and possibilities" (p. 57).

The radical education movement is driven by political concerns, by a fear of anti-democratic initiatives such as those currently associated with some powerful corporations, which sponsor efficient, top-down schools that teach lessons by rote and inculcate obedient, passive attitudes (Fielding and Moss, 2011). Fielding and Moss write of the need to "confront the growing dangers facing humankind that prevent flourishing and even put our very survival at risk" (p. 57). The students in these radical schools are being educated to be active citizens and leaders in a democratic society. Such a degree of shared decision-making should develop an admirable level of independent thinking, creativity and self-confidence.

Yet this type of education is criticized for several reasons. Many countries, including Saudi Arabia, tend to believe that tradition and authority should be in charge of setting the curriculum and rules of behaviour in schools, including respect for authority. The King Abdullah Project does not call for students to run the schools or to choose the subject matter of their classes, and neither activity would be appropriate under the values of Saudi culture.

Bottery (2004) argues that certain decisions must be made by a higher bureaucracy in order to ensure that all children have much the same education: they need an equal division of the same equipment, for instance, taking advantage of economies of scale to buy it; they will need to have similar curricula, teaching methods, discipline, systems of assessment and grading, and teacher training. This is to help ensure equal opportunity for every child to achieve up to the level of their competence.

Another objection to radical education, mentioned by Fielding and Moss (2011), is that even teachers who are committed to radical education may nevertheless complain that they lack time to focus on teaching, because of time spent working on political projects. Fielding and Moss (2011) in fact, although they admire the movement, say, "What we need is less emphasis on restructuring hierarchical leadership and more courage to enable teachers and students with managers to work on developing learning processes and the contextual settings in which

they are located. Such an approach would politicise schools around pedagogy rather than around glossy manifestos" (Fielding and Moss, 2011, p. 138).

3.3 Principles of management of social change

Lewin's models of social and psychological change were based on his *force field* analysis, which assumed that the behaviour of individuals needed to be understood as part of a "field" (using a magnetic field as a metaphor) of social and psychological forces. For instance, bottom-up decision-making (by groups, not only by individuals) will produce more independent thinking and creative outcomes than other distributions of decision-making, all else being equal. (Here "all else" means *other* social and psychological forces in the force field.)

Lewin defined a stable situation as one in which the forces promoting and restraining certain processes were more or less in equilibrium. To bring about a change, leaders either needed to strengthen the factors driving the change, or else weaken the factors holding it back. This basic model underlies most of the subsequent development of the field of management of social change in schools and other organisations. Lewin emphasised the importance to look at a large variety of means by which the strengthening or weakening of these forces could be implemented, and their side effects, before deciding how to proceed in effecting social change (Burnes, 2004; Cherry, undated, online; Greathouse, 1997; Neumann, undated, online; Weick and Quinn, 1999).

Another discovery of Lewin's that has shown much predictive value in later work is his *unfreeze-change-refreeze* model of social change. According to this model, as pressure for change grows, the group may relax its insistence on traditional values and behaviour (*unfreeze*), and a period of variability, experimentation and relaxation of respect for authority ensues (*change*). Without this period, it might be very difficult for changes to occur. After the social group has worked out which traditions are going to change and which will be retained, respect for authority and for the new set of correct rules can be re-established (*refreeze*). Clearly, the *change* phase is an interesting time when customs and rules may be open to changing in more than one direction. Recent studies of large, continuously changing corporations have suggested models in which there does not seem to be so much refreezing after a change is accomplished. The reason given for this is that increased global competition between corporations, outsourcing and fast-changing technology, as well as polarizing political viewpoints in education and competition in education between developing countries, all create

pressure for continuing change (Pfieffer and John, 1972; Burnes, 2004; Weick and Quinn, 1999).

Management of change has become an important focus of management research in the 20th and 21st centuries, as increased global competition between corporations, outsourcing, fast-changing technology and economic crises, as well as the effect of polarizing political viewpoints in education (mentioned above) and educational competition between developing countries has created pressure for more and more rapid change (Brisson-Banks, 2010). Smith *et al.,* (2007) say, "Change is part of the everyday life of an organisation. The ability to manage change has emerged as a core competency for corporations" (p. 41). The educational change currently under way in Saudi Arabia and many other countries is driven by competition in economic development, and typically, as in the Saudi case, involves the adoption of computer technology as a package along with teaching techniques that encourage independent thinking and creativity (Pfeiffer *et al.,* 2005; Pennington, 2013; Bridges, 1995 cited in Brisson-Banks, 2009; Fielding and Moss, 2011).

Many of the corporations and systems that attempt to change are large, top-down organisations (Hall, 2008). However, research has shown that top-down leadership is seldom as effective as bottom-up leadership in managing change. Praise for the effectiveness of democratic methods and leadership-sharing is therefore found throughout research-based change management literature (Kotter, 1995; Smith, 2001, on line; Dannemiller and Norlin, 2001; Brisson-Banks, 2010). Senge, (1998 quoted in Smith, 2001), has said that the bottom-up approach allows organisation members "to work productively toward common goals" (p.2, online). Dannemiller and Norlin (2001) say that it produces decisions that represent the organisation's collective wisdom. A common problem with top-down change is that the top leaders tend to order it to happen and leave the responsibility of creating changes in behaviour and attitudes to mid- and low-level managers. Some top-down leaders appear to expect that such changes will happen automatically once commands are given. The result is often poor communication at all levels.

Top management does not always receive accurate feedback because middle management may feel vulnerable if they tell leaders bad news about how the change is going; also, the change message is likely to be diluted or distorted as it trickles down through the bureaucracy especially if the change interferes with the established culture of parts of the organisation, as it may well do (Lee, 2003). Open communication throughout an organization improves the

likelihood of change taking place, because managers at different levels and in different parts of the structure may understand more about each other's experiences and viewpoints, and thus may be better able to compromise. This might increase the amount of bottom-up leadership and authority, which would produce a more democratic decision-making structure. Recommending ways to encourage change, Mohanty and Yadav (1996) suggest developing "transparent systems, trust building and identifying mutual concerns, [creating] voluntary commitment to [change] by way of dialogue, not through official memos, [and] conducting problem solving and decision-making, conflict resolution and collaborative management training to develop collective interactions between various functional groups" (p. 78).

Thus, the role of middle management is clearly crucial in promoting communication between the top and the bottom levels of an organisation, interpreting the change plans of top management to the lower levels and communicating questions and problems upward to the initiators of the change. Middle managers can promote or block the possibility of more democratic decision-making "democratic" in the sense that decisions by top management are influenced by the views of low-level management. If the past traditions of an organization have been heavily autocratic, as is generally the case in most traditional schools, it may be especially difficult for middle managers to open the gates to communication upward, to top management, instead of allowing only downward communication. If students or teachers are being encouraged to think and express opinions independently of mandated views, and to be listened to and respected by their teachers or head teachers (as in modern curricula like the one being trailed in Saudi Arabia), the inability of students, teachers or head teachers to express independent opinions to higher managers may be especially frustrating.

In educational change situations, the most crucial middle managers are probably the head teachers of each school, who usually have great influence within their schools. In the case of the King Abdullah Project, a key part of the bottom-up relationships being introduced is the relinquishment of power by the head teacher to the other teachers, who make more decisions by themselves or with the head teacher, in groups. This is echoed in the relinquishment of power by the teachers to their students, who do research independently under the guidance and encouragement of the teachers and often study collaboratively. Another advantage head teachers hold is their knowledge of the cultures of their schools, as well as their important role in establishing those cultures. They may be able to foresee and deal with reactions to change before they occur.

Kanter (1985) and Burke (2004) both have pointed out that the planners of change, as well as the middle-level managers, must understand the social dynamics of the whole system: social and psychological forces influencing strategic individuals and groups in different parts of the system. Different organisations, for instance, have different cultures and customs about how arbitrary the top manager is expected to be without consulting the rest of the organization. Thus, while head teachers will know the dynamics of their schools, they may also not be the only important leaders in those schools whose reactions must be foreseen in order to manage change.

Czerniak et al., (1999, cited in Oyaid, 2000) found that teachers tended to comply with the expectations of head teachers, other teachers, parents, and the community. Bottery (2004) and Gronn (2000) both suggest that more of the leadership within schools and workplaces is distributed and collaborative than is sometimes recognized. Gronn mentions different types of distributed leadership: spontaneous collaboration; intuitive working relations; institutionalized practices. Even formally autocratic organizations may have complex interactions involved in decision-making that are not always recognized by outsiders. Harris (2010) suggests that not enough is known about the different types of distributed leadership found in schools to know what their effects are on teaching and learning (Harris, 2010). Bossert et al., (1982) say "No single style of management seems appropriate for all schools. Principals must find the style and structures most suited to their own local situation.

A careful examination of quantitative studies of effective schools…suggests that certain principal behaviours have different effects in different organisational settings" (p. 38). Senge (1998, quoted by Smith, 2001, 2, online) says that "in such situations, only those who are flexible, adaptive and productive will excel. Organisations need to discover how to tap people's commitment and capacity to learn at all levels." Schein (2010) makes this point strongly: it is important for planners to understand the culture of an organisation and the potentials of individuals in it before trying to change it, if they are to lead effectively. If they do not, Schein suggests, the culture may lead them instead!

Clearly there is a contradiction between the top-down tendencies of many large organisations to mandate the changes they want and the belief of social change experts that bottom-up decision-making is far more effective in bringing about change. The solution recommended by change experts has been to introduce bottom-up methods, such as decentralisation of

leadership and empowerment of the lower levels of the organisation, while continuing to work toward the changes introduced from the top. In many cases of contemporary educational change, a major intention of the change is to transform more top-down, autocratic teaching methods into more democratic, bottom-up teaching methods, as in the King Abdullah Project, and thus the methods recommended to bring about the change are also, to a considerable degree, part of the change.

One way of doing this is to create a movement within the organisation, managed by trained organisers, to encourage the organization members to advocate for the change that top management wants, as in the Kotter method. Kotter (1995) says that it is necessary for successful change for an organisation to work as a team and to be united by a single vision (established by upper management, not by participants in the movement). This type of enthusiastic, visionary change program that sweeps up new members by emotion and through personal relationships with its organisers is called **transformational change** by Huber (2004). Personal acceptance of the vision of change by almost everyone, and certainly by all the important managers, is often suggested to be an essential condition for success. A study of change in 12 corporations by Beer *et al.,* (1990), for instance, found that most of their change programmes fell apart unless all departments and managers (that is, all the effective leadership of the organisation) were on board. However, other researchers have warned against "hasty assumptions that [official] managers are automatically leaders or that only managers lead. This implication is especially important for those commentators who utilise interchangeable leader–follower and superior–subordinate dyads." Pfeiffer *et al.,* (2005) also observed that if aspects of a strategy were not accepted fully by all members of a corporate management team, the strategy would almost certainly fail. One such model of a group united by a single vision and a single mind, called Hearts and Minds by Thurley (1979, cited in Brisson-Banks, 2010) consists of an all-out drive to change the attitudes and values of an entire organisation's membership, not requiring total participation in the change campaign, but at least commitment to a shared vision.

Mohanty and Yadav (1996) went into some detail about how building such a bottom-up campaign in a top-down organisation might proceed. They proposed designing human resource development programmes to build competence in leadership and team management in members of the organisation. Thus, a pool of skilled organisers would be available before the change plan was initiated. Next, they suggested creating an open communication process, developing "respect for the human system by evolving transparent systems, trust building and

identifying mutual concerns," gaining "voluntary commitment to action from willing people, by way of dialogue, not through official memos" and "conducting problem solving and decision making, conflict resolution and collaborative management training to develop collective interactions between various functional groups, to make cross-functional co-ordination a reality" (p. 78). Thus, the structures to carry through a democratic-looking change campaign would be in place before the leadership of the organisation launched the campaign.

3.4 Kotter's eight steps for managing organisational change

An example of a model of a successful transformational campaign carried out in a basically top-down organisation was presented in Kotter's eight steps (1995, summarised in Armstrong, 2006). This was one of the earliest sets of recommendations and was followed or only slightly altered by many later change experts. It gives a good idea of how the entire process might work. Kotter's steps do not begin with the planning phase, however, but rather with the first changes that participants would be aware of.

3.4.1 Kotter's eight steps

1. Establish a sense of urgency, looming crises or exciting opportunities. If this is not done (and continued) convincingly, the motivation to change may falter.

2. Form a powerful guiding coalition, containing major players whom other people will follow, or else the change will not get off the ground. This coalition must be welded into a team.

3. Create a vision, which everyone in the organisation is a part of and which maps where they are going. If most people don't understand where the change is going, the whole effort may fall apart.

4. Use every possible means— emails, meetings, fliers, personal contacts—to communicate the new vision and the strategies for achieving it. The guiding coalition should teach new behaviours by example.

5. Empower organisation members to find ways to get rid of obstacles to the vision. Encourage risk-taking and non-traditional ideas and actions. Also, get rid of individuals or groups who are acting as obstacles.

6. Plan and create short-term wins, such as clear performance improvement. Recognise and reward the employees involved. This keeps momentum going so that people continue to try.

7. Consolidate these improvements and keep pointing to still more change. As the credibility of the plan grows, change more systems, structures and policies that don't fit the vision.

Develop, promote or hire employees who can carry out the vision. Keep reinvigorating the campaign with new projects, new themes and new agents of change. Also, recognise that some changes take years, and don't declare victory prematurely.

8. Institutionalise the new approaches and keep making clear the connections between the new behaviours and corporate success. Develop ways to sustain leadership development and succession. This will help make the changes more likely to stay.

3.5 Fullan's eight guidelines for managing organizational change

This might be compared with Fullan's more *democratic* process, in Lewin's sense, in which management truly does not try to influence the final result, allowing the members of the organisation to follow their own ideas. There are two reasons why change experts might suggest such an approach to the management of organisations. The first is that the unspontaneous movements for change described by Kotter (1995; above) do not always succeed. "Implementing organisational change, either as a reaction to influences due to external changes or in anticipation of such changes, very often fails in operational practice. About 70 percent of all strategic reorientations fail in the implementation phase" (Pfeiffer et al, 2005, p. 307). The second is that plans for change sometimes go in unexpected directions when they are tried out in the field. For instance, many of the innovative teaching methods of the past half-century have not succeeded as hoped, and, in the end, have been more successful when they were merged with the older methods they were intended to replace (Pennington, 2009). With these possibilities in mind, Fullan (1993) proposed another eight steps—or actually guidelines—that would promote a greater degree of bottom-up decision making.

3.5.1 Fullan's eight guidelines

1. You cannot force change. The more complex the change the less you can force it. Educational change involves people taking on new beliefs, skills and understanding, which takes time.

2. Change is a journey, not a blueprint. Change is non-linear, loaded with uncertainty, and can be unpredictable.

3. Problems are our friends; problems are inevitable, but we cannot learn or be successful without them. The way problems are handled is vital to the success or failure of the change.

4. Vision and strategic planning come later. Premature vision and too rigid planning can be counterproductive.

5. Individualism and collectivism must have equal power: both individual issues and teamwork count.

6. Neither centralisation nor decentralisation works. Change flourishes in a sandwich: When there is consensus above and pressure below, things happen. This would be the outcome of effective distributed leadership.

7. Connection with the wide environment is critical. The best organisations learn externally as well as internally.

8. Every person is a change expert. 'Change is too important to leave to the experts' (p. 21).

Elsewhere, Fullan (1993) suggests that the key to successful change is often flexibility, letting different solutions develop and then following them wherever they go. In other words, he is leaving room for the possibility of *democratic* change, in the sense that lower-level members of the organization may initiate major decisions.

It is clear that some of the elements of the modern educational paradigm, summarised above, clash with some of the values and practises of traditional Saudi education, described in Chapter 2. These differences, their implications for quality of education, development of personality, educational policies and values and the structure of the educational system are discussed in Chapter 2.

Comparing these modern principles of change management with the description of the educational system in the Kingdom of Saudi Arabia described in Chapter 2, one cannot help but be struck by the differences between them. The most influential difference is probably that Saudi education, like most traditional systems, has until recently had a very strongly top-down structure, while the Project is introducing collaborative planning, learning and discussion, both in schoolwork and in the structure of individual schools.

One advantage conferred by widely distributed communication and decision-making is deeper and clearer understanding of issues if a student, teacher, manager or planner debates and discusses them with others, rather than mechanically following orders or learning phrases. Pooling knowledge may greatly improve everyone's understanding of a topic, not least of all when planners explain to teachers the purposes of new practices, while teachers explain to planners the difficulties of introducing these practices into the schools. This improved understanding also improves the memory for a topic.

As a person thinks about the topic, more ideas and facts are associated with it and, consequently, the more powerful the memory of it becomes, which is of special value, of course, to students. The greater understanding also improves the creativity with which a student, teacher, manager or planner solves a problem.

Another advantage of widely distributed communication and decision-making is that those who think about a problem and, in addition, contribute to making decisions about it, may gain the self-confidence to think and decide about other problems. Thus, teachers and students may be empowered to question the solutions of authorities, and authorities may be willing to consider the ideas of lower level people in the system.

A third important advantage of the new curriculum is the inclusion in the curriculum of electronic equipment, including computers and ICT training. Familiarity with ICT is of enormous value in working in many areas of the global economy, and computers are welcomed everywhere in schools for that reason. It also enables students to self-educate themselves, using the internet, which is especially important where books are scarce and is also at the heart of the new curriculum.

Having considered some of the input of Lewin, Kotter, and Fullan on managerial change, I now consider research literature on curricular change relating to independent thinking, one of the components of the King Abdullah programme. This will provide some indication of the types challenges that may face schools engaged in this work.

3.6 Previous research on integrating independent thinking curricula into traditional systems

Reviewing reports on introducing independent thinking methods similar to those in the King Abdullah Project into other school systems, the strongest obstacles encountered seem to have been resistance from students, other teachers and managers because of customs and

structures already in place. An example of such a clash of cultures was an independent thinking curriculum introduced into English classes taught in China by British secondary school teachers (Yan, 2012). This research found that teachers were unable to implement the new curriculum well, despite their strong commitment to it, because the school administrators did not support the experiment and the students also resisted it. This was due largely to the powerful influence of the traditional Chinese examination culture, especially the national college entrance exams, toward which the schools taught, which aimed more at correctly parroted answers than at understanding in depth (Rhem, 1995), not unlike the Saudi college entrance examinations and those of many other traditional school systems.

Furthermore, as the reforms had been imposed from the top down, teachers at the bottom of the pyramid, who were the crucial agents of change, had little communication with the designers of the curriculum (from outside the school). The planners needed to be more aware of factors in the environments and policies of the schools, including class size, time available, learning materials available, teachers' skills and the assessment practices that were in place (McDonald, 1991; Yeung, 2009). Several researchers who studied this case felt that the change should have been a gradual process, involving *process thinking* rather than *project thinking* (Sahlberg, 2006). That is, instead of being introduced as a ready-made system, abruptly replacing the familiar system, the plan might have succeeded better as a gradual, unofficial approach in which management decision-making activity was reduced and support for teachers was increased (Hoyle and Wallace, 2007; Thomson and Sanders, 1997).

Another problem was that not all the teachers fully understood the philosophical justification for the new methods, at least in part because a clear justification for the new system had not been given to them (Jin, 2013), and probably because their training should have been more hands-on practice and less abstract, theory-driven explanation (Canh and Barnard, 2009). The teachers might have been given more support and confidence through continuous in-service encouragement and development (Moreno, 2007; Penunel *et al.,* 2011) and with more collaboration among teachers in other schools (Leithwood, 2002; Sahlberg, 2006; Harris et al., 2009; Meirink *et al.,* 2010), but the lack of school support seems to have been the key factor.

Sturko and Holyoke (2009) reported a case of educational change in Turkey in which they found a need for more bottom-up strategies, particularly freedom for the teachers to collaborate in developing strategies to integrate reforms and to make suggestions to administrators and planners farther up the chain of command. The study was an evaluation of a professional

development programme focusing on integration strategies, designed for careers and technical education teachers. The researchers found that the teachers believed these strategies could improve student performance, yet they did not use them regularly in their teaching, because they had not had time to practise the techniques they had learned or to discuss them with their colleagues. Sturko and Holyoke called for improvements to be made to the programme, allowing for practice and discussion. This enabled the teachers to refine their uses of the strategies. Sturko and Holyoke argued that teachers should be heard when schools were engaged in policy-making and future planning.

Gibson and Brooks (2012) studied the introduction of independent thinking and collaborative learning and the planning of teaching in several Canadian schools, environments which were considered to support these new teaching approaches. They found that many classrooms were able to take in and support the new pedagogy when they were provided with continuing support and the coaching of the teachers and when the teachers were encouraged to collaborate in changing the curriculum in ways they found worked best. Brooks and Gibson found, however, that emotional and personal identification with the change was missing, and suggested that out-of-school leaders of the change should have participated more in teaching and other activities; and that better on-line resources for professional learning should be available. In this case, support and empowerment of the teachers appeared to help promote democratic changes that seemed to suit the culture of the school.

Research on change in a South African rural school by Bryan (2011) explored the effect of the local context (historical and socio-economic factors) in holding back professional growth of teachers. Bryan found that the teachers in the study agreed that a change in teaching approach was needed to level out the social inequalities in their society, but they lacked a sense of ownership and so did not undergo an attitudinal change toward the new curriculum. They were going through the mechanical motions of the new practice with a passive, rather helpless mind-set, leading to shallow, superficial learning by the students. Bryan suggested that teachers needed to develop active awareness of the socio-economic context and the changes in education which they could bring about, thus growing personally and professionally. He suggested that a collaborative learning culture within the school and the wider community, encouraging parents to become more actively involved, might help increase the active involvement in the education of the teachers. Thus, empowerment of teachers through professional education and collaborative sharing of ideas was again suggested to improve teaching.

3.7 Integration of ICT Skills and Equipment into the Classroom

The educational change currently under way in Saudi Arabia and many other countries is driven by competition in economic development, and typically, as in the Saudi case, involves the adoption of computer technology as a package along with teaching techniques that encourage independent thinking and creativity. This is partly because students need the internet in order to do the independent research at the heart of the new curriculum. In many countries that have only fairly recently achieved universal literacy, such as Saudi Arabia, it is rare for schools to have libraries of books in which students can look up information. Rather than buy such libraries, countries often prefer to take students directly to internet research, which is more widely used in contemporary government and corporate work (Pfeiffer et al., 2005; Pennington, 2013; Bridges, 1986 cited in Brisson-Banks, 2010; Fielding and Moss, 2011).

ICT is also believed to enhance work and education in other ways. It can be used to deliver lessons with interesting and enjoyable real-world examples and stimulating visual and audio illustrations from extremely wide sources. In addition, ICT offers well-known benefits such as efficient new ways to compose documents and organize and store information. Email helps teachers or students communicate outside of class, holding online tutorials or submitting or returning homework, as well as allowing teachers or students to share ideas with teachers or students in other schools. Dedicated software can be used for students with special needs, such as the gifted or challenged. ICT is generally welcomed in schools and other institutions as a core 21st century skill. Consequently, computers are widely used and computer skills are often considered to be necessary tickets into the world of institutional jobs (Hawkridge, 1989; Wishart and Blease, 1999; Smerdon et al., 2000; Downes et al., 2001; Watson, 2001; Cradler et al., 2002; Granger, 2002; Wasserman and Millgram, 2005; Baines, 2005; Alkahtani, 2009; Al-Saif, 2006; Oyaid, 2009; John, online).

On the other hand, some researchers have warned that computers are among the types of equipment that may easily be used for surveillance, in order to tighten control over or manipulate students' work or ideas, as well as for more progressive. Computer surveillance may also be especially difficult to detect, if teachers or students are not told about it. Also, students may become habituated to constant surveillance, especially if they experience it as benign. It is not that computers necessarily promote more autocratic, rather than more democratic, educational structures, and therefore should not be used in the schools. But

because they have that potential,   like other useful technologies, they must be used warily (Monahan and Torres, 2010; Schostak, 2014).

In spite of widespread reports of the benefits of computers in transforming teaching and independent thinking, it is often reported that a majority of teachers, especially at the secondary level, do not take advantage of computer access to change their teaching methods. Teachers across many regions and countries have been found to be more likely to adopt ICT for making class hand-outs, preparing lessons, keeping records and sending emails, all functions that improve teacher efficiency, rather than putting computers in the hands of students to do independent research and class presentations (Gregoire, 1996, cited in John, online; Becker, 1999; Cradler et al., 2002; Al-Showaye, 2002; Kozma, 2003; Demetriadis et al., 2003; Bebell et al., 2004). Some of this might be due to difficulties that teachers experience switching to the new teaching methods that accompany computer use. Computer use is most effective in company with collaborative teaching and learning and tends to alter the balance of power and knowledge between teachers and students, which may possibly not always be welcome (John, online,; Cradler et al., 2002). However, most studies have suggested that three practical, logistical management strategies (listed below), rather than engrained habits and attitudes, are the main factors holding back computer integration (Marcinkiewics and Regstad, 1996; Ertmer, 1999; Czerniak et al., 1999; Preston, 1999; Norton et al., 2000; Williams et al. 2000; Mumtaz, 2000; Franklin et al., 2001; Downes et al., 2001; Al-Ghamdi, 2001; Granger et al., 2002; Mulkeen, 2003; Demetriadis et al., 2003; Scrimshaw, 2004; Al-Ammari, 2004; Ensminger et al., 2004; Al-Khateeb, 2007).

1. **A strategy of making available computers, high quality educational software, electronic equipment such as smart boards, all in good repair, and school scheduling of rooms and times for computer use readily available:** Studies generally agree that availability of the needed equipment is essential to the successful adoption of computers in curricula and is also a major reason that this adoption is often not completely successful. Computers and computer-based equipment are expensive and also prone to crash if not understood. If there are not enough computers in a classroom or in a school or if there are not adequate repair services, including on-site technical support, teachers may not have computers available when they have planned to use them and may grow discouraged and continue to rely on traditional lesson plans.

2. **Availability of adequate ICT training for teachers, before beginning computer use in classwork and continually after that, as needed:** Teachers who cannot operate computers are not going to use them in class, and training classes and opportunity to practise what is taught are frequently not adequate for computer illiterates. Personal computers available to all teachers give them opportunities to learn computer skills through trial and error or through online lessons and also encourage them to use computers for their own professional and personal needs. School policies that encourage informal help and collaboration in computer use among teachers also spread knowledge and raise confidence in using computers. Especially among teachers who are newcomers to ICT, the time required to plan ICT-based lessons may be greater than the time needed to plan lessons without it, and thus schools should adjust time schedules to give teachers more time.

3. **The degree of encouragement and support from the head teacher and other teachers who take leadership in trying to raise the level of ICT use and enthusiasm for it:** Teachers' attitudes toward computer use may be influenced by previous attitudes, professionalism, attitudes of the head teacher and other teachers and of parents, and school and national policies. Discouragement due to lack of resources and training can be combatted to some extent by collaborative support, teaching and learning by head teachers and other teachers and effective communication of lower-level with upper-level members of the school community. This factor is always very important in social change, as mentioned in the discussion of principles of change management above.

Research on the introduction of ICT into Saudi schools that preceded the King Abdullah Project mentioned these factors as difficulties. Studies by Abatain (2001) and Alshowaye (2002) reported on ICT provision and facilities in schools in different parts of Saudi Arabia at the beginning of the new millennium. They found that some schools were poorly equipped to deliver ICT, not least because some still operated in 'rented houses' (i.e. in buildings that were not purpose-built to serve as schools). Equally important were shortages of computer equipment. Both studies emphasised heavy teacher workloads, as they struggled to integrate computers into the curriculum, and poor training opportunities for teachers to develop the

necessary ICT skills. The ICT training programmes were described as too theoretical, focused on computer programming rather than on developing basic computer literacy skills, which would have helped students and staff use computers as information sources and work tools.

Writing in the *Alriyadh Newspaper*, Alauthman (2008) reported that there was still an excessive reliance on the use of traditional teaching methods in the King Abdullah Project schools, despite the fact that modern methods could be more efficient, reduce the burden on teachers and improve student academic performance. He went on to say,

> Today, teachers are encouraged to integrate technology into their personal and professional performance in order to complement the subject matter and to facilitate the teaching process. As Albright (1999, cited in Al-rajih, 2008, p. 61) notes, 'the knowledge explosion has required teachers to increase the effectiveness and efficiency of their teaching and learning, accomplishing more learning in less time; and this has been done through the use of ICT. Teachers have found much to commend in ICT as an educational tool. First, it is a remarkable source of information for research and for class assignments. Second, technology offers the means for interpersonal communication to broaden teachers' experience through interactive collaboration with others around the globe.'

My study before (Alkahtani, 2009) found that two issues seemed to be particular concerns to the teachers:

- A lack of modern equipment and facilities in classrooms.
- The second serious issue was a lack of availability/relevance of in-service training programmes.

My study (Alkahtani, 2009) concluded by urging the Saudi Ministry of Education to improve the quality of facilities in its classrooms and to re-examine its in-service training provision. I found it a matter of regret that little progress had been made, since studies, for example, by Alafnan (2000) and Aboulfaraj (2004), had pointed out the need for improving the delivery of education in the Kingdom, especially in the secondary school sector. I also called on the Ministry of Education to take more account of the views of teachers: "They have first-hand experience of working in Saudi classrooms. As such, they represent a valuable resource, which should be supported and encouraged" (pp. 5, 6). A study by Alzaidi (2008) on the job satisfaction of male secondary school teachers in Saudi Arabia called for some of the same changes: allowing more bottom-up communication from teachers and head teachers; giving head teachers more autonomy in their schools; more recognition and rewards for excellent teaching.

A number of studies across the world have reported problems with the unavailability of sufficient computer-based equipment, of new school buildings designed to use and house it and difficulties in mastering computers, requiring more training of teachers and students. These are expensive resources, especially if they are supplied to a country's whole school system. For beginning computer users, the time needed to plan ICT-based lessons may be greater than the time needed to plan lessons that do not use computers, so that school schedules would need to be adjusted to give teachers more time. Making computers easily available to all teachers could give them opportunities to learn computer skills through trial and error or through online lessons and also encourage them to use computers for their own professional and personal needs, such as keeping records, producing class hand-outs or using email (Jones, 2004; Granger et al., 2002). Such non-teaching uses of computers often precede success at integrating the new technology into the equally new teaching methods (Becker, 1999; Smerdon et al., 2000; Becker, 2001; Al-Showaye, 2002; Kozma, 2003; Bebell *et al.,* 2004.) On the other hand, computers that are used often also crash often; and readily available technical support for all schools would require a great deal of additional money. Lack of resources to manage the ICT revolution thus seems to be a problem in most countries, as has also been reported in Saudi Arabia. The Saudi media have reported that this educational experiment is so expensive it may not be extended to every secondary school in the country, even if it proves successful in other respects (Alkinani, 2008). Therefore, the problem of scarcity of computer-based equipment and training, which form the foundation of the new Saudi curriculum, may threaten the entire enterprise with failure.

A study on ICT in schools in Hong Kong revealed another country introducing ICT and a student-centred curriculum and encountering problems similar to those reported earlier in the King Abdullah Project. Leung et al. (2005) identified a number of factors that stood in the way of teachers trying to use ICT in their teaching. These included shortages of space, computers, computer-based equipment, software, computers in the home, and classroom space. Students and teachers were also trying to understand and master the collaborative, independent thinking curriculum, which increased workloads and other demands on teachers. Another factor stressing teachers was that there were too many teachers for the decreasing numbers of students; teachers were said to be frightened by the school closure policy and the impact of the new technology and the new curriculum on the whole school network. The few teachers who were trying to start integrating ICT tended to "ignore the core tasks to closely facilitate students' learning" (Leung et al., 2005, p. 4).

In the end, the pressure of the impending downsizing of the teaching staff was effective in motivating reforms in time for the 2009 deadline that had been announced. "There was a call for government and teachers' organisations to act together to develop the necessary measures, both short-term and medium-term. This was important to restore teacher self-confidence and the teaching profession's public professional image" (Leung *et al.,* 2005, p. 4). Teachers, whether working with good facilities or less good ones "were influenced by the government, school and media and became aware of the advantages of incorporating ICT into teaching. With support from the school authorities, teachers were willing to squeeze in the time to learn to incorporate ICT into their teaching" (ibid., p. 4). This solution seems to have combined elements of a transformational campaign of the Kotter type, mentioned above, with a threat of negative results for teachers who were not able to meet the deadline.

A very different solution to the scarcity of ICT resources was reported in Chile by Howie (2010). The Chilean government rationed computers and computer-related resources to the schools that were best able to make use of them, which seem to have been the schools in least need of help. This policy might run against the egalitarian values of some countries, although it also offered a solution for extreme shortage of equipment. The Chilean strategy was to insist "that any school wanting to be part of the project and wanting to receive equipment and training had to submit a detailed proposal as to what they were going to do with the ICT" (Howie, 2010, p. 520). The philosophy of this approach was that ICT was not a prize to be handed out, but rather something that was earned. Each school then took responsibility for how the change was planned and run in that school. Howie (2010) compared the Chilean approach with that in South Africa, and said that the Chilean approach held "a number of lessons for the South African policymakers and other developing countries" (p. 507). In South Africa, "schools received equipment whether they wanted it or not, and as a result, some laboratories or equipment were either underutilized or never utilized" (ibid., p. 520).

One positive effect of this rationing was that the schools that did receive equipment were expected to make the new technology and curriculum work by themselves. They had to find ways to solve problems locally and were free to experiment to find out what practices were best liked by head teachers, teachers and students within each school. Budge (2009) identified some useful tips for other countries, based on the Chilean experience:

 1. Planning should centre on teachers and their training, not on the technology;

2. Principles and strategies should be tested in pilot studies before spreading across a school or more widely across the country;

3. Management should be locally based, avoiding centralized bureaucracy;

4. Computers should be used, where possible, with an existing telecommunications network, rather than committing resources to a new one dedicated to use by the school;

5. Computers should be introduced into schools and integrated into learning gradually;

6. Technical assistance and training should be organized locally, perhaps cooperating with local universities;

7. Assessment, monitoring and evaluation processes should be strong.

A study by Ali et al., (2009, online) noted conditions that contributed to the successful integration of ICT into three Malaysian "Smart Schools" and problems that arose during the integration process. The main problems experienced by the participating teachers were related to time, course content and technical issues. The time factor was found to cause the greatest problems to teachers in all three schools: They did not have enough free time for lesson preparation, which required the use of the internet to gather information, although the more ICT-skilled teachers needed less time for lesson preparation. In addition, they had to cover for absent colleagues as well as undertake many other non-teaching tasks. All teachers believed that a one hour lesson was too short, because students took 5 or 10 minutes to arrive for their lesson, 5 minutes to settle and another 5 to get the computers running. Any technical problems might delay the start of the lesson further by 5 to 10 minutes, or longer, even though technicians were on call at the schools. Time also had to be allowed during the lesson for students to print off what they had been working on. Many teachers were dissatisfied with their 14-week ICT training course, especially when the training was on different equipment and software than that available in their schools. Teachers also had been given little idea how to integrate ICT with their teaching. These are similar to problems found in schools in many countries in which ICT is being introduced.

3.8 The Challenges of Pedagogical Change

Whenever there is an innovation people have to learn new things in order to properly engage with that innovation. Now in this practical circumstance in the King Abdullah Project, there is an aim to move from 'chalk and talk' to a more enquiry-based approach. Even though this may sound easy, rest assured it is not. This is because the practices involved in chalk and talk approaches have to be radically changed. The teacher must shift from being the sole authority, leading and instructing, with the students doing as they are told, to a more open, democratic relationship between student and teachers where there is more reliance on student initiative and autonomy. Many people find it difficult to achieve such a change because they have no practical experience nor the skills to enable them to adopt and facilitate independent thinking and democratic relations in the classroom. As Harris (2003) said "In many school systems the inability of system wide reform to significantly enhance student learning is clearly evident" (p.369). She goes on to mention that "there is a growing recognition among policy makers of the need to locate improvement efforts closer to the classroom and to support schools in building the internal capacity for change" (Harris, 2003, p.369). In particular, Harris argued that to ensure the continued progress of students extra effort is required of the teacher in terms of ensuring direct contact, issuing periodic reports, sending follow-up emails and providing students with additional supporting information. This therefore represents an additional burden to the professor, given the additional workload assigned.

Furthermore, some teachers may be unaware of or not convinced by the benefits that independent thinking can bring. Therefore, these benefits need to be clarified and communicated to teachers (Redmond, 2011). Redmond's findings showed that the "instructors experienced a change in role and also a significant change in comfort level and acceptance of the effectiveness of online teaching and learning. The move to teaching online was a catalyst for the instructors to question and reflect on their philosophy and practices about teaching. What worked for the instructors in the traditional face-to-face classroom was not as effective in the online space." (p.7).

In order to implement an innovation this will necessarily involve changes in pedagogical practice and Wengrowicz (2014) confirmed that "the ability to affect the teachers' pedagogical characteristics is an important component in the process of the technological change in education of the 21st century and must be an important part of teachers' training programs" (p.197).

Indeed as Le Fever (2013) argues "risk-taking is an inherent aspect of educational change. Perceptions of risk can inhibit teacher engagement in new pedagogical practices. Fear of public failure and losing control influence teachers' perceptions of risk" (p.56). To overcome this problem, "Supporting risk-taking in professional learning for educational change is important" (p.56).

Le Fever (2013) concluded that "The perceived potential for loss was significant enough to inhibit most teachers from engaging in the actions promoted in the literacy change that they agreed with in principle. The teacher who did engage in change still perceived serious risk in de-privatizing her practice" (p.64). Therefore, risk can be a significant hindrance to embracing educational change.

3.9 Research Questions arising from the Literature Review

In seeking to learn what is going well and what is going less well, in the King Abdullah Project trials, and what might be done to mitigate problems, I will ask a broad set of questions in interviews, questionnaires and open-ended questionnaires.

The first two questions are the main ones that drive this research.

1. What do students, teachers and head teachers taking part in the King Abdullah Project see as its main strengths and weaknesses? What range of experiences do they report? What are their more and less frequent reactions to the new curriculum?
2. What methods of mitigating the weaknesses are suggested by the participants or by the researcher?

The next four questions are based on the principles of management of education and social change discussed in this chapter.

3. Does the distribution of decision making seem to have changed, at different levels of the educational system, as the Project has been introduced? Have participants at various levels

gained more or less opportunity to experiment with managing aspects of the Project or other decisions? (See Section 3.2.1:

Lewin's Continuum of Distribution of Decision Making; and Section 3.3: Principles of Management of Social Change; Section 3.5: Fullan's Eight Guidelines for Managing Organisational Change; and 3.6; and Section 3.7: Integration of ICT Skills and Equipment into the Classroom, in this chapter.)

4. Does communication seem to have increased throughout the educational system, horizontally, downward or upward, as the Project has been introduced? Has decision making become more or less collaborative, as a result? How do participants react to this? (See Section 3.3 in this chapter).

5. What role do head teachers seem to have played in the increase or decrease of communication? (See Section 3.3: Principles of Management of Social Change; and Section 3.7: Integration of ICT Skills and Equipment into the Classroom, in this chapter).

6. Might gradual introduction of different parts of the Project have been more successful than introducing it all at once, as a self-contained package? (See Section 3.6: Previous Research on Integrating independent thinking Change Curricula into Traditional Systems, in this chapter).

The last Six questions, based on earlier research on similar educational projects, including the pilot for this study, suggest possible difficulties in the current Project that have been observed in similar cases of educational change.

7. Do there seem to have been problems with availability, maintenance or repair of the new equipment? (See Section 3.7: Integration of ICT Skills and Equipment into the Classroom, in this chapter.).

8. Do there seem to have been problems with the adequacy of training teachers and students in the new teaching and learning methods or in the use of the new equipment or with lack of time for them to practise the new techniques? (See Section 3.6: Previous Research on Integrating independent thinking Change Curricula into Traditional Systems, in this chapter).

9. Do there seem to have been problems with resistance toward the new curriculum among students, teachers, head teachers, parents or the community? (See Section 3.9 Previous Research on Integrating independent thinking Change Curricula into Traditional Systems, in this chapter).

10. Does there seem to have been lack of communication between schools and planners? (See Section 3.6: Previous Research on Integrating independent thinking Change Curricula into Traditional Systems, in this chapter).

11. Is there enough encouragement and support for teachers and students to learn the new methods? (See Section 3.6: Previous Research on Integrating independent thinking Change Curricula into Traditional Systems, in this chapter).

12. Is there too much work for teachers to do, given the time available? (See Section 3.7: Integration of ICT Skills and Equipment into the Classroom, in this chapter).

3.10 Conclusion

This chapter has presented a review of literature related to aspects of my study. It has considered change management theory and its implications for education delivery in schools, such as the King Abdullah Project schools that were the focus of the fieldwork in this study. It has also considered published research on the challenges of curriculum change, including independent thinking and the demands of optimising the use of ICT for teaching and learning. Twelve research questions have been drawn from this material, the first two crucial to the research and the others suggesting possible difficulties that have been important in other school systems. In the next chapter, on Methodology, I will explain how these questions will be examined in the Findings chapter, through interviews, questionnaires and open-ended questionnaires.

Chapter Four

Research Methodology

4. Research Methodology

4.1 Introduction

The previous chapter presented a review of the literature relating to the themes and issues that underpinned my research. In this chapter, my main purpose is to consider theoretical issues relating to my research approach. In particular, I focus on the reasons for my choice of the various research methods, along with explanations of the methods. This chapter has one main aim, which is to provide an account of the study's design, research methodologies, and rationale for the choice of methods. It will include a description of the research instruments and data collection and analysis techniques used. The first section focuses on the research paradigm and the approach utilised to best address the research questions. It is followed by a description of the different data collection methods, and then a detailed account of the data collection instruments is presented. The study setting, participants and sampling techniques are also described. Section 4.9 explains how the collected data were analysed while sections 4.10 and 4.6 consider ethical issues and the choices I made regarding the research design and methods in order to deal with issues of validity, objectivity and generalizability. I begin by considering a 'research paradigm' because it gives insight on the way we do things, which in this case is how will the research be conducted during the course of the PhD study.

4.2 Research Paradigm

According to Kuhn (1996, p. 15), a paradigm is 'the entire constellation of beliefs, values, techniques shared by members of a given scientific community'. Patton (2001, p. 9) offers a similar definition, seeing a paradigm as a 'world view, a general perspective, a way of breaking down the complexity of the real world paradigms are deeply embedded in the socialization of adherents and practitioners telling them what is important, what is reasonable'. Burrell and Morgan (1979, p. 24) emphasise the notion of belonging, suggesting that 'to be located in a particular paradigm is to view the world in a particular way'. Sparkes (1992) says that "all researchers make assumptions of some kind or other in relation to issues of ontology, epistemology, human nature and methodology and that these assumptions tend to cluster together and are given coherence within the frameworks of particular paradigms. What this means is that we cannot, and do not, enter the research process as empty vessels or as blank slates that data imprints itself upon" (p. 14). Sparkes adds that we need to be aware that "while it would be wrong to suggest that each paradigm contains homogenous schools of thought, it would also be an error not to recognize that certain intra-paradigmatic similarities exist" (p. 18).

Williams (1998, online) emphasises the importance of the researcher recognising their paradigm, as "it allows them to identify their role in the research process, determine the course of any research project and distinguish other perspectives".

One of the main types of research paradigm in the human and social sciences is 'the interpretive paradigm'. Gall et al., (2003, p. 15) define interpretivism as "the epistemological doctrine that social realty is constructed and that it is constructed differently by different individuals". Earlier, Sparkes (1992, p. 24) argued that "Alternative ways of making sense of social reality have always existed and in direct contrast to positivism stands the interpretive paradigm". This "referred to a whole family of approaches and is useful for three reasons: (a) it is more inclusive than many others (for example, ethnography, case study); (b) it avoids the connotation of defining these approaches as essentially non-quantitative (a connotation that is carried by the term qualitative), since quantification of particular sorts can often be employed in this work; and (c) it points to the key feature of family resemblance among the various approaches- central research interest in human meaning in social life and its elucidation and exposition by the researcher" (p. 119). He went on to say that "… a range of research traditions can be located within the interpretive paradigm that go under various names including: ethnography, hermeneutics, naturalism, phenomenology, symbolic interactionism constructivism, ethnomethodology, case study and qualitative research" (Sparkes, 1996, p. 24). He argues that, "the natural science approach with its positivistic assumptions may be appropriate for the study of the physical world (but) it is not appropriate for the study of the social world which they see as having very different characteristics" (Sparkes, 1996, p. 24).

The interpretive paradigm is supported by 'a network of ontological and epistemological assumptions that are very different to those of positivism" (Sparkes, 1996, p. 26). Importantly, he added that "interpretivists focus on the interests and purposes of people (including the researcher), on their intentional and meaningful behaviour, then by attempting to construe they construct and continue to reconstruct social reality, given their interests and purposes world from the participant's point of view they try to explain and understand it" (Sparkes, 1996, p. 26). The interpretivists argue that "in a world of multiple realities, multiple truths can exist, and this means that for interpretive researchers the meanings associated with the term validity are very different from those of positivistic researchers". "Notions of validity as used by positivists may be meaningless to interpretive researchers, implying, as they do, some impersonal, automatic truth" (Sparkes, 1996, p. 36).

My research has focused on the experiences and reactions of teachers, students and head teachers working on the project in Saudi secondary schools. Choice of paradigm had of course implications for the way I went about my research and reported my findings. The focus of my research was on the experiences and reactions of those working with the project in Saudi secondary schools. I believe that the type of paradigm I needed to use in my research was an interpretive- paradigm. I felt that the interpretive was needed in order to get these experiences.

This research was motivated by a desire to understand the reactions and perceptions of the participants in the study, which required empathetic understanding from the researcher. For instance, I was interested in participants' accounts of dis-organization in the implementation of the new curriculum, but I was also interested in head teachers, teachers and students, which might have contributed to inappropriate planning of the Project and also to inappropriate reactions to that poor planning. Of the traditional methods contained within the interpretive paradigm, I believe my study best fits the model of phenomenology. In light of the above discussion, I believe that the type of paradigm I need to use in my research is an interpretive one. For the participants of the project may consist of multiple realities, which I hope that my study employing interpretive approaches will be able to capture their responses; to the curriculum and the change showing what challenges they perceived they had faced in coming to terms with the change.

Use of a positivist paradigm would not be appropriate, given the nature of my research topic and how I want to go about it. This is because Positivists seek to test hypotheses and choose categories that can be 'measured' or 'quantified' so that a hypothesis can be tested statistically. This empirical reality is essentially assumed to be the same for all so that the categories chosen have the same meaning for all. Rather than the categories being imposed by the researcher, interpretivists base their categories of research on the understandings of the participants. In this way, they can identify the extent to which participants share understandings or see the world differently because of the different interpretations they give to their experiences.

My study seeks to explore people's experiences; therefore is a subjective account of the project using interpretive approaches. I have however used triangulation in the data collection (use of survey and in-depth interviews) which enabled me to compare and to contrast the data; in order to develop some degree of generalizability. This is the process of 'grounded theory', where theory is developed through close analysis of triangulated data.

Having addressed the research paradigm, I now turn to consider the concepts of quantitative and quantitative and their part in the development of my research design.

4.3 Quantitative and Qualitative Research

While the qualitative methodologies are associated with the interpretivists, the positivists are associated with quantitative methods that seek to provide meaning through measuring, or quantifying. While recognising the importance of both quantitative and qualitative approaches to educational research, Verma and Mallick (1999, pp. 26-27) considered that 'neither "quantitative" nor "qualitative" were discrete perspectives on research' and that they 'were not mutually exclusive'. Hence, although the researcher were to adopt a quantitative approach in the investigation of a problem, there would be no need to discount any qualitative data gathered in the process. Similarly, a qualitative study could still use any relevant quantitative data that is gathered.

In addition to this, there are descriptive statistics that provide percentages rather than 'probabilities', which are not so problematic in the case of qualitative approaches when used in conjunction with qualitative data. It is basically because for statistical analysis to work, it requires that the essential characteristics of a given piece of data placed into a given category is the same as all the other items placed into that category (Creswell, 2013). In the physical sciences it is easier to create these conditions by purifying substances as in the processes of making chemicals. This process of purification is not possible in the study of social phenomena, because there are differences in experience, in interpretation, in values, in beliefs and so on (Neuman, 2013).

Punch (2005, p. 16) considers the differences in the purposes of the two methods. He suggests that quantitative research tends to be associated with 'theory verification', while qualitative research tends to be associated with 'theory generation', while accepting that the converse could be the case. He added that "Quantitative research is empirical research where the data are in the form of numbers, while Qualitative research is empirical research where the data are not in the form of numbers" (p. 3). In this study, I used two approaches to my data collection; employing in-depth interview and survey questionnaire techniques, as they seemed to offer both methods in addressing the research problem, specifically to find out about the experiences of students, teachers and head teachers working with the new curriculum project. I have used quantitative approaches (probability based statistics) too, enabling the study to make sense of the numbers of people who, for example, agree or disagree with certain

statements about various aspects of the program. This has enhanced and enriched data which is grounded in in-depth qualitative analysis of my study; as explained in my results and conclusion chapters.

4.3.1 Quantitative Research

Lewin (2005, p. 215) suggested that "quantitative research requires knowledge of a range of very precise methods and procedures, all of which are associated with specific terminology and a range of principles arising from probability theory". Additionally, Cohen *et al.,* (2005, p. 501) explained the advantage of using quantitative methods: "Quantitative data analysis is a powerful research form, emanating in part from the positivist tradition. It is often associated with large scale research, but can also serve smaller scale investigations, with case studies, action research, correlation research and experiments". Moreover, questionnaires can save time: 'the greater the amount of information, the more economical of time it is to use a questionnaire' (Wallace, 1998, p. 130). Wallace points out that conducting 60 ten-minute interviews will take at least 10 hours, not counting travel time. Under such circumstances, 'use of a questionnaire may be the only sensible choice' (Wallace, 1998, p. 130). In my view that is why the interpretive angle is important because you can get a more sophisticated understanding of the differences between the people that quantitative researchers put in to the same category and thus blur or erase those differences. Finding approaches that combine qualitative and quantitative strategies, will therefore enrich and provide theories and reasons, to why things are the way they are. Hence my approach to this study.

Johnson and Christensen (2012) point out that quantitative research rests on the assumption that 'cognition and behaviour are highly predictable and explainable', and that 'most quantitative researchers try to identify cause and effect relationships that enable them to make probabilistic predictions and generalizations" (p. 33). The concepts of representativeness and generalization is core to the positivists' approaches. These assumptions are not adopted in interpretivist research and indeed contradict the qualitative view that social behaviour and experience is very complex and is not easily amenable to the construction of 'laws' of behaviour. For this reason, and for the need to enable better understanding of the program under investigation, my study has not relied on the use of statistical approaches and used mainly descriptive statistics percentages.

However, Gao (1992, p. 8) argued that quantitative research is 'more than number crunching…
(being) an activity that permeates all stages of a study' and points out the types of problems
researchers encounter in the course of their work, such as the difficulties met in trying to gather
data on all the variables which it had been hoped to study. There is likely to be some data loss
in one form or another and 'data analysis must contend with that eventuality'.

Denscombe (2007, p. 284) urges caution in the pursuit of quantitative data, reminding us that
these are 'only as good as the methods used to collect them and the questions that are asked'.
He also points to the dangers of the quantitative data researcher becoming 'obsessed with the
techniques of analysis' and data overload. Some of these cautions might well be drawn to the
attention of qualitative researchers. In my research, I used both qualitative and quantitative
approaches in the collection of my data. The use of questionnaires enabled me to explore the
views of teachers and students, through their responses to a combination of closed-ended and
a few open-ended items. I strongly believe that a quantitative approach was very suitable to
address the research questions, since it helped to address the perceived obstacles to the
delivery of the project or maths-science programme ('McGraw-Hill') or 'cooperative learning' in
a numeric way (Denscombe, 2007).

4.3.2 Qualitative Research

For Cresswell (2009), qualitative research "is a means for exploring and understanding the
meanings individuals or groups ascribe to a social or human problem. The process of research
involves emerging questions and procedures, data typically collected in the participant's
setting, data analysis inductively building from particulars to general themes, and the
researcher making interpretations of the meaning of the data" (p. 4). In my view the strong
reason for using qualitative methods is that they enable me to get much more sophisticated
understanding of process. This is because the research is able to get the deeper understanding
of the issues but most importantly get this from the participants' perceptions, from general to
specific reasons why events are the way they are. Silverman (2001) suggests that "the
methods used by qualitative researchers exemplify a common belief that they can provide a
'deeper' understanding of social phenomena than would be obtained from purely quantitative
data" (p. 32). By deeper I mean that through interviewing you are able to examine in more
detail the reasons for causes of action, behaviour and opinions. However, he added that
"Qualitative research is often treated as a relatively minor methodology. As such, it is
suggested that it should only be contemplated in early or 'exploratory' stages of a study" (p.
32).

Silverman (1989, p. 77, cited in Silverman, 2001, p. 34) referred to "a tendency towards an anecdotal approach to use of the data in relation to conclusions or explanations in qualitative research. Brief conversations, snippets from unstructured interviews are used to provide evidence of a particular contention" (p. 34). Corbin and Strauss (1990) have also doubt with those issues. Silverman (1989, p. 77, cited in Silverman, 2001, p. 34) added that "There are grounds for disquiet in that representativeness or generality of these fragments is rarely addressed" (p. 34). However it has been argued that 'anecdotes' can be the way into much more sophisticated forms of narrative analysis (Schostak, 2006). Qualitative approaches are not based on probability statistics hence they don't attempt to attain representativeness and generalizability. However, there are, for example, approaches that address *representativeness and generalizability* (Ragin et al., 1992).

These issues of representativeness or *generalizability* have also been explored by Corbin and Strauss (1990). Corbin and Strauss (1990) explained the advantages of using qualitative research "1- the research question should dictate the methodological approach that is used to conduct the research. 2- qualitative research allows researchers to get at the inner experience of participants, to determine how meanings are formed through and culture, and to discover rather than test variables, qualitative researchers enjoy serendipity and discovery, qualitative researchers have a natural curiosity that leads them to study worlds that interest them and that they otherwise might not have access to, finally qualitative researchers enjoy playing with words, making order out of seeming disorder, and thinking in terms of complex relationships" (pp. 12, 13).

I chose to use mainly qualitative methods for three reasons. Firstly, the main aim of the research was to allow me to explore what was going on in a sample of project schools and to build up a picture of the responses of head teachers, teachers and students to the programme. So, this method helped me to understand the problem more fully because it enabled me to explore the views of a large sample. Secondly, it gave me the opportunity to explore the strengths and weaknesses of this new project by using semi-structured interviews so that the participants could respond more freely within an overall framework. By contrast the structured interview can restrict participants in what they say about their experience. Thirdly, my research sought to reflect the perspectives of those involved (head teachers, teachers and students) and to capture their voices, rather than simply to serve a theoretical standpoint. As Kvale (1996) says, the usefulness of the research interview is "for studying people's understanding of the meaning in their lived world, describing their own perspective on their lived world" (1996,

p. 105). This may involve beginning with a qualitative interview for exploratory purposes and following up with a quantitative, survey method with a large sample so that the researcher can generalize results to a wider population. Alternatively, the study may begin with quantitative methods in which a theory or concept is tested, followed by a qualitative method involving detailed exploration with a few cases or individuals" (p. 14) this is what I did, starting with a quantitative approach to my data collection followed by a qualitative approach. The quantitative approach gave me a broad notion of some key unexplained issues, which I then followed up with more detail in the interviews.

4.3.3 Mixed methods approach

The third approach used is "concurrent mixed methods procedures in which the researcher converges or merges quantitative and qualitative data in order to provide a comprehensive analysis of research problem eventually" (Denscombe, 2007, p. 109).

Because I used both qualitative and quantitative approaches in this study, it could be called a 'mixed method' approach. I used both survey questionnaires and in-depth interviews to collect the data. I also used quantitative analysis (SPSS) to analyse participant characteristics and rate the level of perceptions and reported percentages. I also used grounded theory for the qualitative analysis. In addition, when presenting the data, it was triangulated and reported from the survey and interviews. The data was then validated and discussed both quantitatively and qualitatively.

According to Denscombe (2007): "The mixing of methods can be a valuable research strategy for the validation of findings in terms of their accuracy-checking for bias in research methods and the development of research instruments" (p. 109). He argues that "the use of more than one method can enhance the findings of research by providing a fuller and more complete picture of the thing that is being studied" (p. 110). "A shrewd combination of methods allows the researcher to exploit the strengths of a particular method without leaving him/herself vulnerable to criticism in connection with that method's weaknesses" (p. 111). Scherp (2013, p. 80) gives these reasons for using both types of method; "Quantitative methods such as surveys often suffer from lack of depth and difficulties in knowing how the respondent has perceived the items.   Working with cognitive maps makes it possible to combine the advantages of qualitative and quantitative methods. It is a way of using quantitative analysis based on in-depth interviews in a big sample". In my own questionnaires developed later (see Chapter 5) the concepts were developed in the questionnaire and were explored in more depth

in the interviews. In Gorard's view (2007, p. 1): "Mixing methods is wrong, not because methods should be kept separate but because they should not have been divided at the outset"

I used questionnaire and interview methods in this study. I started by conducting preliminary interviews with a head teacher, teachers and students from one school to explore the research problem. I then did a large-scale questionnaire survey of teachers and students, before conducting interviews with head teachers, teachers and students built on the data gathered from the survey.

4.4 Sampling and representativeness

Because not much was known about the perceptions of students and teachers of the new curriculum programme at the beginning of this research, the study was conceived as basically descriptive, to uncover many possible hypotheses, rather than experimental or correlational ones, to test a limited number of well-understood hypotheses. The main concerns in sampling were to: (1) include a wide range of reactions and viewpoints (explored as deeply as possible), for the qualitative research, and (2) attempt to achieve a rough degree of representativeness of the target population, for the survey research. In seeking a wide range of viewpoints, I tried to follow the advice of Charmaz (2006), speaking of qualitative research, who declared: "Let the world appear anew through your data. Gathering rich data gives solid material for building a significant analysis. Rich data are detailed, focused and full. They reveal participants' views, feelings, intentions and actions, as well as the contexts and structures of their lives" (p. 14). That is why I included both genders in my samples, students and teachers, three different grade levels among the students, and two cities that are somewhat different socio-economically in my sample.

The second concern, the representativeness of the sample of the larger population that I wanted to understand, is difficult to achieve without knowing the factors that will prove to be most important to the research question. By sampling four Saudi schools, two for girls and two for boys, and taking the proportions of students vs. teachers in each school, and by including schools from an urbanized and a less urbanized city, I have achieved a fairly representative sample see (Chapter 5, section 5.3, 5.5 and Chapter 6 section 6.3) with respect to those demographic categories in this region of the country. The sampling did not include other regions of Saudi Arabia in which the new programme is being trialled, however, for logistical reasons, resources and time limitations (see Chapter 5 section and Chapter 6 section). The size of a sample would also affect its representativeness. Graham and Neil (1998) suggest

that, "the target should be a sample large enough to provide meaningful data but not excessively time consuming and invidious" (p. 44). I concluded tentatively, after running a pilot study that four schools (841 students, 94 teachers, and 5 head teachers) would be an adequate-sized sample and one that I could manage given my limited resources.

4.4.1 Sampling techniques for (survey questionnaire) and (in-depth interviews)

In my study, I adopted purposeful sampling and used various strategies during the selection process. Purposeful sampling is the technique best used for sampling "identification" and the process of picking out information whereby resources are limited (Palinkas, et al., 2013). According to the literature, this is a necessity in purposeful sampling due to the difficulties when studying large scale programmes. Mixed methods are known to enhance and "strengthen" the data, in addition to clarifying how the research is to be discussed. Finally, this also helps to improve study's meaning (Palinkas, *et al.,* 2013, Aarons, et al, 2011); as already described (section on mixed methods).

My study is based on purposeful sampling which is used in qualitative methodologies for selecting participants for study Palinkas, *et al.,* (2013) define "Purposeful Random Sampling" as "electing for interviews a random sample of providers to describe Experiences" an interviewee who is willing to participate in the research. The two cities and 4 schools were randomly selected from the list of schools enrolled in the program.

There are various strategies employed in purposeful sampling strategy. Patton (2002, pp. 243, 244) identifies 16 different strategies: Extreme or Deviant Case Sampling, Intensity Sampling, Maximum Variation Sampling, Homogeneous Sampling, Typical Case Sampling, Critical Case Sampling, Snowball or Chain Sampling, Criterion Sampling, Theory-Based or Operational Construct or Theoretical Sampling, Confirming and Disconfirming Sampling, Stratified Purposeful Sampling, Opportunistic or Emergent Sampling, Purposeful Random Sampling, Sampling Politically Important Cases, Convenience Sampling and Combination or Mixed Purposeful Sampling (Patton, 2002, pp. 243, 244).

I have taken Mixed Purposeful Sampling and combined four different purposeful sampling strategies to meet the needs of my research question and reduce possible chances of bias in the selection of the participants for both the survey and in-depth interviews.

However, whatever strategy is adapted, purposeful sampling enables a selection of information rich cases that are very effective when resources are limited (Palinkas, et al, 2013; Patton, 2002). The individual's ability and willingness to communicate and express an opinion is very crucial in purposeful sampling. Interviews were held with teachers and students who were willing to take part. The survey questionnaires were undertaken by students available and willing on the days when I visited there. To obtain a deeper understanding of the concerns and issues with the King Abdullah Project the researcher used open-end questions to elicit more detail of their perceptions. Of the two key elements of time and resources mentioned by Patton (2001), I have determined time and resources as key to be addressed in this study.

4.4.2 Sample selection for the questionnaire

I employed, maximum variation sampling (Collins *et al.,* 2007), defined as "choosing settings, groups or individuals to maximize the range of perspectives investigated in the study" (p. 272). The purpose of this method was to uncover more themes or other variation (Patton, 2002). One example was my choice of two towns that were somewhat different socio-economically, although the selection of cities and schools was otherwise random. In addition, the questionnaires were given out to all teachers who were willing and available–almost all— including teachers of both genders, of various subjects and, also, to all students who were willing and available—again, almost all—of both genders and of various ages, majors and years in the program.

4.4.3 Sampling for in-depth interview

The sample was drawn from the survey participants. The following two factors governed the choices made at phase II, in-depth interview. In recruiting participants, maximum variation sampling was used. Ensuring a wide range of experiences about the phenomena across the dimensions by including all students and teachers, students from various ages, courses, and years in the program and also teachers from various subjects.

Using Critical case sampling is an approach that studies in depth a few cases that are rich in information and seem likely to give information about a particular question of interest in the research. This method permits logical generalization and maximum application of information to other cases; if something is true of one case, it is more likely to be true of other, similar cases (Patton, 2002 in Nastasi, et al., 2004).

I collected data from teachers and head teachers, I sought to produce critical information to permit logical generalization and maximum application of information to other cases. By

including head teachers, and I used the strategy of purposeful random sampling, with the interview groups necessarily small to encourage conversation. Consequently, as the potential purposeful sample is large, this prevented me from conducting large numbers of interviews. Also a representative sample was not obtained due to the strategy of purposeful random sampling. Instead, as indicated by Patton (2001, p. 179), "the goal is credibility, not representativeness or the ability to generalize" by interviewing both girls and boys schools, in different years. Lastly, I used stratified purposeful techniques to sample head teachers, this technique is known to mainly focus on the interests of certain groups, in order to make comparison (Patton, 2002 in Nastasi, *et al.,* 2004). I focussed on selecting participants from urban and sub-urban setting. Focusing on gender variations and age characteristics to facilitate comparisons. Natasi et al., (2004) observe that the typical sample size for grounded theory analysis is between 20 and 30 individuals. I reached the maximum information point after interviewing 27 participants; after that, no new information was being added to the study.

4.5 Sample frame and procedures

In summary, my research is based on the king Abdullah project that has been trialled in Saudi Arabia in 50 schools coming from 13 regions and 25 cities. Every city has got 2 schools (one boys school and one girls school due to the segregation of the genders) practicing this experiment programme. My research consisted of two phases.

Phase 1 - Questionnaire sample from 94 teachers and 841 students and Phase 2-in-depth interview with a total of 27; including students, teachers and head teachers.

From the sample frame, I selected 2 cities, each containing 4 schools. Each city had a school for girls and one for boys. Through these, I sampled four Saudi schools, two for girls and two for boys by including schools from an urbanized to a less urbanized city. This is shown in detail in the following Figure 1, below.

Initial contacts to all schools were via telephone call to the four schools identified from the ministry register of the schools in the project. A letter about the research and consent was then presented in person during the second contact. The cities were the largest cities and attracted a lot of interest from a number of localities in the country and the program. The four schools were all chosen for the following reasons:

1. They would provide both urban and suburban experiences to the program and represented both girls and boys views across the cities.

2. Represented a large number of teachers and students involved in the program

3. Represented a proportion of schools that had been in the program from 1 to 3 years, giving an opportunity to get variability in the data that would enrich the results.

Figure 1: Phase 1 Sampling
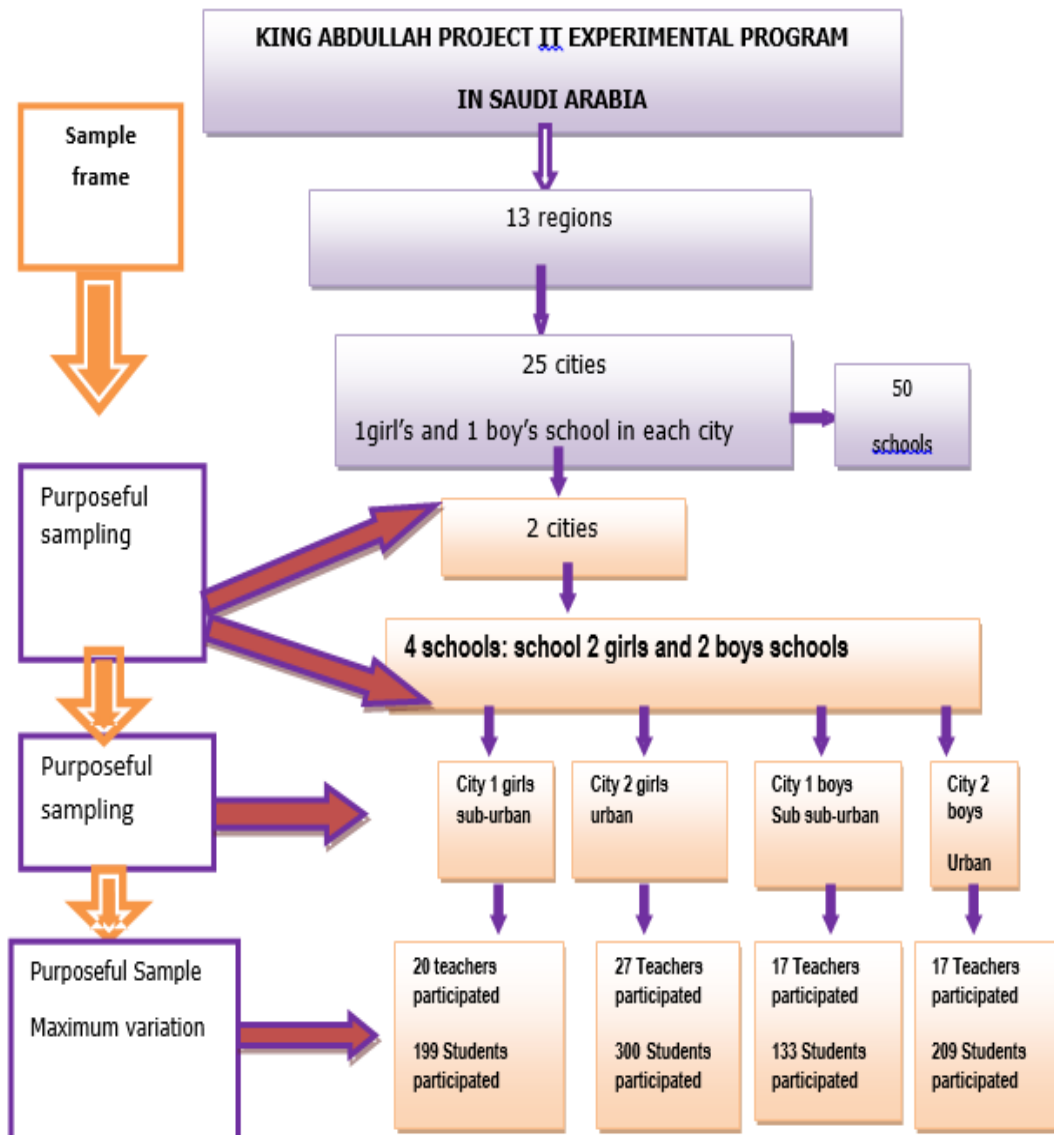
Figure 1: Total No. of Student Participants in each School

The diagrams in Figures 1 and 2 summarise this process of sampling for the two phases of the study

```
┌──────────────┐        ┌─────────────────────────────────┐
│  Sample      │        │          Phase 1                │
│              │        │                                 │
│  frame       │        │       From the 4 schools        │
└──────────────┘        └─────────────────────────────────┘
        │                    │          │          │
        ▼                    ▼          ▼          ▼
┌──────────────┐    ┌──────────┐  ┌──────────┐  ┌──────────────┐
│ Purposeful   │    │          │  │          │  │ 4 Head       │
│ sample       │    │ 11       │  │ 11       │  │ teachers     │
│              │──▶ │ Students │  │ Teachers │  │              │
│ Maximum      │    │          │  │          │  │ 1 deputy head│
│ variant      │    │          │  │          │  │ teacher      │
│              │    │          │  │          │  │              │
│ Purposeful   │    └──────────┘  └──────────┘  └──────────────┘
│ random       │
│ sampling     │
└──────────────┘
```
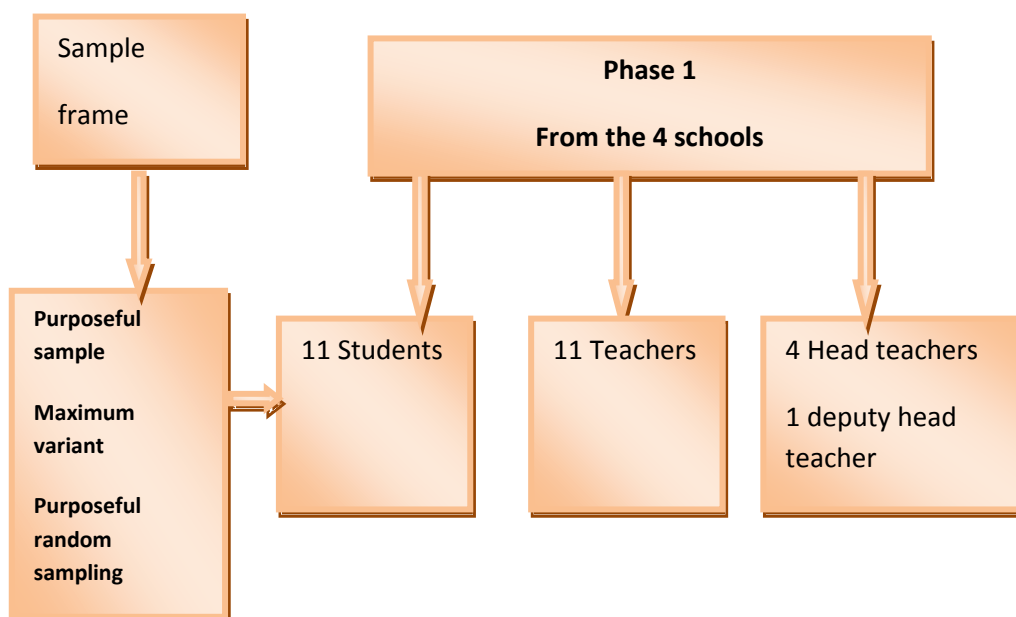
Figure 2: Phase 2 In-depth-Interviews sampling

4.6 Methods employed

In my research, I employed two types of instrument, the interview and the questionnaire. As already established, I undertook some informal interviews with head teacher, teachers and students in a local school. This was to help generate ideas about their experience of working with the programme. Later in my research I conducted semi-structured interviews with other head teachers, teachers and students to build up a fuller picture of how work on the project was progressing. As regards the use of questionnaires, I developed two of them, one for teachers and one for students. Both questionnaires were similar in character, each containing closed-ended items and open-ended ones. Analysis of their responses was to serve as the basis for the semi-structured interviews.

4.6.1 The interview

Powney and Watts (1984) define an interview as 'a conversation between two or more people where one or more of the participants takes the responsibility for reporting the substance of what is said' (cited in Verma and Mallick, 1999, p. 122). Barbour and Schostak (2005) argue

that 'Implicit in our images of interviews are a number of key concepts listed below that fundamentally impact on their utility as methods to be employed by researchers and these may introduce aspects of bias:

- The "messiness" of encounters with others;
- The "performances" of those engaged in communication;
- The level of "commitment" to being engaged in communication;
- "Truth";
- Reality;
- 'Suspicion';
- The hidden agendas at play; and
- The tactics and strategies employed to "unearth" information' (Barbour and Schostak, 2005, p. 41).

I used triangulation of data, probing techniques, cross checking of answers and variability in sampling strategies, to address some of these aspects as discussed in the sampling, data collection, analysis and the following sections.

In my research I used the interview to learn more about the research problem so the interview was suitable for my purposes. Denscombe commended the use of interviews: "When the researcher needs to gain insights into things like people's opinions, feelings, emotions and experiences, then interviews will almost certainly provide a more suitable method – a method that is attuned to the intricacy of the subject matter" (Denscombe, 2007, p. 174). However, he also warned that "the interviewer might see some incongruity between answers given by the same interviewee and be able to probe the matter. Or the interviewer might note a disparity between a given answer and some other factor" (Denscombe, 2007, p. 170). Wilkinson (2000, p. 47) identifies purposes for which the interview is used; when seeking in-depth information; when the issues addressed might be sensitive; and/or when the topics under study might profit from wider exploration. Denscombe (2007) expands on these comments. "When the researcher needs to gain insights into things like people's opinions, feelings, emotions and experiences, then interviews will almost certainly provide a more suitable method – a method that is attuned to the intricacy of the subject matter" (p. 174). Denscombe also points out the usefulness of key informants, who, if allowed to open up in interviews, may provide extremely insightful information. Another important advantage of interviews, he notes, is that they bring to light "informants' priorities, opinions and ideas" that the researcher may not have appreciated.

"Informants have the opportunity to expand their ideas [and] explain their views" (p. 202). A final advantage of interviewing that Denscombe mentions is that it requires simpler equipment than many other types of research and uses instead the researcher's own familiar and well-developed conversational skills.

By using interviews, I could understand their feelings and opinions in more depth than I could do from just studying survey responses or even responses to open-ended items, because the dialogue allowed me to follow up on their statements immediately, and they on mine. With so many of the teachers' and students' reactions not well understood, interviews were important simply to orient me to issues that should be explored. My interviews were *semi*-structured, that is, I set the initial focus of each interview by asking certain questions, but the participants were free to answer at length and to bring up issues I might not otherwise have expected to explore. This falls between a *structured* interview, in which the interviewer's questions control the discussion, and an *un*structured interview, in which completely free conversation takes place (Robson, 2002).

Semi-structured interviews gave me the opportunity to push for what I wanted most to know, but also to take advantage of unexpected topics that were useful to the research. Robson (2002) suggests entering a *semi*-structured interview with the following preparation: "(1) Introductory comment; (2) List of topic headings and possible questions to ask about each; (3) Set of prompts associated with these topics and questions; (4) Closing comments" (p. 238). This was roughly how I planned my interviews. At the beginning of each interview, I explained that the purpose of the interview was to find out about the students' or teachers' experiences with the new teaching programme and that this was a preliminary exercise to help me find out about the sorts of issues raised by participants in the programme. The attitudes and concerns that appeared to be of most importance to the interviewees were then followed up in the questionnaires (See interview schedules in Appendix 4).

However, I did not use interviews as extensively as I had first considered doing, partly because of the time that would have been required and the difficulty of arrangements, especially in boys' schools, which women do not ordinarily enter boy's schools. However, my experiences as a teacher in Saudi schools enabled me to extract maximum information from the interviews that I conducted.

Denscombe (2007) mentions several major drawbacks to using interviews. These include (1) that interviewing is time-consuming, compared with handing out surveys to large groups,

especially if travel time or complicated arrangements are involved. I limited the number of cases ensuring I recruited a manageable group; (2) that completed interviews need to be pondered exhaustively, using grounded theory techniques, to identify their major themes that bear on the research questions; (3) that themes in different interviews are not necessarily comparable, and their coding might well differ with different analysts, so that interview data may not particularly reliable; I used triangulation of data to increase the reliability of the information (4) that the way informants interpret characteristics of the interviewer might inhibit them from providing valid information; and that interviewers and informants without identities, such as in texted dialogues between computers, may mean that informants are able to talk more openly assured of their anonymity; (5) that the interview might seem invasive and upset an informant, especially when different cultures are trying to communicate, I understood the participants culture and worked within this context. Barbour and Schostak (2005), also mention the problem in interviews of "hidden agendas" and "performances" of people involved in conversations, the general "messiness of encounters with others" (p. 41). But while these patterns of behaviour might interfere with understanding, they might also operate in responses to questionnaires, where they could be more difficult for the researcher to discover.

4.6.2 Field Work Strategy

4.6.2.1 Preliminary interviews

As a starting point for the collection of data for my research, I conducted a series of informal interviews with the head teacher, six teachers and five students from a school trialling the new programme. The school had approximately 300 students and 30 staff. The purpose of the interviews was to find out about their experience of the programme, as I explained to them. This was a preliminary exercise to help me find out about the sorts of issues raised by participants in the programme, I planned to follow up these issues in the main data collection stage. The procedures I adopted were informal in character, as were the interviews themselves. Initial permission came from the head teacher, who agreed to allow me access to the school. She also gave me permission to approach staff and students to see whether they would be willing to talk with me about their experience, helping me with my research. I promised to treat all information I was given in strict confidence and to keep their identities anonymous. I undertook to keep all records of my discussions with them safe. The interviews were conducted in various parts of the school, in the head's office, in the staff room and, in the case

of students, in the students' common room. I had a preliminary discussion with a group of ten teachers to talk about my area of research interest and what I hoped to achieve through my interviews with teachers and others. In the end, seven of them did not wish to be interviewed. However, they said that they shared similar views to the three agreeing to be interviewed (the Preliminary interviews in Appendix 1).

4.7 Questionnaire design

Questionnaires are useful in order to get a first survey of the key issues. Wallace (1998, p. 130) offers these practical considerations regarding the use of questionnaires as compared to interviews. The questionnaire takes longer to prepare than the interview, which needs to be more highly structured and 'carefully written because of problems of ambiguity, since a lack of clarity in the questions cannot be immediately cleared up as they often can be in face-to-face interviews'. Gillham (2000) points out that, "questionnaires are just one of a range of ways of getting information from people or answers to our research questions" (p. 2). For Dornyei (2003) the main strength of questionnaires is the ease of their construction. "In an age of computers and sophisticated word processing software, it is possible to draw up something that looks respectable in a few hours" (p. 3).

In my study, I used the questionnaire to identify the responses and reactions and experiences of the parties immediately involved, as they responded to the challenges of change and its management. This method enabled me to collect data from a large sample in the time available to me. From factors arising from the preliminary interviews, I drafted a number of potential ideas for questionnaire items to cover the sorts of things I wanted to find out about, and began to draw up a structure for the questionnaires for teachers and students. The preparations for my research were made in Manchester, and the questionnaires were developed in English. This enabled me to discuss the items with other postgraduate students as well as my supervisor and others. However, my research was to be carried out in an Arabic-speaking country, hence the need for the questionnaires to be translated into Arabic. I developed two questionnaire versions, one for teachers and one for students. Each had a similar format, using mostly closed-ended items but with a few open-ended ones to round it off.

4.7.1 The teacher questionnaire

The teacher questionnaire (appendix 2) was divided into eight sections to draw out information about what respondents thought of as the strengths and weaknesses of the project's implementation (sections 2, 3, 4, and 5, and open ended items in section 8). Questionnaire

items were developed from the analysis of preliminary interview data. Section one sought information on the background of the respondent so that the teacher sample could be profiled, for example, gender, age, subjects taught, class sizes, length of teaching experience, and so on. This profile would inform the reader about the sample's general background and show whether or not it could be seen as broadly representative of Saudi secondary school teachers working in project schools.

Denscombe (2007) points out that, "the closed question structures the answers by allowing only answers which fit into the categories that have been established in advance by the researcher. The researcher in this case, instructs the respondent to answer by selecting from a range of two or more options supplied on the questionnaire. The options can be restricted to as few as two (e.g. 'yes' or 'no'….) or can include quite complex lists of alternative responses from which the respondent can choose" (P.167). What is more, open-ended items, as Denscombe (2007) notes, are those that leave the respondent to decide the wording of the answer, the length of the answer and the kind of matters to be raised in the answer. The questions tend to be short and the answers tend to be longer. Also, as Verma and Mallick (1999) stated, "they allow the respondent to answer in as much detail as he or she wishes without any prompting". The final section consisted of three open-ended items. These were included to enable respondents to highlight issues of particular concern to them, with regard to their work and to complement their answers to the close-ended items. Take, for example, 44. - *What do you see as the current strengths of the programme?*

I left some 6 lines for the respondents to answer and invited them to use the back page of the questionnaire if more space was needed. The questionnaire data were to be analysed using grounded theory.

4.7.2 Student questionnaires

As already mentioned, two questionnaires (appendix 2) were drawn up to collect data from teachers and students working with the King Abdullah programme. More specifically, the questionnaires were to generate issues relating to what respondents saw as the programme's strengths and weaknesses. The responses generated by the questionnaires were the stimulus for in-depth interviews with participants in the programme. Both questionnaires had a similar structure. Each began by seeking information to enable the two samples to be profiled briefly. This was followed by four sections consisting of closed-ended items in the student questionnaire (six in the teacher questionnaire).

The final section in the questionnaires consisted of open-ended questions, this was designed to allow respondents to write freely about their experiences of the programme. The student questionnaire had six such questions to prompt them, while the teacher one had three. Respondents were asked to write their answers in the spaces allowed (about half a page), and to use the back of the sheet, if they required more space. The closed-ended items asked respondents to answer in a fixed response format, for example: *Using the website helps me present my opinions* (Appendix 2). e.g. *YES* or *NO*, or, as in other sections, using a 5-point Likert scale format, for instance, *Lesson planning takes up a lot of my own time* (Appendix 2).

Respondents were asked to answer, as appropriate with have YES or NO, or agree/disagree to indicate the extent to which they agreed or disagreed with a statement or rated something as likely or unlikely. These were followed by some open-ended items, such as:

    I.   *Would you recommend this programme to other students/teachers, and why or why not?*

   II.   *What do you see as the current strengths of the new programme?*

  III.   *What do you see as the current weaknesses of the new programme?*

  IV.   *Have you any other comments about the programme that you would like to make?*

4.8 Research questions

The questionnaires and the interviews were designed to help generate answers to the following research questions.

1. What are the strengths of the Project as perceived by participants?
2. What are the weaknesses of the Project as perceived by participants?
3. What do participants suggest might be causes for the perceived weaknesses and how do participants suggest managing them?

Reference to the research instruments, especially to the final sections with the open-ended items, shows the role of the research questions in this study. It is also true to say that the closed items in the teacher and the student questionnaire also contribute to understanding their thoughts and experience with the new programme.

After I had drawn up my two draft questionnaires (Appendix 2), I discussed them with my supervisor, as well as with some Saudi teachers, working in project schools. Some re-adjustments and new ideas were added in the light of those discussions. Improvements were

also made to the layout of the questionnaire, so that the teachers and students would feel more encouraged to fill it in. The questionnaire items and instructions were carefully translated into Arabic and checked by Arabic-English bilinguals. To make sure the questionnaire was clear and understandable, I changed some words for greater clarity. This is how it looked first For example *the school website help to add some suggestions to improve the school*. After discussion and further reflection I have changed it: *The website provides me with good resources to increase my knowledge*. This was aimed at gaining personal views as felt by the students.

At the end of both the teacher and the student questionnaires there were a few open-ended items. Such questions are typically tacked on to the end of closed-end questionnaires, as Cohen et al. (2005) explain, to enable respondents to "reply in their own terms and give their own opinions" (p. 328). In this research, these questions function somewhat like interviews, opening up experiences, motivations, and viewpoints that might not have been properly raised in the closed-end survey questions. These open-ended items might also provoke less anxiety and disinclination to cooperate than face-to-face interviews. Male students and teachers, in particular, might bring up matters in this impersonal format that they might be less likely to discuss directly with a female interviewer. Thus, many of the benefits of semi-structured interviews were gained from using these items, from the entire sample instead of a small number, without the cost in time and difficulty of arranging and carrying out full-scale interviews with them all.

4.9 Triangulation, reliability and validity

Triangulation is an important technique used in this study to address issues of validity, objectivity and generalizability. Triangulation is, using a variety (or at least more than one) research method or studying more than one type of data, in order to understand phenomena by seeing them from different perspectives (Denzin, 1997; Olsen, 2004; Cohen et al., 2007; Schostak, 2002). In my study, for instance, I used two methods: interviews, questionnaires. I have also worked as a teacher of Arabic in Saudi schools (before the introduction of the new curriculum). The subjects of the study included head teachers, teachers, students, people of both genders, students at different grade levels, and schools located in two socio-economically different cities. In a descriptive study such as this, the more that can be learned by a variety of methods, the more accurate and complete the picture of the subject matter becomes,

benefiting both from agreement and from disagreement of different types of data bearing on the same issue.

The benefits of triangulation vary depending on the perspective of the researcher. Post positivists assert that triangulation enables researchers to minimize the biases. Additionally, Saunders *et al.,* (2007: 98) described generalizability as: "the extent to which the findings of a research study are applicable to other settings". Therefore, using questionnaires and interviews helped me to avoid bias using triangulation in which both sets of results were cross-checked.

I am aware of the fact that the prevention of being biased in this research is key. In order to be unbiased I didn't involve my own opinions within the interview and questionnaire, this was for the reason to disallow the participants opinions and thoughts be tampered with. Furthermore, within my research I decided that the cities, schools participating and the participants were to remain anonymous. This will result in the participant answering freely without their identity being revealed. Another feature, I included to make it unbiased is that I had the intention of selecting schools of different academic levels. I also included schools in different cities and different regions of the city and also included the different genders.

4.9.1 The Role of Triangulation in Validity and Reliability

This study's validity was ensured through performing the constant comparative method which is one of several techniques that aim to look critically at data in order to come up with more valid findings (Silverman 2000; Silverman 2001). Hammersley defines reliability as "the degree of consistency with which instances are assigned to the same category by different observers or by the same observer on different occasions". Kennedy (2009) said " reliability was maintained by pre-testing the standardised interview schedule to ensure that all participants would understand the questions similarly and answers elicited would be analysed on the basis that they did not have any kind of uncertainty or ambiguity." A degree of 'reliability' concerning interpretations and analyses was achieved through:

1. Piloting the questionnaire and interview with some teachers, making sure that it is easy for them to understand and thus that they would interpret the questions in similar ways
2. Triangulating with the questionnaire results between students and teachers as undertaken in chapter 5, this was aimed to see the extent they came to similar conclusions

– and thus the extent to which those understandings were both reliable across groups and valid.

3.   In order to identify the extent of agreement, understanding, and commonalities as well as the contrasts, these were triangulated as shown in chapter 6.

Issues of validity and reliability must concern all researchers. In this research the notions of validity and reliability were thus applied at various stages in methods applied in selecting participants, data collection tools and collection. Formal procedures to measure validity and reliability are important in statistics, while the concepts are understood more subjectively with data such as interviews and open-ended items.

Cohen et al., (2005) rightly point out that "the meaning of *reliability* differs in quantitative and qualitative research … reliability in quantitative research is essentially a synonym for dependability, consistency and replicability over time, over instruments and over groups of respondents". They add that "for research to be reliable it must demonstrate that if it were to be carried out on a similar group of respondents in a similar setting, similar results would be found" (p. 146). On the other hand, "in qualitative research reliability can be regarded as a fit between a researcher's record as data and what is actually researched, i.e. a degree of accuracy and comprehensiveness of coverage". These ideas of reliability are reflected in Bogdan and Biklen's notions of reliability (Bogdan and Biklen, 1992, p. 149, cited in Cohen *et al.,* 2005, p. 149). "Reliability is the extent to which an experiment, test, or any measuring procedure yields the same result on repeated trials, without the agreement of independent observers able to replicate research procedures" (Colorado State University, online).

From the positivist approach, Smith (1991) offers this definition of *validity* as the 'the degree to which the researcher has measured what he has set out to measure (p. 106). Kumar (2005) asserted that "In terms of measurement procedures, validity is the ability of an instrument to measure what it is designed to measure" (p. 137). For the interpretivist, it is vital that tools and methods used can still achieve validity and reliability at various levels of the research.

On the usefulness of triangulation in research, Moran-Ellis *et al.* (2006) have this to say: "Epistemological claims concerning what more can be known about a phenomenon when the findings from the data generated by two or more methods are brought together" (p. 46). A questionnaire should meet the requirements of validity and reliability, if the information it

gathers is to be considered accurate. In simple terms, *validity* means, for example, whether a questionnaire is judged to be suitable for its intended purposes and that the data collected is considered to be reliable.

Denscombe (2007) explains *validity* as it applies to both quantitative and qualitative data collection "In terms of research data, the notion of validity hinges around whether or not the data reflect the truth, reflect reality and cover the crucial matters. In terms of the methods used to obtain data, validity addresses the question, 'Are we measuring suitable indicators of the concept and are we getting accurate results?' The idea of validity hinges around the extent to which research data and the methods for obtaining the data are deemed accurate, honest and on target" (p. 301). In this study, exploring the diversity in viewpoints improved the validity of the data by identifying what was common and what was different across these viewpoints. Validity of the results were also increased by triangulating between the viewpoints collected by questionnaires and those revealed by in depth interview, which gave access to greater understanding of the questionnaire answers. In addition knowledge of the proportions of the sample that gave various answers.

In my research, I have attempted to suspend my own views in order to document the voices of the participants. The data are people's perceptions of the world they experience, and the truthfulness of that data includes the extent to which the researcher is able to understand the meanings that people attribute to their own and others' behaviour, as well as beliefs about what that behaviour has been. The topics of the researcher's and participants' questionnaire answers and conversations are often physical facts, such as the time that teachers' and students' work takes or the frequency with which equipment breaks down, but the researcher has not measured time or frequency of events; instead, the focus is on the participants' perceptions of these categories and how the perceptions affect reactions and attitudes.

The phenomenological approach to understanding human social behaviour, as exemplified in Schutz's thinking (Wilson, 2002), explores this type of subjective research and, thus, is relevant to the research in this study. In the social sciences, as Schutz and others have observed, the subjects of research are themselves interpreting the social world, just as the social scientists are attempting to do. The subjects of research are attempting to make sense of their experiences, in interaction with other people, while social scientists are attempting to make sense of how they make sense. This quest plays an important role in social management

research. In the research described in this thesis, management policies are sought that might change perceptions and behaviour.

As described above, I used triangulation to increase the validity of my data collection methods, sampling different groups of participants (head teachers, teachers, and students). I triangulated the views within the teacher group to identify the degree to which all or some teachers agree or differed. Further, I compared and contrasted these views with range of views provided by the students. I also sought to understand to what extent different groups of teachers agree or disagree with different groups of students. Through in-depth interviews I sought to understand possible explanations as to agreements or disagreements and seek further data to test out those explanations. I further used triangulation to get answers when viewpoints or attitudes differed, attempting to establish or at least speculate about the reasons for these differences. For instance, if a large proportion of the teacher sample said that they could run computers properly, while a large proportion of the student sample (which was drawn from the same four schools as the teachers) had agreed with the statement that most teachers were incompetent in using computers, this might have cast serious doubt on one or both results, by suggesting that one or both sets of participants were being somewhat dishonest. Whether dishonesty was involved or not, however, these differences would bring to light differences in the knowledge or attitudes of the two groups and thus provide a richer, fuller picture of the perceptions of the entire sample.

Even more complexity of perceptions throughout the entire sample might have been shown by repeated one-on-one interviews with a variety of individuals, until close relationships were established that involved trust and honest confidences about perceptions and observations; in other words, extended ethnographic fieldwork would be required. I did not have the time or other resources for this. However, I believe that my familiarity with the culture of the Saudi schools, as well as with this part of the Kingdom of Saudi Arabia, was of some help in establishing trust with participants. In all these ways, validity was increased because the triangulation in data collection increased the accuracy of the overall understanding of the attitudes of the sample.

The following are some key principles outlined by Schutz that can assist in ensuring the trustworthiness of findings these principle are "(1) The principle of relevance (2) The postulate of logical consistency: which is undisputed. (3) The postulate of subjective interpretation: which means that explanations in the social sciences have to refer ultimately to the subjective

meaning of action (4) The postulate of adequacy: which means that the constructs of the social scientist have to be consistent with the common-sense constructs of actors. (5) In addition, he sometimes invokes the postulate of rationality: which means that models of rational actions are preferred since they are especially evident and form a point of reference for the characterization of deviant types" (Schutz 1955a, cited in Eberle, 2010).

4.10 Field Work

In April 2011, I travelled to Saudi Arabia to collect data. The process took 1 month in the first phase (survey) of data collection. I administered all questionnaires in the girl schools myself and had to ask my husband to hand the questionnaires to the boy's school, on my behalf (head teachers and teachers for the 2 boy's schools). This was due to the cultural requirement of only males entering in boy's school. However I ensured, that all my research protocols were well explained to my husband in order to assist me with the data collection.

Week 1:

Meeting with the head teacher, in City 2. She was very cooperative and took me for a look around the school, which gave me a clear picture of this girls' school in City 2. I administered questionnaires to the girl school to 27 teachers' questionnaires and questionnaires to the 300 students. I went into every single class and explained the purpose of my research I handed questionnaires to a teacher who was available in a boys' school. These were left and collected one week later. I received their responses with a 100%.

Week 2: City 2 boy's school

I had phoned the head teacher and had explained my aims and intention of my thesis, as I did with every other head teacher that had participated. My husband handed out 30 teacher questionnaires and 209 student questionnaires. Again, I received a 100% response from both teachers and students.

Week 3 boy's school city 1

A total of 250 questionnaires were administered to teacher and students respectively. But there were differences. I received a low response. Although the response rate was low there was

still sufficient to show a range of key issues from male teachers, only receiving about 50% replies 17 for teachers and 133 for students.

Week 4 girl's school city 1

In the girls' school in City 1, I handed out 199 student questionnaires and 20 teacher questionnaires. I received a 100% response.

After that I came back to England, I analysed the quantitative data consisting of closed-ended items. Responses were coded and entered into an SPSS program and the percentages of various answers to each question were calculated. At the end of both the teacher and the student questionnaire there were a number of open-ended items. This data was analysed using thematic approaches and this data was used to support and give an in-depth understanding of the survey analysis. Subsequently, I travelled a number of times between 2011 and 2012 to undertake the interviews.

4.11 Piloting

The research literature has no shortage of texts offering advice and suggestions to help novice researchers to go about their work. Examples of advice offered on the piloting of materials and procedures include the following: if possible, conduct a pilot study on people similar to those you are intending to research to iron out 'any problems of comprehension or other sources of confusion' (Walliman, 2006, p. 90); test how long it takes for subjects to complete them, 'to check that all questions and instructions are clear and to enable you to remove any items which do not yield usable data' (Bell, 2005, p. 147); "the main purpose of a pilot exercise is to get the bugs out of the instrument, so that respondents in your main study will experience no difficulties in completing it. It also enables you to carry out a preliminary analysis to see whether the wording and format of questions will present any difficulties when the main data are analysed" (Bell, 2005, p. 47). In my research, when the questionnaires and the interview schedules were established, I took them into a couple of Saudi project schools and piloted them with teachers and students. When they had completed them, I discussed them with those who had taken part in the piloting, with the objective of making any changes for validity reasons.

4.12 Data Analysis

In this section I consider how the data that I got from various sources were analysed.

4.12.1 Analysis of interview data and of closed-ended item data

The analysis of the interview and the open-ended questionnaire items began with me translating the original Arabic into English. In a study involving two (or more) languages like the present one (conceived and directed in English, and conducted in Arabic) it is not uncommon for some difficulties to emerge with establishing the Arabic equivalents of key words from the English. Obviously, in the present study, the use of questionnaires and interview schedules in Arabic was for the participants, Saudi teachers, students and head teachers. Arabic has a very limited vocabulary relative to English vocabulary and at times some words are used to convey a range of different meanings. In the present study, there were some problems with establishing meanings that were readily understood by the participants. This required use of several words to convey what the English words meant. However, it was possible to minimise problems by discussing wordings initially in English and then in Arabic when drafting the instruments. Various suggestions were offered by some fellow postgraduate students in Manchester and then by Saudi colleagues later in the Kingdom, prior to the main study.

Then it was a matter of making copies of the transcripts, for use when the data were subjected to grounded theory analysis. Typically, the aim is to try to find out what is probably going on in a certain type of situation. As the researcher triangulates between different data sets, some of the themes become more grounded, as they prove to be relevant in a wider variety of environments, and as they are confirmed by increasingly thorough analysis of each data set and increasingly thorough comparison and contrast between data sets.

The richness of the variety of forms they take in different data sets also adds to the degree to which they are grounded. Eventually, the most explanatory themes are recognized as one or more core concepts or theories, which form the argument of the study.

4.12.2 Grounded theory analysis of data from interviews and open-ended survey items

The qualitative data were analysed by grounded theory methods (Glaser and Strauss, 1967), which are well suited for a research situation like this, in which a great deal is not known, initially, about the actions, attitudes and motivations of the research subjects. As Jones and Alony (2011) say, "Grounded theory is useful in providing rigorous insight into areas that are

relatively unknown by the researcher" (p. 96; see also Denscombe, 2007, p. 92). Unlike most scientific studies, grounded theory research encourages an open mind about the reasons for the patterns being studied and even about what those patterns are. Triangulation between a variety of demographic groups and data collection methods is called for in order to obtain a broad picture of what is going on.

Greckhamer and Ljungberg (2005) say that grounded theory "does not specify whether interviews, observation, archives or other data-collection methods would be the most appropriate for its purposes. Instead, it suggests and accepts a variety of data-collection methods from various sources" (p. 735). Wilson (2009) notes, "The specific procedures in a grounded theory methodology provide a rigorous yet productive means for developing a theoretical perspective from differing sources of data. Adopting a multi-faceted methodological approach in the analysis and integration of multiple sources of data provides an effective means for illustrating the experiences of the participants" (p. 15).

As proposed by Glaser and Strauss (1967), grounded theory analysis starts by "coding each incident in the data into as many categories of analysis as possible, as categories emerge or as data emerge that fit an existing category" (p. 105). "After coding for a category perhaps three or four times, the analyst will find conflicts in the emphases of his thinking. He will be musing over theoretical notions and, at the same time, trying to concentrate on time, trying to concentrate on his study of the next incident [or statement], to determine the alternative ways by which it should be coded and compared. At this point, the rule of the constant comparative method is: stop coding and record a memo on your ideas" (p. 107).

Here is an example of the process of grounded theory analysis used in this research. The analysis began by open coding to fracture the data. A variety of codes were identified. Codes were parts of the data which stood out because of their many connections with other codes and repeated across many participants. Upon further analysis these linked codes were grouped into categories; for example, *broken-down equipment; no ongoing maintenance; repair may take months; there is no longer funding for repair and tech support; students complain computers not used in some classrooms*. In addition to linking with each other under categories. Further constant comparison of the codes and categories led to fleshing out the following themes; Inadequacy of *training;* Inadequacy of *equipment maintenance*.

The tentative explanations the researcher is weighing, and recorded in the memo, may guide the researcher's decisions about what types of data to explore next. If it happens that some

observations noted in the memo are repeated in data from a number of participants, assuming they are also important to the research questions, they may be classified as minor themes. Some minor themes will seem especially close to each other; that is, they will all seem to be pointing to a larger point that is important to the research questions. These themes may be bundled together into larger themes. For instance, "*The whiteboards have no maintenance and have broken down many times,*" might be joined with a number of other themes into two larger themes: "*Lack of maintenance and repair of equipment*," and *"Some equipment broke down extremely frequently.*"

In time, as wider relationships between themes are perceived, they may join into themes that will be still more general in application and deeper in meaning. For instance, "*Lack of maintenance and repair of equipment*" might join into a more general theme: "Lack of Project resources to meet all needs." Thus a theory (in the grounded theory sense), explaining the weaknesses of the Project, might begin to form: A number of the weaknesses of the Project have been due, at least in part, to a lack of sufficient resources. "Lack of Project resources to meet all needs" might also be perceived to join with other themes as part of the more general theme "Failure to plan the Project with sufficient foresight," Inadequacy of equipment and maintenance and this too would form the beginning of another theory explaining the weaknesses. Thus, as more themes are identified and more relationships between them are recognized, greater insight may be gained into underlying causes of the strengths or weaknesses of the Project, which are major objects of the research questions. As some of the probable causes become clearer, it will also begin to be clearer how these weaknesses might be managed. Here is an example of that a memo might look like:
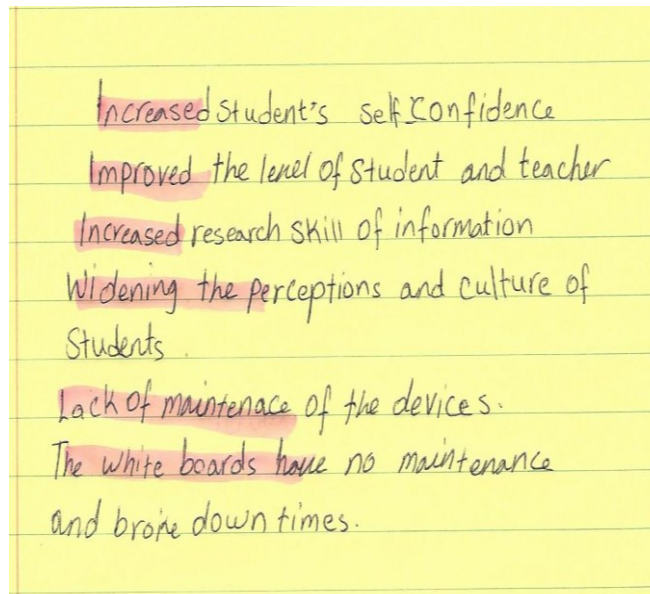
Figure 3: Research Memo

Examples of simple categories, recorded early in the analysis, might be computers, computers crashing or difficulties using computers. Grounded theory analysis involves repeatedly applying new categories to previously studied data, as well as to data from new informants, data from new collection methods and from previously written memos, a process that is called the constant comparison method. The use of triangulation techniques can also make a contribution to determining the validity of the findings, through the use of constant comparison between data sets, e.g. between quantitative data (reported in Chapter Five) and qualitative data (reported in Chapter Six), between sub-groups of teachers, students and head teachers, and so on. The constant comparisons offered may serve to strengthen and confirm the similarities and differences in evidence emerging from different sets of data, of different types and from different places.

The purpose of taking apart the data and putting it together again in this way is to discover new relationships between categories that have not been suspected before and thus new explanations for the patterns the researcher is finding.

Another grounded theory technique is called *theoretical sampling*. Jones and Alony (2011) describe it as follows.

> There are two main steps involved with theoretical sampling. In the
> first step, the researcher targets participants who share minimal

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differences with regard to the subject under examination. After data from this step have passed the scrutiny of constant comparison, the sampling moves to the second step. In this step, an enlargement of the sample commences until differences between participants are maximized. By initially minimizing differences, the researcher is able to quickly develop categories and determine their properties (p. 106).

The following categories emerged from the analysis of the preliminary interviews described above:

- Programme training for head teachers and for teachers, before the launching of the project; for instance, a maths teacher spoke of training courses and limited opportunities to practise techniques before use in school;
- Classroom equipment;
- Technicians and maintenance;
- Availability of support;
- Use of website;
- The programme, assignments and the school day;
- Workload demands;
- Supply staff lack project training;
- New technology helped improve school;
- The quality of the education and (her) professional development.
- Teacher-student relationships; for example, one student in year one: "getting on well with the programme; teacher-students relationships stronger;"
- Positive/negative attitudes towards the programme;
- Self-confidence gains;
- Teaching/learning;
- Bringing laptops to school vs using them only in school;
- Use of computers;
- Skills gained; for instance : a student from year two, science option, said: "the programme helps to promote students' self-skills and stimulate cooperation between students;"
- Reactions of parents/families

Gradually, as grounded theory analysis continues, categories emerge that replace a number of the old categories, being more general in application, more explanatory and more grounded in the attitudes and motivations of informants. As Glaser and Strauss (1967) put it, "as the coding continues, the constant comparative units change from comparison of incident with incident [or statement with statement] to comparison of incident [or statement] with properties of the category that resulted from initial comparisons of incidents" (p. 108). As the number of categories decreases, the amount of information in each category increases, these categories begin to be called *themes.* Eventually, one or more major themes become the *theories* (or the arguments) of the study. A *theory* might be something like this:

- *The inadequacy of funding for important resources for the new curriculum (digital equipment and equipment repair and training in ICT and in the new teaching) has held back some teachers from teaching successfully using it.*

These major themes are called *theories* in grounded theory research, although they are not at all like scientific theories. Some grounded theory *theories* might be testable hypotheses, but many are not sharply defined enough to be tested, and perhaps might more properly be called *arguments* or *ideas* in scientific vocabulary. As Glaser and Strauss (1967) say, "the constant comparative method can yield either discussion or propositional theory" (p. 115). That is, the findings can be presented either in the form of hypotheses or in the form of arguments or ideas. Nevertheless, it is evident that such grounded theory theories bring out new information, which deepens our understanding and from which testable hypotheses may eventually be fashioned.

4.12.3 Analysis of questionnaire closed-ended items

The full analysis of the questionnaire closed-ended items can be seen in Chapter Five. The data from the teacher and student questionnaire responses (except those from the open-ended ones) were coded and scored using SPSS (Statistical Package for the Social Sciences) software to analyse the data collected. The open-ended items at the end of the questionnaires were analysed in the same way as the interview data. A descriptive analysis of the data obtained from the questionnaire closed-ended items was carried out using frequencies and percentages. No other statistical tests were performed since the main objective of the questionnaire was to obtain generalizable results. In addition, the study's research questions did not require statistical tests.

4.14 Ethical Considerations

On the matter of ethical issues, I was careful to observe the advice offered by Educational Research, British Educational Research Association on-line resource (https://www.bera.ac.uk/wp-content/uploads/2014/03/Ethics-and-Educational-Research.pdf) and the Manchester Metropolitan University. As Blaxter et al. (2006) say, "All social research (whether using surveys, documents, interviews or computer-mediated communication) gives rise to a range of ethical issues around privacy, informed consent, anonymity, secrecy, being truthful and the desirability of the research. It is important, therefore, that you are aware of these issues and how you might respond to them" (p. 178). "Researchers, who are oriented toward their professional role, who are committed to the scientific ethos, and who interact regularly with other researchers, are likely to act ethically" (Neuman, 2000, p. 90). Veal (2006) observes that "the principles underlying research ethics are universal – they concern things like honesty and respect for the rights of individuals. Ethical issues arise in the design and conduct of research and in the reporting of results. The general principles usually invoked in codes of research ethics include the following. Research subjects should come to no harm, nor be under pressure and should 'take part on the basis of informed consent" (Veal, 2006, p. 70). Unless previously agreed, when writing up the research, subjects' responses should be edited out, so as not to reveal the identity of a school or any individual teacher or student.

As my research setting was Saudi secondary schools (catering, typically, for students 15-18 years), the gatekeeper in each case was the head teacher. The head teacher's permission was essential for gaining access to each of the schools.

In addition to that, individual teachers and students invited to take part have the freedom to opt out, at the beginning or at any subsequent point in the work. Following the guidance given in the University's Research Handbook on ethical considerations, I drew up information for participants about the research and what it would involve them doing. I gave them assurances about the protection of their identities, during my research and in the reporting of it. I also enclosed a consent form for interviewees, for head teachers, teachers and for students. (See copy of the consent form in Appendix 5.) I shall, as a matter of courtesy to respondents, show them the part of the research record that reports what they have said in interview, as recommended by Bell (2005). I have promised to treat all information I have been given in strict confidence, to keep the identities of respondents anonymous and to keep all records of my discussions with them safe.

4.15 Conclusion

This chapter has sought to address some of the theoretical issues relating to my research methods arising from my reading on   and instrumentation and from the conduct of my research that include the three stage of my study first preliminary interview then the questionnaire then finally the interview with a brief description of how I analysed it. In the next chapter I present my analysis of the questionnaire responses from teachers and students.

Chapter Five

Quantitative Data Findings

5. Quantitative Data Findings

5.1 The introduction

This chapter presents the findings from the questionnaire part of the fieldwork conducted for this study. As was explained in the previous chapter, two tools were used: student and teachers questionnaires and interviews with students, with teachers and with head teacher. The following chapter will report in-depth interviews and written responses.

This study triangulated between three methods of collecting data and four samples: (1) two different questionnaires, one for 94 teachers and one for 841 students, asking different yes-no and multiple-choice questions of each sample; this large sample of quantitative data was useful in showing the proportions of teachers and students in the larger populations who held various views or experienced various reactions to the Project; (2) in-depth interviews with 11 students, 11 teachers and five head teachers from the two schools in the sample, to explore issues not resolved by the questionnaires; (3) written responses to open-ended questions, allowed the 841 students and 94 teachers to give personal reactions and to further introduce topics not included in the questionnaires. Triangulation between quantitative and qualitative data added richness and depth of understanding to the results. The chapter will be organised by: a) to present findings, b) to comparing the findings.

Most questions on the student questionnaire and the teacher questionnaire used a five-point scale (strongly agree, agree, not certain, disagree, and strongly disagree) or (very likely, likely, not certain, unlikely, very unlikely), on which to rate each statement. In the text, strongly agree and agree are lumped together as agree; and strongly disagree and disagree are lumped together as disagree. The same merger occurs with likely and unlikely. The entire five responses, however, are given in the tables. Other questions are in the "yes – no" format.

5.2 Findings from the Quantitative Surveys

Most of the quantitative as well as qualitative questionnaire items are based on Research Questions 1, 2 and 3 , in chapter one , which sought to establish the participants' experiences with and views on the King Abdullah Project, their perceptions of its strengths and weaknesses and differences between the perceptions of some demographic subsamples. Perceptions of the basic strengths and weaknesses perceived in the Project, which are the topic of Questions 1 and 2 are extremely important to establish, because these are one of the aims description, which the study was designed to address.

5.2.1 The students' quantitative survey

The first questions presented here are from the questionnaire taken by the 841 students in this study. A brief discussion of the characteristics of this sample follows as shown in Table 5.1. There were more female students (59.3%, n=499) than male students (40.7%, n=342). They were drawn from two cities and were in secondary school levels one to three, with almost equal numbers in the first and second levels (38%, n=320 and 38.2% n=321, respectively). The second largest group in the programme were the second year science students and the smallest group were the second year arts students, comprising 28.9% and 9.3% of the total sample, respectively (see Table 5.1). Almost all the students (92.4%, n=777) reported using a computer at home before enrolling in the Project, with only 6.9% (n=58) reporting not using one. A majority of students sometimes brought laptops to school (47%, n=395); while 16.1% (135) never did, and 7.3% (61) always did.

Table 5.1: Demographic characteristics of students in this sample

	Variables	N	Percent of total
City of residence	City 1	332	39.5
	City 2	509	60.5
School level	1st Grade	320	38.0
	2nd Grade	321	38.2
	3rd Grade	200	23.8
Gender	Female	499	59.3
	Male	342	40.7
Age	15-16	336	40.0
	17-18	464	55.1
	19-20	35	4.1
Used a computer at home before enrolling in the program	Yes	777	92.4
	No	58	6.9
Bringing laptop to school	Yes	61	7.3
	No	249	29.6
	Sometimes	395	47.0
	Never	135	16.1

5.3 Student perceptions of the strengths of the Project

The student questionnaire contained a number of statements describing characteristics of the Project as strengths. One of these statements was that the programme had a positive impact on student-teacher relationships; 54.1% of the students agreed, while 20% disagreed, and slightly more, 25.9%, were undecided.

The majority were pleased with their progress (69.2% pleased or very pleased, 19.7% not sure, 11.1% not pleased or strongly not pleased), and felt that they understood better when learning with the new methods (59.7% better or much better, 22% not sure, about 18.3% understanding more poorly or very much more poorly). Similar majorities thought that the new methods made the subjects more interesting (71.8% "yes" against 28.2% "no") and that the new school day was more enjoyable than the traditional one (68.6% "yes" against 31.4% "no"; see Table 1 in Appendix 3).

Students appeared to be optimistic about their progress with computers. Solid majorities agreed that they were gaining computer skills (77.8% agreed, 8.8% did not agree, and 13% neither agreed nor disagreed) and now felt comfortable using the computer in their schoolwork (88% "yes" against 12% "no"). A majority also felt the electronic equipment had helped them improve their learning (60.5% agreed, 11.1% did not agree, and 24% neither agreed nor disagreed). A fairly large majority of the students also believed that their schools had very few problems with computer maintenance (75.5% "yes" and 24.5% "no"; see 2 in Appendix 3).

Students were lukewarm about the effects of the new methods on science and mathematics. Some 62.4% of the students agreed that the programme introduced new methods into the science and mathematics teaching (while 21.2% disagreed and 16.4 % chose neither). Majorities agreed that the new curriculum made science and mathematics easier to understand (51.7% with 25.1 disagreeing and 23.1% choosing neither) and more practical and easier to understand (54% with 26.5% disagreeing and 18.7% choosing neither). A small majority disagreed that the curriculum integrated ICT with the science and mathematics textbooks (46.1% disagreeing with 28.7% agreeing and 25.2% neither agreeing nor disagreeing).

Several questions were asked about the cooperative learning component of the programme. Modest majorities agreed that cooperative learning involved them in developing the curriculum (34.4% with 8% disagreeing and 8.7% neither agreeing nor disagreeing), that it helped them develop problem-solving skills (63.3 % with 18.5% disagreeing and 18.2% neither agreeing nor disagreeing), that it helped them develop thinking skills (64.8% with 15.3% disagreeing

and 20% neither agreeing nor disagreeing) and helped develop communication skills (74.1% with 12.5% disagreeing and 13.5% neither agreeing nor disagreeing). A good majority agreed that the teachers encouraged students to take part in discussions (70.7% "yes" and 29.3% "no"), and a smaller majority said that some students did not take part in group work (59.4%, with 20.6% disagreeing and 29.9% neither agreeing nor disagreeing).

In response to the questions about communication and self-confidence generally, 66.8% of the students said that they now felt free to communicate (with 19.1% neither agreeing nor disagreeing while 14% disagreed). A majority agreed that the teachers and their head teacher were now listening to their opinions 62.9% (against 37.1% "no"), but only about half said that their confidence in general had increased (54.1% increased, 20.7% not increased, with 26.9% choosing neither; see Table 3, Appendix 3).

5.4 Student perceptions of weaknesses of the Project

As shown in Table 5.2, there are several crucial challenges identified in the Project. These are: insufficient practice or skills (67.7%), school assignments being too demanding (64.7%), changing from traditional methods to new methods of teaching (57.3%), training for new students (56.6%), large numbers of students in the classes (44.9%), lacking of computer skills(38.6%), and limited computer skills (34.2%); all contribute to making the Project less effective.

Table 5.2: Summary of challenges faced by students

Obstacles you might face in mastering the new Project	Very likely N	Very likely %	Likely N	Likely %	Not sure N	Not sure %	Un likely N	Un likely %	Very unlikely N	Very unlikely %
Lack of support from my family.	130	15.5	155	18.5	134	16.0	164	19.5	257	30.6
Lack of support from my schoolmates.	133	15.8	204	24.3	169	20.1	190	22.6	144	17.1
Lack of computer skills.	158	18.8	166	19.8	137	16.3	154	18.3	225	26.8
Lack of knowledge about the new curriculum.	175	20.9	211	25.2	193	23.1	131	15.7	127	15.2
Insufficient practice or skill on my part.	354	42.1	215	25.6	134	16.0	61	7.3	76	9.0
The school day is very short for the work we have to do	207	24.6	135	16.1	127	15.1	140	16.7	231	27.5
There are too many students in my class.	174	20.7	167	19.9	122	14.5	205	24.4	172	20.5
There is not enough training for new students in this school Training	256	30.4	220	26.2	226	26.9	75	8.9	60	7.1
Limited previous computer skills make the Project difficult.	130	15.5	157	18.7	158	18.8	167	19.9	227	27.0
The change from traditional to new methods is very challenging.	249	29.6	233	27.7	159	18.9	93	11.1	106	12.6
Assignments in this school are very time-demanding.	365	43.5	178	21.2	119	14.2	91	10.8	87	10.4

5.5 The Teachers' Quantitative Survey

Like the students' questionnaire, the teachers' questionnaire mainly addressed Research Question 1 and 2 from Chapter One. Question 1 and 2 sought to establish the participants' experiences with and views of the King Abdullah Project and their perceptions of its strengths and weaknesses.

5.5.1 Teachers' demographic characteristics

A total of 94 teachers completed the teacher questionnaire and there were equal numbers of both female and male teachers. The teaching staff were drawn from two girls' schools and two boys' schools. A majority came from City 2 (60.6%, n=57). The mean ages were 30-39 years with a range from 22 to 45 years.

About 60% of the teachers had been teaching in the new project from three to four years. The teachers taught a number of subjects with the largest proportion reporting to be teachers of Arabic (19.9%), Maths (15.1%), Islamic Education (15.1%) and Biology (12.9%). Other subjects that did not have more than 5 teachers were combined to give a total of 19.5% teachers teaching other subjects. For the majority of teachers working in this school, it was their first post (83%, n=78). Table 5.3 provides the summary of the teachers' demographic characteristics.

Table 5.3: Teachers' demographic characteristics

Variable		N	%
City	City 1	37	39.4
	City 2	57	60.6
Gender	Female	47	50.0
	Male	47	50.0
Age	22-29	8	8.5
	30-39	54	57.5
	40+	32	34.0
How long have you been in teaching?	6 months and less	0	0.0
	1-4 year	7	7.4
	5-9 year	28	29.8
	10+ year	59	62.8
How long have you taught in the new project	Under 1 year	5	5.3
	1-2	27	28.7
	3-4	58	61.7
	5+	4	4.3
What subject(s) are you teaching this school year?	Arabic	15	19.9
	Math	14	15.1
	Islamic	14	15.1
	Biology	12	12.9
	English	9	9.7
	Geography	6	6.5
	Chemistry	5	5.4
	Others subjects	18	19.5
Hours taught per week	1-10	33	35.1
	11-22	60	63.8
	23-34	1	1.1
Grades taught this year	Grade 1	26	27.7
	Grade 2	19	20.2
	Grade 3	11	11.7
	Grade 1 and 2	4	4.3
	Grade 1 and 3	7	7.4
	Grade 3 and 2	19	20.2
	Grade 1,2 and 3	8	8.5
Is this your first job in schools?	Yes	78	83.0
	No	16	17.0

5.5.2 Preferences and actual use in classes of ICT and audio-visual resources by teachers

The availability and utilization of various ICT tools were assessed as shown in Table 5.4. There was a variety of electronic equipment available for teachers' in the project to use. About 34 of the 94 (36.2%) teachers were apparently not using the overhead projector in their teaching, 27 were not using the smart board (28.7%), and n=43 (45%) were not using the TV/Video/DVD, despite the fact that the TV/video/DVD (72.4%, n=68), smart board (72.4%, n=68),and computer (61.8%, N=58) are used by highest percentage, followed by audio tape recorder (58.6%, n=55) and lastly overhead projectors (24.5%, no=23) (see below Table 7 in Appendix 3). The smart board and computer were the pieces of equipment used most by the teachers.

However, on the other hand; about 25 of the 94 teachers were apparently not using the computer in their teaching, especially the internet for research. The website for researching references and the group email on the website were essential to using the new curriculum. The qualitative data may throw some light on the complex motivations involved (see below Table 5.4) and (the table 7 in Appendix 3).

Table 5.4: Preferences and actual use of ICT in classes and audio-visual resources by teachers

	Overhead projector		Audio tape recorder		TV/video/DVD		Computer		Smart board	
	N	%	N	%	N	%	N	%	N	%
Yes	60	63.8	68	72.3	51	54	69	73.4	67	71.28
NO	34	36.2	26	27.7	43	45	25	26.6	27	28.72
Total	94	100	94	100.0	94	100.0	94	100.0	94	100

5.5.3 Teachers' responses to the program

5.5.3.1 Teachers' workloads

As in the student quantitative data given above, most questions on the teacher questionnaire used a five-point scale (strongly agree, agree, not certain, disagree, and strongly disagree) or (very likely, likely, not certain, unlikely, very unlikely), on which to rate each statement. In the text, strongly agree and agree are grouped together as agree; and strongly disagree and disagree are lumped together as disagree. The same merger occurs with likely and unlikely. This grouping is used in the student data section above. In both sections, the entire five responses are given in tables. Other questions are in the "yes – no" format.

From Table 5.5, it can be seen that less than a majority of the teachers (40.4%) strongly agreed that "lesson planning takes up a lot of my own time," but that extremely few (8.5%) disagreed and that 23.4% were undecided. About 37.2 %, n= 35 agreed that a lot of marking to do with students' work took most of their own time with only 21.3% disagreeing.

The number of students in class were many (52.2% agreed, 35.1% disagreed) while the project also presented another challenge as most teachers reported the teaching load in the school as "very heavy" (49% agreed, 29.7% disagreed). This created a situation where some teachers felt that there was no time for teachers to relax (46.8% agreeing, 27.6% disagreeing).

Teachers had also spent a lot of non-contact time dealing with paperwork (42.6% agreed, 29.8% disagreed). Additionally, teachers perceived that parents didn't cooperate with the school as much as they could have (39.3% agreed, 29.7% disagreed).

Table 5.5 Teacher perceptions of the programme workload

	Lesson planning takes up a lot of my own time.		Too much of my non-contact time is taken up with paper work		I have a lot of marking to do of students' work, in my own time.		There is no time for teachers to relax.		The teaching load in this school is very heavy.		Parents don't cooperate with the school as much as they could do.		There are too many students in my classes.	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
strongly disagree	6	6.4	11	11.7	5	5.3	5	5.3	7	7.4	7	7.4	10	10.6
disagree	2	2.1	17	18.1	16	17.0	21	22.3	21	22.3	20	21.3	23	24.5
neither agree	22	23.4	26	27.7	20	21.3	24	25.5	20	21.3	30	31.9	12	12.8
agree	26	27.7	23	24.5	35	37.2	24	25.5	23	24.5	16	17.0	26	27.7
strongly agree	38	40.4	17	18.1	18	19.1	20	21.3	23	24.5	21	22.3	23	24.5
Total	94	100	94	100	94	100	94	100	94	100	94	100	94	100

5.5.3.2 Obstacles that might prevent teachers from mastering the curriculum

Six questionnaire items were proposed as possible obstacles for teachers to mastering the curriculum. The results show various issues most likely to cause problems that might interfere

with their mastering the new curriculum. A majority of participants considered these as possible obstacles likely to have a negative impact on their mastery of the curriculum: Lack of time to carry out the changes needed, with 69.2% of the teachers reporting it as a likely obstacle. Insufficient practice or skill on their part was the second highest obstacle, with 64 out of the 94 teachers citing it as a problem. Insufficient knowledge on their part was third, with a majority of 64.9% reporting it as an obstacle. Other obstacles included the inflexibility of work regulations and rules on the changes, lack of desire on their part to change and insufficient support from their head teacher as illustrated in Table 5.6.

Two other statements touched on the problems and were agreed with by almost as large majorities: implementing ICT required good technical support (84% against 9.6% disagreeing); and integrating ICT demanded time to plan and practise its use (78.7% against 7.5% disagreeing). Large majorities of the teachers seemed to approve of the new technology, given the overall response to the new programme (see Table 4, Appendix 3).

Table 5.6: Perceived obstacles that limit teachers' mastery of new curriculum

5.5.3.3 Benefits or disadvantages associated with ICT in the Project

	In sufficient support from my head teacher		Insufficient knowledge on my part		Insufficient practice or skill on my part		Lack of time to carry out the changes needed		Lack of desire on my part to change		In flexibility of work regulations and rules on the change	
scale	N	%	N	%	N	%	N	%	N	%	N	%
Very unlikely	14	14.9	6	6.4	2	2.1	3	3.2	16	17.0	12	12.8
Unlikely	30	31.9	14	14.9	17	18.1	9	9.6	22	23.4	7	7.4
Not sure	17	18.1	13	13.8	11	11.7	17	18.1	22	23.4	19	20.2
Likely	13	13.8	32	34.0	28	29.8	28	29.8	21	22.3	30	31.9
Very likely	20	21.3	29	30.9	36	38.3	37	39.4	13	13.8	26	27.7
Total	94	100	94	100	94	100	94	100	94	100	94	100

Six statements asked about positive effects and problems of the new technology. Overall majorities of participants agreed that the equipment helped improve teachers' performance (88.3%, against 3.2% disagreeing). This view is similar to student perceptions on the benefits of the programme on their overall performance. A majority of 66% of the teachers agreed with "I consider that I am computer-literate", while only 20.2% disagreed.

The new programme was also reported to make the subject more interesting with 90.5% agreeing, and only 3.2% disagreeing, that it helped the teacher uses a range of teaching styles (85.1% agreeing as compared to 7.4% disagreeing). Additionally, the programme was reported to be improving the quality of the education (81.9% agreeing as compared to 5.4% disagreeing; see Table 6, Appendix 3).

The use of internet and websites also was considered to enhance most of the work of the teachers and further improved how teachers worked as shown in Table 5.7 below.

Four statements arguing the benefits of the internet component of the Project were given; results showed that majorities agreed that "the internet is a good resource, increasing teachers' knowledge" (84% against 11.7% disagreeing), "using websites helps to strengthen relations with students" (64.9% against 18.1% disagreeing).

However, approximately half agreed and about a quarter disagreed that "using the website makes the teaching very interesting" (57.5% against 23.4% disagreeing). In another example of lack of enthusiasm for the website, in response to "I consider that I am computer-literate", a majority disagreed (66% against 20.2% agreeing).

Table 5.7: Reported benefits of ICT in the new program by teachers

	Using websites helps to strengthen relations with students		The internet helps to decrease my workload		I consider that I am 'computer-literate'		Using websites makes the teaching very interesting		The internet is a good resource ,increasing teachers' knowledge		The programme helps teacher to work better together	
	N	%	N	%	N	%	N	%	N	%	N	%
Very Little	5	5.3	7	7.4	7	7.4	9	9.6	6	6.4	4	4.3
Little	12	12.8	18	19.1	12	12.8	13	13.8	5	5.3	7	7.4
Not sure	16	17.0	22	23.4	13	13.8	18	19.1	4	4.3	19	20.2
much	25	26.6	23	24.5	33	35.1	29	30.9	25	26.6	30	31.9
Very much	36	38.3	24	25.5	29	30.9	25	26.6	54	57.4	34	36.2
Total	94	100	94	100	94	100	94	100	94	100	94	100

Six statements about general positive effects of the programme received similar majority support: "The project contributes to improve the students' general computer skills" (79.6% agreed, 5.4% disagreed; "The project helps my students to increase their self-confidence" (77.2% agreed and 9.7% disagreed); "The project makes my students more creative" (77.4%

agreed and 7.5% disagreed); "Integrating ICT with the curriculum makes lessons more enjoyable" (74.2% agreed and 7.6% disagreed); "Cooperative education increases the participation of weaker students" (65.6% agreed and 11.8% disagreed).

Table 5.8: General effects of the new programme as perceived by the teachers

SECTION (6)	The project helps my students to increase their self-confidence		The project makes my students more creative		The project contributes to improve the students' general computer skills		Cooperative education increases the participation of weaker students		Integrating ICT with the curriculum make lessons more enjoyable	
	N	%	N	%	N	%	N	%	N	%
strongly disagree	2	2.2	4	4.3	3	3.2	4	4.3	2	2.2
disagree	7	7.5	3	3.2	2	2.2	7	7.5	5	5.4
Neither	12	12.9	14	15.1	14	15.1	21	22.6	17	18.3
agree	37	39.8	35	37.6	29	31.2	32	34.4	27	29.0
strongly agree	35	37.6	37	39.8	45	48.4	29	31.2	42	45.2
Total	93	100.0	93	100.0	93	100.0	93	100.0	93	100.0

5.5.3.4. Improved performance and support for teachers

The last four questions asked about other aspects of the teachers' experiences. One of the questions, "I consider that I am a better teacher now than when I used the traditional methods" recorded a response of (91% "yes" and 8.7% "no"); this was enthusiastic agreement.

The other three questions asked about support for teachers from their superiors and also received majorities saying that they had support: "the head teacher encourages me to develop my teaching skills" (81.5% "yes" and 18.5% "no"); 'the subject inspector encourages me to develop my teaching skills" (64.1% 'yes' and 35.9% "no"); and "I get plenty of in-service training opportunities" (65.2% "yes" and 34.8% "no").

Table 5.9 General effects of the new programme as perceived by the teachers

SECTION (7)	The head teacher encourages me to develop my teaching skills		The subject inspector encourages me to develop my teaching skills		I consider that I am a better teacher now than when I used traditional methods		I get plenty of in-service training opportunities	
	N	%	N	%	N	%	N	%
Yes	75	81.5	59	64.1	84	91.3	60	65.2
No	17	18.5	33	35.9	8	8.7	32	34.8
Total	92	100	92	100	92	100	92	100

5.6 Comparison between Student and Teacher Quantitative Responses

The student and teacher questionnaires were not identical, owing to my interest in following up somewhat different questions with the two groups. Therefore, items from the two questionnaires were not usually very comparable and attempts to compare and contrast student and teacher views of the Project have necessarily been tentative. Some of the questions raised by these data are likely to be clarified by the qualitative data.

5.7 General effects of the Project on performance

The teacher questionnaire presented a number of statements praising improvement in the quality of teaching or learning resulting from the new curriculum. Very large majorities of the teachers (between about 80% and 91%) agreed or agreed strongly with most of these items; percentages of teachers disagreeing with these statements were almost all in the single digits, as shown here: "I am a better teacher than I was when I used traditional methods" (90.% yes, 8.7% no); "The Project makes the subjects more interesting (90.5% agreed, 6.4% neither, 3.2% disagreed); "The Project helps the teacher use a range of teaching styles" (85.1% agreed, 5.3% neither, 7.4% disagreed); "The Project improves the quality of education" (81.9% agreed, 12.8% neither, 5.4% disagreed; "The Project makes my students more creative" (77.4% agreed, 15.1% neither, 7.5% disagreed).

In the student questionnaire, general comments on the Project's effects were less likely to focus narrowly on performance, although one item said "I understand subjects better with the new programme" Only 59.7% of the students agreed and 8% disagreed, but 22% were not sure, a rather lukewarm response compared to the teachers' enthusiastic replies. On "I am pleased with the progress of the Project," 69.2% of the students agreed; this refers to the progress of learning the Project methods and using them, but not necessarily to the performance of the students. Somewhat higher majorities of students, around 70%, agreed that "The new methods make the subjects more interesting (71.8% yes, 28% no); "The new school day is more enjoyable than the traditional one (68.6% yes, 31% no);" and "Cooperative education helps develop communication skills (74.1% agreed, 12.5% disagreed);" Lower rates of agreement, between 60% and 70%, responded to "Cooperative learning lets me help to develop the curriculum (34.4% agreed, 8% disagreed);" "Cooperative learning helps me develop thinking skills (64.8% agreed. 15.3% disagreed);" and "Cooperative learning helps me develop problem-solving skills (63.3 % agreed, 18.5% disagreed)."

One negative item on the student questionnaire, "The change from traditional methods is very challenging and this would be likely to be an obstacle for me in mastering the Project," was agreed with by a little more than half the students (57.3% likely be an obstacle) and disagreed with by about a quarter (23.7% unlikely).

In other words, items that praised the effects of the Project on student performance and related topics were mainly agreed with by 80% to 90% of the teachers, but other items, which had the

same general drift, were agreed with by roughly 60% to 70% of the students, as in these reactions to questions that are close matches:

Teachers: "The Project makes the subjects more interesting (90.5% agree, 3.2% disagree, 6.4% not sure); Students: "The new methods make the subjects more interesting (71.8% yes, 28.2% no).

One explanation for this difference might be that the students were less sure of their opinions than the teachers, so that more chose "undecided".

5.8 General Effects of the new Project Equipment

The teacher questionnaire presented statements praising the positive effects of the new equipment on teaching and learning. Teachers agreed with some of these statements by large majorities, around 80%. For instance, "The equipment helps improve teachers' performance" (88.3% agreeing, 3.2% disagreeing), "The internet is a good resource, increasing teachers' knowledge" (84% agreeing, 11.7% not agreeing) and "The Project contributes to improve the students' general computer skills" (79.6% agreeing, 5.4% disagreeing). However, majorities dropped to 74.2% in agreement (18.3% not sure and 7.6% disagreeing) with "Integrating ICT with the curriculum makes lessons more enjoyable;" and to 57.5% agreeing (19.1% not sure and 23.4% disagreeing) with "Using the Project website makes the teaching very interesting." Agreement dropped even lower than this (50% agreed, 23.4% not sure and 26.5% disagreeing) for "The internet helps to decrease my workload**."** This gives the impression that teachers' experiences with computers were less than completely satisfying (and, in fact, that computers may sometimes have increased their workloads).

The student questionnaire responses on computers' effects on performance, like those of the teachers, were a mixture of praise and doubts, although probably for somewhat different reasons. The teachers praised the educational benefits gained from computers, but didn't seem to enjoy working with them. The students felt they were gaining computer competence, but doubted that it was improving their performance in school or that their competence was adequate for their schoolwork.

Solid majorities agreed that they were gaining computer skills (77.8% agreed, 8.8 % disagreed) and now felt comfortable using the computer in their schoolwork (88% "yes," 12% "no").

However, only 60.5% of the students agreed (24.1% undecided, 15.3% disagreed) that "the equipment has improved my performance" and almost as many students did (38.6%) as didn't (45.1%) agree that "lack of computer skills might be an obstacle to my mastering the Project." A more complicated question, "Limited previous computer skills make the Project difficult and might be an obstacle to my mastering it" evoked agreement from 34.2% of the students, disagreement from 46.9%, and "not sure" from a whole 18.8%, so it must be regarded as a rather unsuccessful question. It may be that many students did have previous computer skills and so could not agree or disagree with this statement. Nevertheless, it does appear that many students were ambivalent about the adequacy of their computer skills or whether computer skills were contributing to their learning.

Another pair of closely matched questions to which teachers and students reacted almost identically shows that students were not always much less positive than teachers: Students: "I am gaining computer skills (77.8% agreed);"

Teachers: "the Project contributes to improve the students' general computer skills (79.6%% agreed)."

5.9 The mathematic-science curriculum ('McGraw-Hill')

The student questionnaires contained some questions on the new computer programs and textbooks for the McGraw-Hill science and mathematics module, toward which students seem to have been lukewarm. To the statement "The science program introduced new teaching methods," only 62.4% of the student agreed (21.2% disagreed). Perhaps the science and mathematics program had not introduced new enough methods that many students recognised them as such; or perhaps much of the science and mathematics programme really was not changed. Students also agreed by very low majorities that the "new curriculum made science and mathematics easier to understand than before" (51.7% agreed, 25.2% disagreed) and the "new curriculum made science and mathematics more practical and easier to understand (54% agreed, 27.3% disagreed). A small number disagreed that the curriculum integrated ICT with the science and mathematics textbooks (28.7% disagreed that the two were integrated, 46.1% agreed that they were integrated, 25.2% were not sure). Presumably 46.1% would have liked more integration. These data suggest that students were not highly enthusiastic about the new science and mathematics curriculum.

Incidentally, in response to the questionnaire statement that "my school has few problems with computer maintenance," 75.5% of the students agreed and only 24.5% disagreed.

5.10 Workload

My preliminary interviews (see Appendix 1) suggested that increased work for the time available, for both teachers and students, was a major burden accompanying the Project. The questionnaires in this study showed that both teachers and students objected to the extra work or extra time required by the Project. Teacher questionnaire items about lack of time included the following: "Lesson planning takes up a lot of my own time (68.1% agree, 8.5% disagree)"; "Too much of my non-contact time is taken up with paperwork (42.6 agree, 29.8 disagree);" "I have a lot of marking to do of students' work in my own time (56.3% agree, 22.3% disagree);" "The teaching load in this school is very heavy (49% agree, 29.7% disagree);" and "There is no time for teachers to relax (46.5% agree, 27.6 disagree)." "Lack of time to carry out the changes needed is likely to be an obstacle to my mastering the Project" was agreed with by 69.2% of the teachers and disagreed with by only 12.8%.

In two questions about lack of time for work, the students reacted differently to different wordings of the same complaint. A majority of 64.7% agreed (21.2% disagreed) that "Because in-school assignments are time-consuming, they are likely to be an obstacle for me in mastering the Project." However, they disagreed, although by the slimmest of margins (44.2% disagreed, 40.7% agreed) with "School days being very short for the work we have to do is likely to be an obstacle for me in mastering the Project." Clearly, the students preferred cutting down on the amount of schoolwork to lengthening the school day.

Complaints about space allocation included "That there are too many students in my classes" on the teacher questionnaire (35.1% disagreed, 52.2 % agreed) and, on the same item on the student questionnaire, 44.9% disagreed, 40.6% agreed. A minority of teachers did not believe there was too much classroom crowding, while the students who objected and didn't object to it were almost equally divided.

5.11 Project Training

Two teacher questionnaire items had possible relationships to the Project training programme. However, neither item requested an assessment of the training that had been received.

"Insufficient knowledge on my part is likely to be an obstacle to my mastering the Project" was agreed with by 64.9% of the teachers and disagreed with by 21.3%. Presumably, this knowledge should have been imparted by the training programme, although teachers could also have read about the Project on their own.

"Insufficient practise or skill on my part is likely to be an obstacle to my mastering the Project" was agreed with by 68.1% of the teachers and disagreed with by 20.2%. Both the practise and the skill were to some degree the responsibility of the training programme.

In answer to a questionnaire items, 61.6% of the students agreed that they needed training and only 18% did not think so. Students also believed that "there is not enough training for new students in this school" (56.6% agreeing, 16% disagreeing). This would presumably refer to year-round training to help new students catch up with the old students in the Project methods.

Students also agreed with a number of questions that suggested that lack of knowledge or skills might be obstacles to their mastering the new curriculum, although the questions did not specifically mention training. "The change from traditional to new methods is very challenging and is likely to be an obstacle to my mastering the Project" was agreed with by 57.3% of the students and disagreed with by only 23.7%. Only 46.1% of the students agreed that lack of knowledge of the new curriculum was likely to be an obstacle to their mastering the Project, but even fewer (30.9%) disagreed and 23.1% were not certain.

There were other questions about lack of knowledge or skills that students did not find likely to handicap them severely in the new curriculum. For instance, limited previous ICT knowledge was thought unlikely to be an obstacle to succeeding in the Project by 46.9% of the students, although 34.2% found it likely. Lack of computer skills was thought unlikely to be an obstacle to their mastering the Project by 45.1% of the students, but was thought likely to be an obstacle by 38.6%. Both sets of proportions are close, however.

Note these almost identical questions:

Students: "Insufficient practise or skill on my part is likely to be an obstacle to my mastering the Project" (likely an obstacle 67.7%, unlikely 16.3%);"

Teachers: "Insufficient practise or skill on my part is likely to be an obstacle to my mastering the Project (68.1% likely an obstacle, 20.2% unlikely)."

Students: Lack of knowledge of the new curriculum is likely to be an obstacle to my mastering the Project (46.1% likely an obstacle, 30.8% unlikely);"

Teachers: "Insufficient knowledge on my part is likely to be an obstacle to my mastering the Project" (64.9% likely an obstacle; 21.3% unlikely.

Students and teachers give almost identical responses to the first question and extremely different responses to the second one, perhaps because the students may not think they are expected to learn about the curriculum, while the teachers are probably sure that they are expected to.

5.12 Other Topic

Two other items in the teacher questionnaire do not have counterparts in the student questionnaire, but raise interesting topics.

"Lack of desire on my part to change is likely to be an obstacle to my mastering the Project" (agreed 36.1, disagreed 40.4%). This shows close to equal percentages who agree and disagree. How strong is resistance to the new methods?

"Inflexibility of regulations and work rules on the change" were thought by 59.6% of the teachers to be likely to be obstacles to their mastering the Project, while 20.2% thought they were unlikely to be obstacles.

Of the many questions raised by this triangulation, here are some that seem especially important to follow up in the qualitative fieldwork.

1. Why did large majorities of the teachers agree with positive descriptions of the results of Project technique, while only smaller percentages of students did? What more can we find out about their experiences and attitudes? Is there a problem here that is not being well managed?

2. Why did many teachers seem not to like to work with computers? What are the attitudes of students toward working with computers? How serious is this problem?

3. How high is the morale of teachers regarding their success in teaching the Project material and how high is the morale of students regarding their success in the new Project and in later exams? Are these serious problems?

4. Why do the students not have much enthusiasm for the new science and mathematics module? Do the teachers like it any better?

5. Are relationships becoming friendlier and more equal under the influence of Project practices such as collaborative learning, teaching and planning within the school? If not, how can that be improved?

5.13 Summary

Chapter 5 has presented the quantitative questionnaire findings. It was divided into three main parts: the results of the students' quantitative survey, the results of the teachers' quantitative survey, and, finally, the triangulation of the student and teacher data. Chapter 6 will analyse the student, teacher and head teacher qualitative data from open-ended questioners and interviews; triangulate between the three categories of participant; and then perform the main triangulation between the quantitative and qualitative data.

Chapter Six

Qualitative Data Findings

6. Qualitative Data Findings

6.1 Introduction

This chapter will analyse data from written essays (which responded to open-ended questions included in the questionnaire) and, also, data from semi-structured conversations with students, teachers and head teachers. The analysis will triangulate between the perceptions revealed by the students and by the teachers, as with the quantitative data. This will be followed by triangulation between the results in the quantitative data and those in the qualitative data. Triangulation between data collected in different ways is often much more powerful than triangulation between the same types of data collected from younger and older participants, because the contrast in the perspectives is much greater.

Qualitative data from open-ended questionnaires and interviews, by contrast, offers participants and researchers a chance to explore the answers to survey questions that are superficial and uninformative or ambiguous or problematic in some way. Motives for participants' viewpoints, and even, sometimes, completely new viewpoints, may come to light when participants expand on the reasons for their answers to survey questions. On the other hand, it is difficult to tell if a great many participants or very few accept an opinion offered by a few participants. As more factors behind the quantitative answers emerge, researchers can return to the quantitative data again, understanding more about what the answers to the questions mean, and gain a more informed understanding of the proportions of participants who gave different answers (Silverman, 2001). It was these complementary benefits of quantitative and qualitative data that influenced me to include both in my research design.

In this chapter, qualitative data from open-ended questionnaires and from in-depth interviews was analysed by constant comparison (see Chapter 4, Methodology) between the student sample, the teacher sample and the head teacher sample. The data will be combed through multiple times, constantly taking note of similarities and differences between reactions and perceptions of the three samples, in search of answers to three research questions that were laid out in Chapter 1:

1. What are the strengths of the Project as perceived by participants?
2. What are the weaknesses of the Project as perceived by participants?
3. What do participants suggest might be causes for the perceived weaknesses and how do participants suggest managing them?

After minor themes, which appear to be relevant to these questions, are identified in one or more groups of participants, they may be joined into larger themes which seem to have the similar causes or effects. The end of the chapter will present the results of triangulation between the quantitative data and the qualitative data. The resulting picture of the reactions to the Project, in some or all groups.

The results discussed in the following section are drawn from the answers to five open-ended question in the student questionnaire and a further three open-ended items in the teacher questionnaire (all given in Appendix 2, in addition to the complete quantitative questionnaire questions). These questions were quite broad. Most were along the lines of the following: What do you see as the current strengths of the Project? What are the main obstacles to implementation of the Project? What would you like to see changed about the Project before it is rolled out to other school districts? After the open-ended question were analysed, a series of interviews were held with students, teachers and head teachers to enable the researcher to try to follow up unanswered questions. The questions used to start the interview conversations, which are listed in Appendix 3, were also fairly broad. The questions and answers were given and answered in Arabic and then translated in English for use in this thesis. However, the analysis was based on the researcher's knowledge of the Arabic questions.

6.2 Participant Profiles

Three types of participants in the hierarchy of the educational system, profiled below, were separately studied in this research. They were interviewed separately and their data were analysed separately.

6.2.1 The student sample

Eleven students, aged between 16 and 18 years, took part in the interviews. Four of them were in year three; four in year two (of whom two were doing science subjects) and the other three were in year one. All participants reported having experience in using a computer. The majority of them reported use of a laptop in class where necessary. Three of them had not received a laptop from school.

6.2.2 The teacher sample

A total of 11 teachers participated in the teacher in-depth interviews. They were from different specialties, teaching subjects like Maths, ICT, Arabic, English, Islamic Science, Science,

Physics, Biology and History. The majority had had experience working in the schools since the project was started. Most had spent about four years in the schools, although three had worked in the schools for only two years. They had an overall working experience in teaching ranging between two and nineteen years. The majority of them considered that they had the ability and the basic knowledge needed to use the computer. Some had computer experience, ranging from two years to more than ten years. In regard to the changes teachers had had to make in order to teach and to meet the demands of the project, a majority of them reported having changed their way of teaching by using the technology (ICT) and additionally by following the new methods of teaching. However, all teachers reported feeling comfortable working with the new project. Further results are discussed in a later section.

6.2.3 The head teacher sample

Four of the five head teacher participants were currently working in Project schools. A fifth was a deputy head teacher, but had been head of a Project school for three years, before changing jobs on health grounds. The four head teachers came from two cities, two from boys' schools and two from girls' schools. All head teachers reported that they felt comfortable working with this project and had knowledge of how to use the computer. Two of them had worked as head teachers for just two years and the others for more than two years.

6.3 The Analysis of the Qualitative Data

As explained in the previous chapter (Chapter 5) on quantitative data, the chief aims of the questions asked in this study were to identify aspects of the Project perceived as strengths and weaknesses of the King Abdullah Project, as well as any perceived causes of the weaknesses and suggested ways to manage them. A constant comparison approach (see Chapter four: Methodology) was used to repeatedly compare and contrast new and previously studied data that might provide answers to these research questions. When a group of data was identified that tended to suggest the same answer to a research question or a new relationship with older data, it would be classified as a theme.

For example, a number of different statements called attention to possibly related problems: extremely frequent breakdowns of equipment, which were then often not available for long periods; scarcity of equipment, mainly for that reason; the difficulty that teachers had finding anybody to fix their equipment; and other problems that all pointed to a larger theme of lack of

technical support, causing difficulties in carrying out the new curriculum. Eventually, the researcher gathered these minor themes into a larger theme concerned with lack of technical support holding back classroom work. In addition, the three groups of participants; students, teachers and head teachers—were constantly compared in order to identify differences between them in their perceptions of the Project.

6.4 Research Question 1: What are the strengths of the Project as perceived by participants?

6.4.1 Theme 1: Improvement in the skills and performance of students and teachers

Students, teachers and head teachers fairly frequently praised the improved performance of many of the teachers and students (including on local and national tests), as well as the new teaching techniques, which were seen by a majority to be responsible for these results. There were no noticeable differences between the three groups in these perceptions. Lessons were widely seen to be more understandable, as well as more enjoyable, and to deliver information more quickly than before, thanks to the practical, real-world references and the colourful, entertaining illustrations. The teachers tended to value the speed with which the lessons were transferred, while the students tended to value the clarity of understanding and the fun element. All three groups found the research and presentation module to be of value, although the teachers tended to praise the research and computer skills a bit more, while the students particularly valued the self-confidence that was generated.

a. Students

Like the head teachers and teachers, the students seemed to be aware that they were out-achieving a number of non-Project schools, even on tests written for the traditional curriculum. As a year-one female student wrote, "This project has contributed to the improvement of my class's performance from 70% to 90%" (open-ended questionnaires).

Asked what they thought the current strengths of the program were, about 10% of the student open ended questionnaires mentioned their own and the teachers' improved performance, occasionally relating it to the new teaching techniques or to the introduction of computers. In addition to that, about 8% said that their self-confidence had improved, about 8% that their

academic skills had improved and about 8% that relations between teachers and students had improved. The most frequent reply, however, was simply that it was a new educational strategy (22%). Asked if they would recommend the Project to their peers, their most frequent open-ended responses were: yes, because it improved self-confidence; yes, because it improved students' skills (7%); and yes, because it made education more enjoyable (6%).

In the student interview group, a majority said that the knowledge of both students and teachers had been increased by researching the internet. The independent thinking activities, in which students researched topics that might be of their own choice (or picked by their teachers, if they were at a loss), wrote reports and then gave presentations of their findings to the class, were credited by students (as by teachers) with increasing student self-confidence. As a boy in Year 3 said, "using new methods of teaching helps to improve students' performance, so it is easy for students to understand and increase their self-confidence." (Student interview)A year-two male student wrote, "Using new methods of teaching helps improve student performance, so it is easy for students to understand the lessons and increase their self-confidence; and it also increases the teachers' knowledge" (Open-ended questionnaire).

Like the teachers, a number of students praised the practical, real-world emphasis of the lessons and the colourful illustrations which helped to explain them. A year-one female student wrote "The curriculum is a strong point, because it relates to real life and we test many theories and scientific rules through experiments" (open-ended questionnaire). However, unlike the teachers, who praised this style because it helped the students grasp the material much faster, a number of students praised it because it was more entertaining than abstract, verbal lectures.

By and large, students approved of the collaborative learning technique. Three out of eleven male students reported that it reduced the fear of individual students, because all students in a cooperative group received the same assessment, even if some were not doing very well, or were absent, or found themselves in the wrong group. A male student from City 1 said that "he was a weak student who got the same grade as a hard working student in the same group".

b. Teachers

Like the students and head teachers, the teachers were aware of the achievements of Project schools in competition with other schools (see Head teachers, below). Asked what changes the Project had caused in their students, five out of eleven teachers in the final interview group noted that their students had learned new skills and three out of the eleven thought the

technology had helped them improve their performance. As a female teacher of Arabic said, "In my view, using the technology contributes to improve student performance and increases student knowledge of using different methods." A female ICT teacher felt that providing the school with laptops and smart boards was the most valuable contribution of the Project (final teacher interview).

Two teachers mentioned that the students were learning how to research, and one, a male teacher of Islam, praised "the use of technology by students, and the interest of some students in searching for information, and gaining a sense of their own value in presenting lessons or presenting certain information to their colleagues".

This teacher of Islamic studies went on to say that a group of his students, already familiar with computers, had been

> "Complaining about writing assignments and comments on their textbook. After they started learning the subjects through the computer, however, they enjoyed writing their assignments and pursuing topics further. They became keen about possessing programs that helped them get information and kept exchanging those programs with each other. They began to receive information through many senses: hearing, sight and touch, when using the smart board or computer; which especially helped students of weak capabilities, who could not be taught through more abstract ideas".

The independent thinking activities, in which students researched topics that might be of their own choice (or picked by their teachers), wrote reports and then gave presentations of their findings to the class, were credited by teachers with increasing their self-confidence. Teachers also appreciated the opportunity to research the internet, for class preparation or other purposes. (Libraries are seldom found in Saudi schools.) Explanation of abstract theories with practical, everyday examples and also the electronic generation of colourful, interesting illustrations were also praised by teachers, because students learned more quickly using these methods.

All teachers in the interview discussed collaborative learning (small group learning or discussion groups). Five teachers said that it was good for students to collaborate in working on subject matter. Specific benefits were mentioned. Seven teachers believed that collaborative learning helped to deliver knowledge to students more quickly; six agreed with a female maths teacher who said that "collaborative learning gave students a golden opportunity to develop their skills to express opinions, as participants in a class" (interview); three teachers

felt that collaboration helped to break the routine of a class; and one believed that cooperative work helped to manage the time and organize it.

c. Head teachers

In the head teacher interview, a majority agreed that the Project was responsible for two Project schools having risen to the top of the exam-table league in City 2. Additionally, one school had been ranked seventh in the entire Kingdom of Saudi Arabia. As a result, the rate of student applications to enter Project schools had increased. Most of the head teachers agreed that the use of new methods and the integration of technology in education had given the students more knowledge and that "the project had a big role to play in the educational process, by helping to improve student and teacher performance" (statement written by a majority of the head teachers).

Asked if they had visited many classes and what impressions they had gained of the teaching and learning under the new Project, all five head teachers in the group reported that teachers and students had improved in performance.

A male head teacher from City 1 added, "Nowadays, the student has become a part of the education process and the classroom environment encourages students to study. The variety of methods being used in the classroom has a positive effect on students and teachers."

The head teacher interview, asked if they had visited many classes and what impressions in they had gained of the teaching and learning under the new Project, all five head teachers in the group reported that teachers and students had improved in performance. A head teacher who had retired for health reasons said, "Yes, I visited all the teachers in the school and I noticed that the teachers' performances had improved 100%. Teachers moved in their assessments from good to very good, and from very good to excellent. Every day, the teachers learned more of the new method and applied it in their teaching".

6.5 Research Question 2: What are the weaknesses of the Project as perceived by participants?

6.5.1 Theme 2 Inadequacy of training

The inadequacy of their Project training was one of the main complaints of the teachers. The head teachers, by contrast, seemed more aware of their own excellent experiences with their

Project training, and the students complained of not having been trained by the teachers who had not been well-trained in how to use the equipment and how to study and learn under the new curriculum. Not knowing just what they should have been doing seems to have been a source of distress to both teachers and students and, as the material below suggests, a number probably did not know as much as they should have. According to the teachers, the training sessions were too short to allow much, or any, hands-on practice. In any case, they were usually held at the end of a school year, when there would be no chance to apply the new techniques for several months. To be fair to the trainers, it must have been a challenge to try to teach computer use and an entirely new educational philosophy and set of teaching habits, in a few hours a day, for a few weeks. It might be questioned whether a few more days or weeks would have been enough, in any case.

a. Students

The students had not experienced the Project teacher training, but many were aware that the teachers had not trained them adequately in how to learn in the new Project or in how to work the new equipment.

b. Teachers

From the 11 different interviewees, training and maintenance were each identified by seven teachers as the greatest challenges that threatened their teaching. The main criticism of the Project training by the teachers was that it was not long enough. There was not time for practical training and hands-on practice, ironically enough, because too much time was taken up with theory, the very pattern the Project urges teachers not to follow in their own teaching. The times in the school year when training took place were often inconvenient for the teachers and sometimes prevented them from remembering the new techniques by practising them immediately in classes. The teachers–who were experts–did not admire the teaching of all the trainers. There were poorly planned events, such as teaching the teachers to use computers of brands not used in their schools; or supplying new textbooks to the students before the teachers themselves had seen them or had been given guidance in how to teach them.

c. Head teachers

The head teacher received more training in, as the deputy head teacher confirmed "We have received some training courses that we do not apply. For example, we have received training

in how to use a visual device to connect all teachers in Saudi Arabia, but this facility is not yet active".

As a female head teacher expressed it,

> "The training which I am interested in, as available, is the Strategic Planning Program, and the Total Quality Management. The course should be practical and not only theoretical. I hope we would be given a chance for implementation step by step and at the same time be given ample opportunity and freedom from the accumulated tasks".

But the training had some issues as all participants confirmed that there were not enough training materials, the training period was not long enough for trainees to learn the required skills and knowledge with it. A female head teacher offered an explanation for the poor training that teachers had complained about.

> "Teachers' instructors fall into three categories. One group consists of expats who have no deep knowledge of our educational and pedagogic policies and how they relate to the cultural environment, religion and bad habits in some practices of pedagogy and education. A second group consists of teachers who have practiced education for a short period somewhere and have spent enough time to be qualified as education instructors, but who lack sufficient knowledge and experience with teaching theory. The third group delivers a training course while failing to illustrate some main points, as they have basically done work in the field of development rather than learning to be teachers themselves".

6.5.1.1 Subtheme 1: Lack of understanding and mastery of Project teaching techniques among students and teachers

Students and teachers expressed more concern about failure to understand or adopt the Project teaching techniques, in open-ended questions and interviews, than head teachers did. Head teachers seemed to be dealing with the problem by encouraging teachers. All three groups seemed aware that some teachers and students were still trying to follow the traditional curriculum and others were working out compromises between the two systems. Many, perhaps most, had gone through a progression, from confusion to gradually increased

understanding, as they adopted more and more of the new practices. That may be a process by which the Project will be gradually established and accepted.

a. Students

In response to an open-ended essay question about what the weaknesses of the Project were, the second most frequent response of students (after the lack of maintenance of equipment) was that the teachers were not adequately prepared to teach the new Project (14% of the students). The third most frequent answer was that the students were not prepared at all for the new way of learning (13% of the students), then that the project was not being fully put into practice (11% of the students) and, fifth, that skills were not improving (9% of the students). Two male students complained about the lack of individual competition in collaborative learning, because the weaker students in each group might pull down the overall grade for the stronger students (open-ended question).

It was clear in a number of student interviews that some teachers were not implementing the new methods very competently, and sometimes outright rejecting the new ways of teaching, and that this held their students back from using the new curriculum. A boy in Year 3 reported that "the teacher is still hanging on, using the traditional teaching methods and just heavy homework and a lot of tests, which do not determine our grade, but cause stress and anxiety." A girl in Year 1 complained that "the teachers don't fully know how important this project is and how they can make an investment in order to improve education."

Another female student, who apparently did not understand the Project at all yet, felt that the demand of the new, complicated research projects were interfering with her progress and her acquisition of knowledge and lowering her self-esteem. A girl from Year 2 observed that "some [teachers] unfortunately teach classes in the way required of them without steering students in the right direction, and in that case, the lesson is boring and extremely unfavourable for students. The degree to which the students build their performance depends on teacher performance." That point was repeated by students and by teachers.

b. Teacher

The qualitative data included some comments by teachers or students admitting to confusion and inability to carry through the Project teaching techniques. It was difficult to know how widespread this lack of understanding was, but a number of anecdotes suggested it was not rare. For instance, although seven out of the eleven teachers in the teacher interview judged

that the new curriculum was much better than the old one, three of the eleven said the new one was more difficult to teach, because the teacher and students needed training. Some teachers, like the female student who felt she was held back by the research projects, may not have understood the project at all.

A female teacher complained that "research projects took away time from studying and exhausted the students. She felt there was no point in the projects at all" (teacher interview). A male teacher of history said that "the project so far is very interesting and amazing, but the implementation of the project is very wrong. Students haven't understood the project fully yet. Teachers have not had sufficient training to enable them to apply it" (Teacher interview).

It was not clear whether a residue of teachers and students were failing to adopt the Project or whether almost all were on a path toward gradually increased understanding of the new techniques. A number of students described slowly learning what they were supposed to be doing, as their teachers also slowly understood more about the Project (see Training, above). Under Theme 1, a head teacher described teachers learning a new technique every day or so and constantly improving their teaching. If most students and teachers were at various stages along such a path, then the Project was probably continuing to improve, as long as participants continued to believe in it and to keep trying.

A female Biology teacher suggested an interesting way to deal with difficulties in carrying out the Project. She herself preferred the old way of teaching and she said, "Not all students accept this new method, and I would not be able to force students to do research. In my teaching, I've mixed old and new methods. For example, I give them worksheets that require the student to read the lesson and answer the questions at home, then share the next lesson, answer questions, and explain. Thus, the student will memorise and understand the information, but also explain and give examples. A number of teachers may continue to teach effectively, by mixing methods in this way, perhaps eventually incorporating more and more of the new techniques".

c. Head teachers

Head teacher interviews did not give much attention to the problem of failure to adopt the new system and apparently did not think that cases were very numerous (as, of course, they may not have been). Their approach seemed to be, instead, to encourage the teachers who were making progress. A head teacher in City 1 said of her classroom visits, "Sometimes I found a

few teachers on the staff of the school or on deputation who were still using the old style, but the most important classrooms were participating in the renovation."

6.5.1.2 Subtheme 2: Lack of mastery of the electronic equipment

Students, teachers and head teachers seemed to be about equally distressed at the frequent unavailability of equipment, especially computers. Students felt deprived if their classes did not use computers. Teachers felt stressed if they could not manage to acquire or to run these essential tools of their trade under the new Project. Head teachers treated it as a serious problem.

As the quantitative data has previously shown, about a quarter of the 94 teachers were not using computers in their classes and about the same proportion were not using smart boards, both of which were highly useful—and the computer essential—to carry out the Project methods. The data do not tell us, however, whether this occurred mainly because the equipment, some of which was quite old, was highly prone to break down and then would not be repaired for long periods; or because teachers or students made mistakes in using it and caused it to break down; or because teachers did not even try to use equipment in expectation that it might break down during class preparation— or even worse, during class; or because teachers did not even try to use the new equipment, especially the complicated computers. There is evidence that all those causes were at work.

a. Students

A number of students, almost all male, complained about the absence or scarcity of computer use in their classrooms. "Yes, the technology is very useful, but the teachers never activate the desktop. I hope they can solve this problem" (male student, year two, City 2, open-ended questionnaire). Another male student, from City 2, wrote, "Yes, [the technology is useful], if I had it, of course" (open-ended questionnaire). Another male student felt that if his teachers" were more consistent in using technology in lessons, he would be able to function better in doing his work. He thought that teachers used the computer if they wanted to; it was purely a matter of luck for the students whether computers were part of their curricula or not" (open-ended questionnaire). A comment that suggests that some teachers simply could not use the equipment was made by a year-two female student: "They do not apply the programme fully, like the traditional one. They use the smart board like the old one [the white board] and we don't use the laptop "(final student interview). As one male student from City 2 reported, "I have

not been equipped with a laptop and, with regard to this issue, laptops are not even being used in class**.**"

b. Teachers

A female biology teacher remarked that she was lucky not to have problems, because she had used a computer for quite a few years, but that two of her colleagues were having so much difficulty with their computers they were considering taking a vacation or applying for early retirement (teacher interview). The data do not tell us whether equipment breakdown occurred more often because of teachers' mistakes or students' mistakes. Also, we do not know if teachers failed to use the equipment because they had not mastered it and were afraid to try; or because the inconvenience of breakdown was not worth the risk; or, of course, a combination of the two. A majority of the eleven teachers in the final teacher interview confirmed that many new methods of teaching were useful and functional and that they themselves used them in their teaching presentations, images and work papers. But, in order to use them effectively, they said, they had to be more familiar with the laptop, the internet and the new educational strategies generally (teacher interview)**.**

Several teachers mentioned that the internet was not always accessible to use for research, even if the software was repaired. A male teacher from City 1 said the main problem in using new technology was the weakness of the internet.

Another male teacher from City 2 said that

> "One of our problems is that the computer is exposed to tampering from the students, when the teacher is not yet in the classroom. In this situation, the computer needs maintenance, which usually takes a lot of time. We might give one class a lesson using a computer and when we come to give the same lesson to another class, be faced with an unrepaired computer and have to deliver the lesson without using a computer. So, some students are barred from receiving information in the same way that other classes at the same stage do".

A common response by teachers to failure of equipment, not surprisingly, was to fall back on the traditional methods of teaching the lesson. In the final teacher interview, a female ICT teacher suggested that "teachers should always have an alternative plan, in case the equipment did not work". One teacher in the group confided that, in lieu of an alternative plan, she had simply decided not to use the new equipment (teacher interview).

c. Head teachers

Several head teachers, like several teachers, felt that breakdowns often happened because students played with the equipment and broke it while their teachers were not in the room. A female head teacher, who had managed to arrange technical support in her school, said, "Our fear is the improper use of the PC, and thus work on the PC is done in specific classes. The PC is given to the student for the project term, under the supervision of the subject teacher".

6.5.2 Theme 3: Inadequacy of equipment maintenance

One of the major reasons for the unavailability of equipment (**Subtheme 2**, above) was that the schools usually could not afford to repair out-of-commission equipment immediately. Many students, teachers and head teachers seemed aware of this, although teachers were perhaps most affected.

a. Students

Students were aware of the difficulties in arranging maintenance and repair for electronic equipment, but probably not quite as much as the teachers. Asked about maintenance problems, eleven participants in a student interview emphasized that their school faced problems, four said they sometimes faced issues, one student didn't know and one student (from a school with technical support) denied there were problems. A male student from City 1, however, discussed "the problem of maintenance services, where a device may remain a month without maintenance; also, maintenance of laboratories and providing the necessary materials is needed; and, also, we need to maintain maintaining the air conditioners" (open-ended questionnaire).

b. Teachers

Equipment maintenance was regarded as a chronic problem and was probably mentioned more often than any other weakness of the Project by the teachers. In the teacher interview, the largest numbers (seven out of eleven) said that the greatest challenges facing teachers were training and maintenance. In the head teacher – teacher interview group, fourteen out of sixteen participants believed that lack of maintenance was the most important factor hindering successful use of computers in their schools and classes. Three out of sixteen of these participants referred to the failure of the internet to work as a source of lack of success of the computer in the school curriculum. Next to computers, smart boards (the next most frequently used piece of equipment) were most likely to break down. A male head teacher from City 2

reported "great numbers of smart board breakdowns, which hinder the educational process" (interview).

Teachers showed initiative and cooperation in sharing equipment and finding extra-school sources of equipment. Every participant in the teacher interview group shared teaching materials, such as the smart board or other tools, with another colleague. A female maths teacher used a traditional black board. As she explained,

> "At the beginning of the project, we were using the smart board, and because it continuously broke down, we brought in the normal board to have an alternative. Sometimes the two are used together, with one student doing exercises on the normal board and another on the smart board."

A female maths teacher from City 2 observed that "the devices are not trusted or reliable because they usually break down or jam. Sometimes there is no competent engineer available, so I have shifted to a normal blackboard that I brought in myself."

A female Arabic teacher from City 1 explained that "we face a big crisis. The school is in fact provided with good equipment, but the main problem is maintenance. The internet does not work very well and the smart board is usually broken down, so we are forced to use the traditional method of teaching. We have just one projector, which is shifted from class to class. The lack of sufficient maintenance greatly impacts the use of equipment in the classrooms" (open-ended questionnaire).

c. Head teachers

Three out of the five head teachers stated that the main problem facing the school was the lack of maintenance (head teacher interview group).

A female head teacher in City 1 explained that

> "We face many problems when the devices are out of order, as their repair may be late and sometimes we bear amounts beyond the budget to purchase or repair a device. Also, there is no periodic maintenance by a specialist, but only the support in-charge, who makes only small repairs, inventories the devices, and submits the list to the project in our city. Also, the bathrooms are rarely maintained and at some locations there is water leakage that damages or completely stops the devices".

As a head teacher in City 2 noted,

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"Poor communication of the computer with internet-inefficient appliances makes the computer time-consuming and slow, due to the succession of students working with it. The continuing need for the illuminations projector and the slowness of the computer (provided by Mdiont Company) hinders daily study. There are also problems with the interactive board that the technical support engineer cannot solve".

A major reason for the maintenance problems was apparently that the Project was no longer paying for equipment repair, as it had done at first. A female head teacher said that "at the beginning of the project, repair was done by Aljeraisi Establishment, but two years ago we started repairing at the cost of the school". She stated "establishment is no longer answering our calls now, and we don't know why".

6.5.2.1 Subtheme 1: Lack of resources

Interviews and questionnaires occasionally suggested that the resources available for the Project were not infinite. The refusal of the Project to continue paying for technical support, maintenance and repair of equipment was striking, because this was a service that was of importance to keep the Project going. The Project did not replace or add to the store of equipment. The school buildings were sometimes reported by teachers or students to have leaks. Science laboratories and their equipment and materials were also not always maintained.

a. Students

In an open-ended questionnaire, a male science major mentioned that "leaks in some school buildings were dangerous for the electronic equipment, which broken air conditioning was not good for the equipment and, also, that chemistry lab materials were out of date and were replaced by students out of their own pockets".

b. Teachers

Teachers gave a large number of accounts of equipment crashing and not being repaired soon or replaced by the Project (see **Theme 3: Inadequacy of equipment maintenance**, above) and some accounts, also, of school buildings not being maintained.

6.5.2.2 Subtheme 2: Failure to take the initiative

This theme arose entirely from a single head teacher.

In the head teacher interview group, Head teacher 1 criticised other head teachers and teachers because many of them had not studied the Project before trying to apply it and then convinced other people of its worth and worked with them to make changes. Head teacher 1 believed in the Project, was something of a natural leader, and solved a number of the most vexing difficulties of the Project, locally, without spending the Project's money. She solved these problems independently by educating herself (learning about the Project and studying change management online) and then communicating with students, teachers, other head teachers, parents and local community leaders and convincing them of the Project's value. She also communicated and exchanged ideas widely with head teachers and educational managers outside her town and even her country.

Head teacher 1 communicated with other educators in the Kingdom of Saudi Arabia and beyond, on the internet and through education newsletters and local journals. In the process, she convinced many people of the value of the Project. (Actually, some other head teachers and teachers read about the Project ahead of time and, also, many teachers showed initiative and creativity in sharing or borrowing equipment for their classes.)

Head teacher 1 arranged for an international software expert to educate the students, teachers and parents of her school on maintaining and fixing computers. This software expert also maintained computers and monitored their use in the classroom. Head teacher 1 also arranged for year-round training in the Project teaching techniques, for the teachers and mothers of her school, and was sharing this training facility with another school at the time of my research. She did this without costing the Project or the Ministry of Education any additional money.

Head teacher 1 said:

> "When the Project team coordinator explained the new curriculum to us at the start of the experimental Project, I did not have any background in it. The school inspectors for our region upset us. They thought that the Project would fail. I was very positive and I believed it could be a success. I have tried my hardest to introduce this Project by distributing leaflets explaining it and I have arranged many meetings to introduce it. At first, I faced problems with the teachers, many of whom were not happy about the change, because they were used to traditional methods of teaching. I sorted out this problem by supporting them and talking with them to overcome the difficulties in the work. I motivated and persuaded them to work using communication channels, including electronic ones. With the passage of time and after much effort, the situation has changed. Now they accept the Project and like it better than before, especially when they see the effects of the changes in student performance. Thanks be to God, there are no hindrances: the internet

is up and the students are as creative as they can be, designing fantastic works and programs.

I spoke to the national Project co-ordinator, because I wanted to help other schools come to terms with the demands of the Project. I would like to introduce useful things to develop educational leadership and management; for example: how to evaluate Project schools' performance. I have produced a guide to developing organisation in a Project school and I distribute these documents and this guide to other schools".

The head teacher was firmly of the view that the Project needed "serious consideration by the Ministry of Education. A steering committee was required, led by the national Project director and made up of people from a variety of backgrounds, including parents and students. The committee would work with project schools to explore the Project's strengths and weaknesses, proposing appropriate solutions where necessary".

It was important to "spread the ethos of the project to the local community, I mean, to all the institutions related to the fields of education, creativity and development". Furthermore, "project schools and their head teachers should communicate with international education bodies and parties on modern methods of development and change".

6.5.3 Theme 4. Lack foresight of foresight in planning

This theme arose from comments by head teachers and a few teachers. These head teachers and teachers expressed the view that Project planners and managers should have foreseen more of the difficulties encountered in implementing the Project—difficulties that the head teachers and teachers themselves, knowing more of the culture of the schools, would probably have predicted. Some of these problems have been discussed above, such as difficulty mastering the electronic equipment and the new teaching techniques and problems with the training programme and with equipment maintenance. Other problems that might have been foreseen are discussed in subthemes below. Many students and teachers were keenly aware of the burdens imposed by various programmes, but it was among the head teachers that questions were raised openly about the lack of foresight in planning that lead to many of the problems.

6.5.3.1 Subtheme 1: The difficulty of the new science and mathematics material

The new textbooks and lectures in the McGraw-Hill science and mathematics module seemed to require more work to learn than previous science texts, which added more to the student

workload. This might have been because the students were trying to memorise more than was expected in the new curriculum or because the new curriculum assumed some knowledge that had not yet been covered in the Saudi curriculum or, perhaps, for some other reasons. The McGraw-Hill material was much admired by students, teachers and head teachers for its colourful illustrations, clear explanations and its way of relating theories to practical, real-world phenomena. Nevertheless, there were some problems, including mistakes in the Arabic into which it had been translated.

a. Students

A year-one female student wrote, "The curriculum is very heavy, with a limited amount of time to cover it all, so the teacher has two choices: either to explain the lesson very quickly or leave out some parts of it. This affects students' educational achievement. In my opinion, this is the weakest factor in this Project" (open-ended questionnaire). A year-one male student, referring to the difficulty of the McGraw-Hill textbook, wrote "There is a lot of information on each topic and there are many theories" (open-ended questionnaire). Referring to occasional incorrect Arabic in the textbook, a year-two male student joked, "I have at least learned some new English idiomatic expressions" (student interview).

b. Teachers

Four out of the nine teachers who were presenting the McGraw-Hill science and mathematics module were of the opinion that it was too complicated and long and difficult (science teacher interview). But some other teachers and students also commented on this problem. As a female maths teacher observed,

> "We have just one problem: the period of the lesson is not suitable to cover the quantity of the curriculum, especially because different topics are studied at different times in the two curricula, or may not be studied at all in one or the other. To take one example, just to teach the pupils how to draw a curved graph needs one lesson to explain the maths aspect of the curve, followed by a second lesson on generating the curve" (teacher interview).

6.5.3.2 Subtheme 2: Problems with class size

Four out of eleven teachers in the teacher interview group agreed that collaborative learning did not work with a large-sized class. Most of the criticism of collaborative learning came from the qualitative data. Two of eleven students in a student interview group felt that collaborative work was too noisy. A year-two male student explained that "it was noisy because the teachers

tended to lose control of large classes divided into smaller groups" (open-ended questionnaires). Nine out of eleven teachers in an interview group also remarked that computer classes needed smaller numbers of students to finish some of the work that needed to be done one by one, such as printing out work at the end.

a. Students

Two out of eleven students in a student interview felt that a disadvantage of collaborative work was that it was noisy. A boy in Year 2, City 1, this: "The class is noisy with collaborative education because the teacher cannot control the class room" (open-ended essay). A few students also mentioned that computer classes take more time than the usual class size and therefore must either be smaller in size or must be scheduled to take longer.

b. Teachers

One teacher out of eleven in the teacher interview group remarked that "not all subjects could be successfully taught using collaborative learning". Four teachers in the teacher interview group agreed that collaborative learning did not work with a large-sized class.

6.5.3.3 Subtheme 2: Too much student and teacher work for the time available

Both teachers and students were very much aware of the heavy workloads they carried under the Project. A number of chores seemed to take more time and often cause more stress.

a. Students

Both students and teachers were balancing the research and presentations, which had to be planned and carried out, monitored and supported by the teacher, in addition to learning and teaching (and testing) the textbook and lecture materials.

b. Teachers

About forty responses in the teachers' open-ended questionnaires complained that they had very heavy workloads. A female maths teacher in City 2 discussed the heavy workloads that Project work entailed. "The individual homework is evaluated on an ongoing basis, which gives better results, but it is a strain for the teacher to correct the paper work daily, especially if she has 15 lessons and 90 students" (open-ended questionnaire).

Lesson planning was much slower than before for teachers, who were trying to integrate electronic equipment into the lessons and homework, especially if they were also planning an alternate lesson without electronic equipment. The new curriculum seemed to involve doing and grading more homework and it did not stop at the end of the school day, but, instead, teachers and students continued working and communicating by email. Classes using computers took more time than traditional lessons, even if computers did not crash; they needed to be started up at the beginning and then the students' work needed to be printed out, one student at a time, and handed in at the end. Either the classes needed to be longer or they needed to contain fewer students. Either solution would take away resources from other classes.

6.5.3.4 Subtheme 4: Massive educational change over too short a time

This theme originated in comments by a few head teachers and teachers. The viewpoint expressed was simply that too much had been attempted all at once and that various aspects of the Project should have been phased in and mastered more slowly. Skills such as the mastery of computers; and such as the blending of roles, in which teachers relinquish some of their authority, while students acquire skills of research and presentation; have been learned slowly, in any case, since the Project trial was initiated. A female teacher from City 1, in fact, suggested that "the Project should have been started in first grade, so that attitudes and skills could have developed at a more natural pace" (interview).

a. Students

No students suggested that the Project should have been phased in more slowly. However, student accounts of being lost at first, in trying to understand the Project, often described at least half a year, if not much longer, before they understood what they were expected to be doing.

b. Teachers and head teachers

Several teachers, in open-ended questionnaires, and head teachers, in their final interview, touched on the question of whether the Project should have been phased in more gradually, perhaps over several years. A female teacher in the teacher interview also suggested that the Project should have been started in first grade, so that understanding and mastery of techniques could develop slowly. This idea was not more widely expressed in the data, but a number of teachers suggested that teacher training should have gone on much longer.

6.6 Triangulation between Quantitative data and Qualitative data

This is the final triangulation of the study. The purpose of this section is to compare and contrast the data from questionnaires in Chapter 5 with the data from open-ended questionnaires and interviews in Chapter 6. The final set of seven themes gives the best picture I have been able to put together, of the perceptions of this sample of the King Abdullah Project participants, of the strengths and weaknesses of the Project. The final chapter will discuss ways to manage the weaknesses that have been identified in the Project and to try to prevent them in the future.

6.6.1 Theme 1: Improvement in the skills and performance of students and teachers

The appearance, in the quantitative data, that teachers believed in the academic value of the King Abdullah Project more strongly than students, was not supported by the larger (and more spontaneously offered) amount of qualitative information bearing on the question. The three qualitative samples—students, teachers and head teachers—appeared to have similar views of the benefits provided by the core teaching techniques of the Project. Strong majorities of students, teachers and head teachers praised the improved performance of teachers and students—including of students on local and national tests—as well as the core teaching techniques of the Project, which were seen by many to be responsible for these results. The practical, real-world explanations and entertaining illustrations were credited, by majorities in all three groups, with making lessons more understandable, more quickly delivered and more fun. The independent thinking activity was praised, especially by teachers and head teachers, for the research, independent thinking and classroom presentation skills it taught; and, especially by students, for the self-confidence it gave them. Both teachers and students believed that their performance was improved from using computers and other electronic equipment.

a. Quantitative perspective

82% of teachers praised improvement in the quality of teaching and learning that had been produced under the King Abdullah Project, including as an effect of computers and other equipment. Offered only one questionnaire item on the academic (non-equipment-related) value of the Project techniques ("I understand subjects better with the new programme") a majority of students agreed (59.7%), but about a third of them chose "not sure," a rather lukewarm response compared to that of the teachers. A similar majority felt that the electronic

equipment had helped them improve their learning, but again with a fairly large "not sure" component. 60.4%, of students were pleased with the new emphasis on electronic equipment, but close to half were uneasy about whether their computer skills would be adequate for what they would be required to do with them.

b. Qualitative perspective

The appearance, in the quantitative data, that teachers believed in the academic value of the King Abdullah Project more strongly than students, was not supported by the larger (and more spontaneously offered) amount of qualitative information bearing on the question. The three qualitative samples—students, teachers and head teachers—appeared to have similar views of the benefits provided by the core teaching techniques of the Project. The practical, real-world explanations and entertaining illustrations were credited, by majorities in all three groups, with making lessons more understandable, more quickly delivered and more fun.

The independent thinking activity was praised, especially by teachers and head teachers, for the research, independent thinking and classroom presentation skills it taught; and, especially by students, for the self-confidence it gave them. Both teachers and students believed that their performance was improved from using computers and other electronic equipment. Improved performance of Project students on local and national tests and, as a result, a higher rate of new student applications to Project schools, had provided persuasive evidence of the quality of Project education. Slowness of a number of teachers and students to accept collaborative learning techniques is discussed below under **Lack of understanding and mastery of the Project teaching techniques** and **Difficulties with class size.**

6.6.2 Theme 2: Inadequacy of training

Inadequate training and lack of equipment maintenance were the two most severe challenges that teachers faced in trying to apply the King Abdullah Project, as could be seen in both quantitative and qualitative data. The amount that teachers new to the Project would have to learn was daunting, in any case, but there was also, according to many teachers, not enough training time to prepare most of them to use computers or to apply the new teaching techniques successfully. The classes were too short and were usually held at the end of the school year, so that there was no opportunity to practice the new learning for several months.

a. Quantitative perspective

On the student questionnaires, 61.6% of the students agreed that they needed training; 57% thought that lack of training for new students was likely to interfere with their success at the Project, as against only 16% who thought it was not likely to do so; almost half, 46.1%, agreed that lack of knowledge of the new curriculum might be an obstacle to their mastering the Project. Thus, about 50% to 60% of the students felt they needed more training in the Project, but the questionnaires did not reveal whether the teachers also did. Over 30.4%, (n=256) of all the students strongly agreed that they needed training and a further 26.2%, (n=220) also agreed about the need for training before the commencement of the program. In the list of possible deficiencies that might be obstacles to mastering the Project, "insufficient practice or skill on my part" was agreed with by a fair number of students, 67.7%.

b. Qualitative perspective

The qualitative data from the students, like the quantitative, indicated that many were aware that the teachers had not trained them adequately in how to learn using Project techniques and often did not seem to know enough themselves. The teachers had a great deal to say about their training. The classes had emphasized theory and did not last long enough for practical application (the very approach the Project taught teachers not to follow in their own teaching). Training usually took place at the end of the school year, in any case, so that there was little or no opportunity to put the new methods into practice for several months. The teachers did not always admire the teaching of their trainers. But more to the point, there just was not enough time either for neophytes to absorb a new and different approach to teaching or for them to learn how to use computers.

6.6.2.1 Subtheme 1: Lack of understanding and mastery of Project teaching techniques among students and teachers

Hints in the quantitative data led to the discovery, in the qualitative data, of considerable evidence of failure to understand Project techniques and, in a few cases, outright rejection of them. There was also evidence that some or, perhaps, many teachers and students were on a path of gradual discovery and adaptation to the new Project techniques. Another process that seemed to be taking place was the mixing of traditional and new techniques, by different

teachers in different ways, aiding students and teachers to gradually make the transition toward more complete Project teaching.

a. Quantitative perspective

In the quantitative data, "Lack of desire on my part" was considered likely to be an obstacle to mastering the curriculum by 36.1% of the teachers (but not considered a likely obstacle by 40.4%). That raised the question of whether as many as a third of the teachers actually did not want to try to adopt the new curriculum (in spite of the almost unanimous agreement with praise of the Project techniques). However, other problems, concerned more with implementation than with the intrinsic value of Project techniques, may also have stood in some teachers' way (see, for instance, **Inadequacy of equipment maintenance** below).

b. Qualitative perspective

It was clear in a number of interviews that some teachers were not implementing the new methods competently, and, sometimes, outright rejecting them, holding their students back from benefiting from the Project. A boy in Year 3 reported that "the teacher is still hanging on, using the traditional teaching methods and just heavy homework and a lot of tests, which do not determine our grade, but cause stress and anxiety." A girl from Year 2 observed that "some [teachers] unfortunately teach classes in the way required of them without steering students in the right direction and in that case, the lesson is boring and extremely unfavourable for students. The degree to which the students build their performance depends on teacher performance." That point was repeated by students and by teachers.

From personal accounts, it appeared that some or many teachers and students were on a path of gradual discovery and adaptation to the new Project techniques. If that was happening, then an observer might have expected to find better teaching skills from time to time as he or she revisited classrooms, as one head teacher, in fact, described doing (in the qualitative data for Theme 1, above in Chapter 6). Another process that seemed to be taking place was the mixing of traditional and new techniques, by different teachers in different ways, aiding students and teachers to gradually make the transition toward more complete Project teaching.

6.6.2.2 Subtheme 2: Lack of mastery of the electronic equipment

Computers and smart boards were not being used by a quarter of the teachers during the period of my data collection, to the detriment of the students, who were missing important benefits of the Project. There was evidence for several explanations for this. The equipment may have been especially prone to crash, being used the most; or it may have been unavailable for long periods once it did crash, a possibility discussed in Theme 3, below. The explanation considered here is that teachers were also reluctant to use the equipment because they had not learned to do so well enough to avoid crashes, which would be a failure in training. The data also do not tell us how many teachers were using the independent thinking activities, one of the most important innovations of the King Abdullah Project. Without computers, or with repaired computers that failed to access the internet (which also happened), that central element of the new curriculum would have been denied to a number of students.

a. Quantitative perspective

The quantitative questionnaire did not discuss the topic of computer maintenance, except for the equipment inventory; in which 25 out of the 94 teachers reported that they did not use the computer in their classes and 27 reported they did not use the smart board.

b. Qualitative perspective

Students, especially male students, complained in interviews that their teachers and classes were not using computers. In a few cases, evidence suggested the teachers did not know how to use it, as in the case if a teacher who was using a smart board as if it was a traditional whiteboard or blackboard. Breakdowns were highly inconvenient, because they might occur in the middle lesson preparation, or even in the middle of class, necessitating a switch to new teaching techniques. A female ICT teacher in the teacher interview group suggested that teachers should always have an alternative plan ready, in case the equipment did not work. One teacher in the group confided that, in lieu of an alternative plan, she had decided simply not to use the new equipment.

6.6.3 Theme 3: Inadequacy of equipment maintenance

The chronic crisis in equipment availability, described above in **Theme 2, Subtheme 2** and earlier in this chapter, may have been due in part to the extreme difficulty of getting equipment repaired. In the past, the Project had arranged to pay a local company for repairs, but, more recently, schools had been expected to foot their own bills and, as a result, crashed devices

sat on shelves for weeks, or months, until money was available to fix them. (In addition, even repaired computers did not always access the internet successfully, or interface successfully between the internet and other equipment, still another factor in the problems equipment was creating for Project activities.)

a. Quantitative perspective

The quantitative information that was available is given above in **Theme 2, Subtheme 2**.

b. Qualitative perspective

Open-ended questionnaires and interviews touched on the inadequacy of equipment repair extremely frequently, especially those of the teachers, whose work was being most directly sabotaged. Computers and smart boards, particularly, the two pieces of equipment most used in the Project curriculum, were for that reason breaking down most frequently. Without the internet and in the absence of school libraries for research, the independent thinking module could not be carried out by a number of teachers. One effect was that teachers were showing ingenuity in finding substitutes for smart boards and were also sharing the scarce equipment with each other regularly. Every member of the teacher interview group was sharing with other teachers. Another effect was that teachers who otherwise might have used computers and other equipment did not try to integrate them into their teaching.

6.6.3.1 Subtheme: Lack of resources

These data were collected only by the qualitative method. Occasional facts were mentioned that raised questions about whether the Project was running short of funds to continue to support some obligations. For instance, more electronic equipment was not supplied when new students entered the school. In addition, the scarcity of equipment crisis was brought on when the Project cut off funds for equipment repair after several years. Several students complained about maintenance of the buildings and labs, as well as the equipment. For instance, in the open-ended essay, a male science major mentioned that leaks in some school buildings were dangerous for the electronic equipment, that broken air conditioning was not good for the equipment and, also, that chemistry lab materials were out of date and were replaced, he said, by students, out of their own pockets.

Computer-related and other electronic technology is extremely expensive, in comparison to other educational tools, as other countries have found when they introduced modern educational programmes of this kind. The Saudi media have reported that the King Abdullah

Project may prove to be too expensive to extend to secondary schools throughout the Kingdom (Alkinani, 2008), regardless of its educational success. If the bottom line will simply not support the Project, then perhaps all the other management strategies together will prove to be futile.

6.6.4 Theme 4 Lack of foresight in planning

This theme arose from qualitative comments by head teachers and a few teachers, who expressed the view that Project planners and managers should have foreseen more of the difficulties encountered in implementing the Project—difficulties that the head teachers and teachers themselves, knowing more of the culture of the schools, could probably have predicted. Some of these problems were discussed above, such as difficulty mastering the electronic equipment and the new teaching techniques and problems with the training programme and with equipment maintenance. Other problems that might have been foreseen are discussed in subthemes below. Many students and teachers were keenly aware of the burdens imposed by various programmes, but it was among the head teachers that questions were raised openly about the lack of foresight in planning that lead to many of the problems.

6.6.4.1 Subtheme 1: The difficulty of the new science and mathematics material

In the qualitative data, some students said that the McGraw-Hill text and lessons were too long and heavy. The McGraw-Hill curriculum had covered different material in a different order than the Saudi one and, therefore, it often took longer to present a lesson or, especially, the background that students had not had. Also, there seemed to be more to learn, perhaps especially if it was still being committed to memory. There were more theories and more facts included in the McGraw-Hill text than the students were expecting.

a. Qualitative perspectives

Four teachers who were teaching the McGraw-Hill science and mathematics module were of the opinion that it was too complicated and long and difficult (science teacher interview). But other teachers and students also commented on this problem. As a female maths teacher observed,

> "We have just one problem: the period of the lesson is not suitable to cover the quantity of the curriculum, especially because different topics are studied at different times in the two curricula, or may not be studied at all in one or the other. To take one example, just to teach the pupils how to draw a curved graph needs one lesson to explain the maths aspect of the curve, followed by a second lesson on generating the curve" (science teacher interview).

A year-one female student wrote, "The curriculum is very heavy, with a limited amount of time to cover it all, so the teacher has two choices: either to explain the lesson very quickly or leave out some parts of it. This affects students' educational achievement. In my opinion, this is the weakest factor in this Project" (open-ended essay). A year-one male student, referring to the difficulty of the McGraw-Hill textbook, wrote "There is a lot of information on each topic and there are many theories" (open-ended essay). Referring to occasional incorrect Arabic in the textbook, a year-two male student joked, "I have at least learned some new English idiomatic expressions" (student interview).

6.6.4.2 Subtheme 2: Problems with class size

From analysis of the quantitative data, the percentages of both students and teachers who feel that class sizes are too large is almost equal. This perception of class size being too large might be an obstacle to using the new programme.

According to the qualitative data, classes that used collaborative activities, such as small group discussions or learning groups, did not always go well with the large-sized classes that were traditionally used for lectures, recitations or test taking. The reason, apparently, was that it was harder for teachers to control several small groups than a single class. Classes with computers also needed to be smaller than traditional classes, because it took a long time to start the computers, make sure that everyone was handling them correctly, and the computers required a period of time for them to operate and shut down, whereby the time wasted could have been used to focus on their class work. This took longer than running a traditional class, where students only had to write, which they knew how to do. Two small classes instead of one larger class would take away resources from other classes, of course, and set up tensions between teachers and subject departments.

a. Quantitative perspective

From analysis of the quantitative data, the percentages of too many students in the class's teacher and student are nearly the same. Class size, that is the number of students might be an obstacle to using (participating in) the new program. This concern with class size for the teachers (52.2% agreed, 35.1% disagreed) is in contrast with the responses from the students (44.9% "unlikely," 41% "likely"), where class size was an unlikely concern for slightly over half of the teachers and likely a concern for slightly less than half of the students.

b. Qualitative perspectives

Two of eleven students in a student interview group felt that collaborative work was too noisy. A year-two male student explained that it was noisy because the teachers tended to lose control of large classes which were divided into small groups (open-ended essay). Four out of eleven teachers in the teacher interview group agreed that collaborative learning did not work with a large-sized class.

Nine out of eleven teachers in an interview group remarked that computer classes needed smaller numbers of students to finish some of the work that needed to be done one student at a time, such as printing out work at the end of the class.

6.6.4.3 Subtheme 3: Too much student and teacher work for the time available
Both qualitative and quantitative data emphasised the heavy workloads that teachers and students carried under the Project.

A number of chores seemed to take more time and therefore cause more stress. Classes using computers took more time than traditional lessons, even if computers did not crash; they needed to be started up at the beginning and then the students' work needed to be printed out, one by one, and handed in at the end. Lesson planning was much slower for teachers who were trying to integrate electronic equipment, especially if they were also planning an alternate lesson without electronic equipment.

The research and presentations had to be planned and carried out, monitored and supported by the teacher, in addition to learning and teaching (and testing) the textbook and lecture material. The new curriculum seemed to involve doing and grading more homework and it did not stop at the end of school, but, instead, teachers and students continued working and communicating by email.

a. Quantitative perspectives

A majority of students (65%) believed that in-school assignments were likely or very likely to be time-consuming, in contrast to only 35% who believed that they were unlikely or very unlikely to be time-consuming or who had no opinion.

b. Qualitative perspectives

About forty responses in the teachers' open-ended questionnaire complained that they had very heavy workloads. A female maths teacher in City 2 discussed the heavy workloads that Project work entailed. "The individual homework is evaluated on an ongoing basis, which gives better results, but it is a strain for the teacher to correct the paper work daily, especially if she has 15 lessons and 90 students " (open-ended questionnaire).

Lesson planning was much slower than before for teachers, who were trying to integrate electronic equipment into the lessons and homework, especially if they were also planning an alternate lesson without electronic equipment. The new curriculum seemed to involve doing and grading more homework and it did not stop at the end of the school day, but, instead, teachers and students continued working and communicating by email. Classes using computers took more time than traditional lessons, even if computers did not crash; they needed to be started up at the beginning and then the students' work needed to be printed out, one student at a time, and handed in at the end. Either the classes needed to be longer or they needed to contain fewer students. Either solution would take away resources from other classes. Both students and teachers were balancing the research and presentations, which had to be planned and carried out, monitored and supported by the teacher, in addition to learning and teaching (and testing) the textbook and lecture materials.

6.6.4.4 Subtheme 4: Massive educational change over too short a time
a. Quantitative perspectives

In the quantitative data, 57.3% of the students felt they were likely to find the change from traditional to new educational methods an obstacle to their succeeding at the Project, as against 23.7% who felt they were unlikely to find that transition an obstacle to success.

b. Qualitative perspectives

This theme originated in qualitative comments by a few teachers and was represented by only one quantitative item. The quantitative data supported the qualitative opinions. The viewpoint expressed in the qualitative data was simply that too much had been attempted all at once and that various aspects of the Project should have been phased in one at a time. Collaborative learning, the mastery of computers, the research and presentation activity, loosening of top-down authority and bars to communication and other aspects of the Project would not need to be introduced in a block. In fact, a number of parts of the Project were and probably still are

being absorbed and adopted slowly by the participants and an argument can be made, certainly, that this is a wiser way to go about it. An important argument can also be made that the Project should not be considered to have failed, simply because all of its components are not fully established. A female teacher, in fact, suggested that parts of the Project should be initiated in the first grade, so that attitudes and skills can develop at a more natural pace. This will be discussed at more length in Chapter 7.

6.7 Perceived Solutions to some of the problems that arose

Students, teachers and head teachers, in both the open-ended essays and the interviews, agreed that training was a serious weakness. Students saw that they needed training because they hadn't received any at all, while the teachers had received training, but were concerned that it was inadequate. They had a number of objections, including the length of training, the times when it was made available, the backgrounds of the trainers and the related failure to cover some points that they needed. The head teachers agreed and added the need to follow up all the trainees.

Both students and teachers agreed that the school needed technical support. However, just students asked for support. Only one teacher asked for another, more comprehensive change: different schools should apply the project correctly and avoid any of the previous mistakes. One head teacher called on the Ministry of Education to study the Project very closely and listen to the views of students, teachers and head teachers before extending the project across the Kingdom.

Participants were asked for their views on the possible solutions for the problems raised. The results were discussed by participants as follows:

a. Students

The following were the statements collected from participants in response to the question: "What would you like to be done in order to improve the education of students in the King Abdullah Project schools in Saudi Arabia? What, in your view, still needs to be done, before the Project is rolled out nationally – and why? In the survey, the open-ended essay questions sought insights into whether the students would recommend the Project to other Saudi students, and why. Also, make other general comments about the programme that you would like to make.

From the interview data a small majority of students would like a lot to be done in order to improve the education of students in the King Abdullah Project. They needed training courses, of the type given the teachers, to prepare them for the Project (7 comments). Some participants wanted to provide schools with better maintenance, as this was a big concern across all participants, as highlighted early (6 comments). Other students confirmed the need to decrease the amount of content in the curriculum (2 comments). From the open-ended survey analysis, 40 participants considered that if the project was to prove a success, students needed more support from the school.

> "We don't get any support from teachers and, above that, we support teachers and help them, because they don't know how to use the equipment like the smart board and computer" (boy, year 3).

b. Teachers

The teachers were invited to give suggestions on how to improve the new project in the interview with this open-ended item in the teacher questionnaire: "What would you like to be done to in order to improve the education of students in the King Abdullah Project schools in Saudi Arabia? "Various issues were identified that needed change; the strongest participant suggestion was to improve training courses. A majority of teachers would like this to be done in order to improve the education of students in the King Abdullah Project schools in Saudi Arabia training courses to prepare them for the project.

Nine out of eleven participants in the interview data recommended that they should select the right times for participants to be trained and agreed that the times the training took place were not suitable for them. The teachers hadn't been trained in how to teach the new curriculum. Three deficiencies, in length of time and in the time of day and of the semester, had affected their training. Two participants said they should select the right scientific material and one of them suggested to create a human resources department to identify the participants' needs in terms of training provision.

A further nine out of eleven participants in teacher interviews wanted schools to be provided with a better maintenance programme, one that concentrated on technical support.

Five out of eleven participants in the interviews said that when the project was fully put into practice, the equipment should be kept in repair and should be available to be used most of the time.

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Nearly all the interviewees felt that there was still a lot that needed to be done before the programme was rolled out nationally, including improvement of the training, repair of the equipment and correction of other defects and mistakes.

Finally for the future, some teachers put forward this advice, drawn from an open-ended teacher open-ended response:

> "*The King Abdullah Project is wonderful and the top of the educational process for teachers and students, so the project needs:*
> - *Trainers who have high levels of knowledge about the project and are able to embody the thinking skills in the curriculum and be expert in using technology.*
> - *Provision by the Ministry with a permanent expert to provide on-going training and support in Project techniques in every single field.*
> - *Teachers should be seconded for one year for training purposes.*
> - *The school environments should be improved and the schools should be provided with technical support"* (female teacher, geography).

c. Head teachers

Head teachers were asked to respond to the following:

"*Do you think that training could have been improved? If yes, how? What do you see as the main issues the Ministry should address, so that the programme can be successfully introduced into all the Kingdom's secondary schools?"*

All head teachers suggested these solutions in order to put into practice what they have got in training. All suggested that the training could be improved if the participants drew up proposals for changes to be made on the following topics:

a- Providing the Project with good trainers;

b- Following up the trainees to make sure they practised what they had learned from the training course.

c- The training course should respond to participants' demand in their school.

d- All participants agreed that the Project managers, before applying the Project in other schools, should listen to the participants' voices and study the project carefully and thoughtfully.

6.8 Summary

To sum up, this chapter has reported on the analysis of the results of the qualitative data and then on the results of the quantitative-qualitative triangulation. The results take the form of seven themes, which are listed below, along with the most important subthemes. The following themes have emerged from the analysis so far. Theme 1: Improvement in the skills and performance of students and teachers; Theme 2: Inadequacy of training, which causes, (Subtheme 1) Lack of understanding and mastery of Project techniques among students and teachers; and (Subtheme 2) Lack of mastery of the electronic equipment ;Theme 3: Inadequacy of equipment maintenance; (Subtheme 1) Lack of resources. (Subtheme 2): Failure of participants to take the initiative; Theme 4: Lack of foresight in planning, which has been a cause of: (Subtheme 1): The difficulty of the new science and mathematics material; (Subtheme 2): Problems of class size. (Subtheme 3): Too much student and teacher work for the time available ;(Subtheme 4): Massive educational change over too short a time

In the Discussion chapter, the next to come, will temporarily be scattered among the weakness themes, as themes are merged and separated in the course of grounded-theory analysis. The solutions suggested for each weakness will be grouped with that weakness and discussed in the light of organizational change management theory. This analysis will lead to one new theme, in which the different solutions will be merged. Suggestions to manage these general themes, as well as to manage the more focused and immediate problems in the previous themes, will be presented under "Recommendations" in the Conclusion chapter.

Chapter Seven

Discussion of the Strengths and Weaknesses of the King Abdullah Project

7. Discussion of the Strengths and Weaknesses of the King Abdullah Project

7.1 Introduction

The purpose of this chapter is to address the following Research Questions raised in chapter one: What are the strengths of the Project as perceived by participants? What are the weaknesses of the Project as perceived by participants? What do participants suggest might be causes for the perceived weaknesses and how do participants suggest managing them?

This chapter will consider arguments for and against possible causes of these strengths and weaknesses and, consequently, ways of managing them. A major purpose of the discussion will be to draw, from the experiences of the participants, suggestions for management solutions that may not have occurred to planners and upper management, or that may not have been possible to carry out.

The following themes arose from using grounded theory techniques (qualitative) approaches for analysing open ended questionnaires and in-depth interview in chapter 6. This was supported by using descriptive analysis, which is used for quantitative data, and are discussed below in this chapter, Chapter 7:

1. Improvements in academic skills and performance
2. Inadequacy of the project training
3. Inadequacy of equipment maintenance and repair
4. Inadequate foresight on the part of planners and managers
5. Inadequate bottom-up communication and shared decision making

Each theme will be considered separately in order to identify management strategies and other considerations unique to it. As the chapter proceeds, strategies that apply to more than one theme will emerge. A major purpose of the discussion will be to draw, from the experiences of the participants, suggestions for management solutions that may not have occurred to planners and managers or that may not have been possible to carry out.

7.2 Discussion of project strengths and weaknesses and how to manage them

7.2.1. Theme 1. Improvements in skills and performance of students and teachers

In the qualitative open-ended questions and interviews (Chapter 6), and in the quantitative surveys (Chapter 5), as interpreted through the qualitative data, head teachers and teachers tended to agree that the project had improved their teaching. Head teachers, teachers and students also praised three major improvements in student skills and performance since the adoption of the King Abdullah Project. All three were suggested to be due to core elements of the project.

Improved memory of students for lesson material was noted by teachers, but also shown by objective evidence. Project students improved in competition with traditional-curriculum students on national tests that were written for the traditional curriculum. Both of the project schools in City 2 have risen to the top of the league tables in that city; and one of the schools was ranked seventh in the entire kingdom (Head teacher 1, School 1, City 2; Head teacher 2, School 2, City 2).

Thus, Saudi Arabian educational changes have not foundered on the difficulty of teaching to the national tests, as has happened to similar reforms in a number of other countries, notably China (McDonald, 2003; Rhem, 1995; Yeung, 2009; Yan, 2012). This early success has shown that the greater autonomy and creativity allowed to students under the King Abdullah Project has not put them at a disadvantage in competition with students drilled to memorise facts. As a result, there has been a surge of new applications to enter the project schools. This dramatic success should make it easier to continue applying the project techniques in Saudi Arabian education and with continuing positive results.

Given the rote learning nature of the traditional study and testing, it is likely that this success was based on improved memory, among the project students, for the details and meanings of lessons. A number of teachers and head teachers gave credit for the students' improved memory to the practical, real-world explanations and entertaining illustrations in classes, which were believed by teachers to make classes more understandable, more quickly learned and more fun. These effects were made possible (or at least much easier) due to the use of computers and the other new equipment, some of it also, like the smartboard, computer-based.

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Current educational approaches support this interpretation, holding that interesting students in learning and thinking about new material is more effective than simply transmitting the material for passive memorization. Thus, techniques that involve students in relating to the material, such as finding practical applications in the real world, using visually exciting illustrations, appealing to other senses or involving students in other ways, will encourage learning about, thinking about and, also, remembering the material (Berry and The TeacherSolutions 2030 Team, 2011.)

Teachers and head teachers also gave credit for the students' better memories to the research module (independent research on the internet, presenting and explaining personal interpretation of the research results to the class and, finally, discussing or debating these conclusions with the class). This is also in accord with educational research. It is now recognized that students who research topics of their own choosing and then discuss and explain their findings to the class are more likely to remember and use their findings than students who only take notes during lectures. A similar finding is that students who learn collaboratively, with each other or with the teacher, also learn in more depth and remember better (Neumann, undated, on line; Steele, 1986, 2000; Schein, 1996; Weick and Quinn, 1999; Burnes, 2004; Schein, 2010). In both cases, the students have to think about the subject matter more deeply if they explain it or discuss it. Contemporary teaching uses discussion and debate (as in collaborative learning or presentation of research) to lead students to think more deeply about the arguments for and against ideas. Especially if they have argued for or against these ideas, students are more likely to establish personal identifications with their arguments, and thus remember the details of the arguments and the topic.

Similar techniques, incidentally, are used by social change experts in introducing social changes to organisations (Neumann, undated, on line; Steele, 1986, 2000; Schein, 1996; Weick and Quinn, 1999; Burnes, 2004; Schein, 2010). They may engage peoples' interest in changes by creating excitement, as, for instance, presenting a vision of the wonderful benefits the changes will bring or the terrible disasters that may occur if the changes are not accepted; or they may build a sense of belonging and support in groups that cooperate to advocate for the changes; or they may cause people to think more deeply about the changes through arguing for them. All these activities are likely to create personal interest and identification with the changes (Kotter, 1995, cited in Armstrong, 2006; Mohanty and Yadav, 1996).

In other words, the teachers' explanations for the project students' improved memories of their lessons are quite plausible, given the findings of social psychology. On the other hand, it should be pointed out that the perceptions of the causes of the project strengths, by head teachers and teachers, do not provide independent, additional support for these already established principles. The reason is, of course, that head teachers and teachers are very likely to have encountered these explanations in their King Abdullah Project training or elsewhere, rather than noticing them completely on their own.

The other two major strengths that participants perceived in the King Abdullah Project were: first, skills in doing research, report writing and oral presentation, usually not learned until later, as in university; and, second, computer skills, which might open later opportunities in business and government. A number of teachers also reported their chores were made more efficient by computers and other electronic equipment. The chores included class preparation, class materials preparation, after-class group tutorials and homework submission and rapid return by email. But large proportions of students and teachers also said that the computers had made independent research possible for them and had opened a world of information to students and teachers, in schools that at present are still without libraries.

It is noticeable that these most admired aspects of the new curriculum by participants, some of which have been credited for the rising test scores, are core techniques of the project curriculum: research, report writing and presentations; independent thinking; discussion or debate over issues; practical applications of abstract principles; interesting visual illustrations; and integration of electronic equipment, especially computers, into classes. There is probably only one signature technique of the project that is not highly admired and praised by participants. Collaborative learning is not yet well accepted, especially by students. Many students were unhappy with the lack of individual competition and, also, the tendency of small discussion groups to fall apart when teachers could not control them in large classes (see Theme 4).

It is interesting that the remaining other four themes in this study, which describe weaknesses rather than strengths of the project, were not thought by most participants to arise primarily from core practices of the new curriculum. Instead, they were explained as flaws in its implementation, such as the training of teachers to use the new techniques or the planning of how to fit the new class needs into the traditional time schedules and class sizes. This suggests

that the major weaknesses of the project are solvable by adjusting the methods of implementation, rather than by changing major techniques of the curriculum itself.

We will now consider the remaining four themes, perceived as weaknesses of implementation, and the similarities and differences between their perceived causes and between possible strategies for managing them.

7.2.2 Theme 2: Inadequacy of training (Subtheme 1: Lack of understanding and mastery of Project teaching techniques among students and teachers, Subtheme 2: Lack of mastery of the electronic equipment)

This theme refers to one of the two most widespread complaints made by participants about the King Abdullah Project. In comments in interviews or open-ended questions, teachers were often described by others, or, less often, by themselves, as being unwilling or unable to apply the new project techniques adequately in their classes. The students of teachers who were confused in this way were, of course, also handicapped. Some students described slowly changing the way they learned as their teachers slowly learned the new way to teach. These difficulties were often blamed by teachers on the project teacher training, which was held before the project was introduced, and it emerges from the data as a major theme.

The students of teachers who were confused were also handicapped. Some described slowly changing the way they learned as their teachers slowly changed the way they taught. Other students complained that computers were not used at all in some classes. This theme does not refer to teachers' problems with crash-prone equipment that was not repaired at a quick enough rate, which is discussed under Theme 3. The causes referred to in this theme are (1) confusion about how (or why) to apply the new methods or (2) resistance to trying the new methods because of previous experiences or attitudes.

Teachers had many criticisms of the project training. It was said not to have gone on long enough for many trainees and to have been held at inconvenient times for a number of them, frequently at the ends of school years, when teachers would not have opportunities for several months to practice what they had been taught. There seemed to be general agreement that more training was needed, ideally through in-service classes throughout the year. The trainers were said not to have been experienced teachers or to have particularly understood the Saudi school system. They emphasized theory and offered very few and rather inexpert explanations or demonstrations of teaching techniques (ironically, since they were teaching a philosophy of

relating instruction to every day experience, not to abstractions). There was apparently no time for discussion or questions (again, ironically, because the trainers were emphasizing the importance of discussion in teaching.) Also, the training had not been planned very closely with the schools. For instance, teachers were sometimes trained on one type of computer or software and then discovered that the computers or software at their own schools were of a different type. As another example, the new McGraw-Hill science and mathematics curriculum should have fit with the order in which science topics were already being taught in Saudi schools, but it did not.

Students complained that they had had extremely few or no training classes, because they were supposed to be trained by their teachers, which sometimes compounded the general ignorance or confusion. The head teachers, however, who had received separate and somewhat different training than that given the teachers, and in a very small group, were pleased with their training.

Head teachers and teachers offered a number of suggestions to improve the training, which appear to be very much to the point. The project planners might take these strategies into account in arranging future training sessions:

1. Training should have been more hands-on and less theoretical;
2. Times of training, teachers felt, should have been chosen in consultation with the teachers;
3. Teachers thought that the trainers themselves should have been teachers, with backgrounds in the Saudi schools, and should have been able to explain more clearly how teachers should carry out the new methods;
4. The training lectures should have taken into account the traditional lessons that had been given or were being given in the schools;
5. Teachers would have liked a limit of 15 trainees in each class, leaving opportunities for questions and other discussion; the training should have included two-way discussions of the problems that teachers were having in understanding and what they wanted to know more about.
6. Head teachers and teachers felt that planners and trainers should have consulted with them before the training sessions, to understand what teachers would be likely to need to know;

7. Head teachers and teachers also felt that trainers and planners should have continued to monitor teachers' and head teachers' efforts to carry out the project; they should have continued to offer training during the school year;

8. Perhaps the major recommendation was simply that there should have been much more training, preferably available year-round. Students argued that newly arrived students and teachers would be particularly lost without a source of immediate tutoring in the new curriculum. A few teachers pointed out that mastering a computer well enough to use it in class and also teach students how to do so, without previous experience, might take many teachers at least several years. The implications of this observation are carried further in Theme 4, which considers whether different elements of the curriculum should have been introduced sequentially, instead of all at the same time.

Inadequate training seems an unfortunate way to launch a new educational curriculum. A few teachers touched on the point that educational trainers should have come better prepared with knowledge of teaching techniques, particularly the techniques of the approach that they were teaching and, of course, particularly when their audience consisted of teachers. It is possible that factors such as limited time prevented the trainers from planning and carrying out the classes they might have wanted to teach. Nevertheless, the lack of discussion and questions, which are basic techniques in contemporary teaching, is striking. Discussion and debate are known to help learners think more deeply about new information (Neumann, undated, on line; Schein, 1996; Weick and Quinn, 1999) and should be especially valuable in teaching a completely new curriculum. It is also surprising that there was not more consultation ahead of time, between trainers, head teachers and teachers, to help the trainers understand what the teachers already knew and what they most wanted to learn. Widespread and open communication in an organization, especially the rarer type of communication from lower level members to higher level members, is recognised as being extremely helpful in facilitating any type of change (Kanter, 1985; Kotter, 1995; Mohanty and Yadav, 1996; Senge, 1998, cited in Smith, 2001, on line; Smith, 2001, on line; Dannemiller and Norlin, 2001; Burke, 2004; Brisson-Banks, 2010; Lee, 2010).

A thread of poor communication runs through most of the themes in this study and is a cause of problems that we will encounter repeatedly in Chapter 7. Organisational change experts

generally encourage widespread communication in an organisation to which they are introducing change. Discussing and debating new information tends to open people's minds to deeper implications; they are likely to come to understand more about new ideas and they are more likely than otherwise to accept them. To avoid the sort of one-way top-to-bottom communication exemplified by the project training described above, change experts also try to introduce more decentralisation of opinion giving and decision making into systems that are changing (Kanter, 1985; Kotter, 1995; Mohanty and Yadav, 1996; Smith, 2001, online; Dannemiller and Norlin, 2001; Burke, 2004; Brisson-Banks, 2010; Schein, 2010). The need for bottom-up sharing of ideas and viewpoints in a situation of change is probably the most important issue involved in implementation of the King Abdullah Project. It will be explored further, at the end of this chapter, under Theme5.

7.2.3 Theme 3: Inadequacy of equipment maintenance (Subtheme 1: Lack of resources, Subtheme 1: Failure to take the initiative)

This theme represents the other of the two problems that teachers complained most interfered with their ability to do their jobs (Inadequate training, Theme 2, being the other). Head teachers and teachers and (more rarely) students reported that when a piece of equipment crashed or broke down, it might be months before it was repaired and available again, because of the scarcity of repair and maintenance services. A major reason for this was said to be that the King Abdullah Project was no longer paying for privately contracted repairs, as it had done at first, and so schools were waiting until they had saved enough funds for these extra-budget expenses.

This loss of access has interfered to a considerable extent with the full adoption of project techniques by teachers of the King Abdullah Project. Much of the new electronic equipment, especially the smartboards and computers, are foundational to some of the new teaching techniques, such as the research module and the methods to teach more rapidly, using interesting and clear illustrations. Therefore, the equipment loss has had an unfortunate impact.

There seem to be several reasons for the frequency of breakdowns. The equipment, some of which may be old, was said by participants to be especially prone to crash. Also, teachers said that students sometimes experimented with it when they were not supervised, which motivated strict rules about when and where computers could be used. However, teachers themselves did not always know how to manage the equipment and also caused crashes.

There was poor communication between computers and other equipment, so that computer-based equipment sometimes could not be made to work; also, computers did not always access the internet well, which was disastrous for research.

An added cause of scarcity of working equipment was that teachers sometimes avoided using equipment that was in good repair, simply in order to avoid crashes and the necessity to change teaching techniques in the middle of a lesson. A common response by teachers to last-minute equipment failures was said to be to fall back on traditional teaching methods. As an example, in the final teacher interview, a female ICT teacher suggested that teachers should always have an alternative teaching plan to fall back on, in case the equipment failed during a lesson. One teacher in the group confided that, in lieu of an alternative plan, she had simply decided not to use the new equipment! None of these problems would have been so destructive to the King Abdullah Project, however, if maintenance and repair had been readily available.

The most common participant suggestions were to find more technical repair experts or more funds to pay them. In addition to those general suggestions, a number of ideas have been suggested or tried, by teachers or head teachers to attack the maintenance problem.

1. Many teachers and head teachers believed that students were tampering with school equipment, especially computers, accidentally causing them to break down. There was already close monitoring of student use of school computers at the time of the data collection, such as allowing them to be used only in classes or study periods after school. This will probably continue.

2. Simple equipment repair classes, especially for students, were being discussed by teachers and head teachers at the time of the data collection. Repair classes for teachers had also been proposed.

3. Teachers were already sharing equipment and finding ways to procure more outside of the school, in response to the scarcity of repaired equipment.

4. A more ambitious suggestion was to arrange to have one highly computer-literate person on the staff of each school.

5. An idea that might definitely have strained resources was to have a standing contract with a computer repair company for all the schools, which had been tried before, and might have been cancelled because of the cost.

Lack of resources: The most serious aspect of this difficulty in funding maintenance and repair is the possibility that the project may have to carry on without using much of the new electronic equipment; or else using it very seldomly. Lack of resources to manage ICT expenses is often reported from other modernising educational systems; and Saudi media have reported that high expenses may prevent the King Abdullah Project from being extended to the rest of the kingdom (Alkinani, 2008). Presumably this would be because the important research and discussion technique depends heavily on computers; and the entertainment and practical application techniques depend strongly on all the equipment. Project management may not want to continue, in spite of the success the project is beginning to show, without the new electronic equipment.

However, it is well to keep in mind that core elements of the project, such as independent thinking, discussion, debate, and finding interesting illustrations from everyday life can be promoted by more than one technique, including techniques not supported by technology. As Theme 4 discusses at more length, teachers may even invent effective new teaching techniques in trying to do without equipment. Furthermore, we have no reason to believe that the absence of maintenance and repair is permanent. It may very well be a response to temporary financial events, for instance.

Head teachers and teachers apparently discuss this problem frequently. One solution that has been suggested is the establishment of equipment and software maintenance and repair classes for teachers and students, an idea which may have some merit. Another idea, suggested by a head teacher, was to arrange to have one highly computer-literate person on the staff of each school.

In the light of change management principles, it would be wise to discuss and attempt to carry out ideas like these in communication, or collaboration, between higher and lower levels in the educational system. Change management research has shown that communication, discussion and decision making that are shared between different levels are likely to lead to more creative outcomes than efforts from a single level. Head teacher-teacher-manager-planner discussion sessions, for instance, might generate doable solutions that none of those groups could have produced on its own.

As mentioned earlier, communication, discussion and debate are known to deepen understanding of a problem, thereby stimulating new ideas and enabling negotiation or cooperation between different viewpoints. Multi-level discussion is also likely to open

possibilities for more resources for the agreed-on solution, as well as keeping management updated on what is going on (Kanter, 1985; Kotter, 1995; Mohanty and Yadav, 1996; Smith, dated 2001, online; Dannemiller and Norlin, 2001; Burke, 2004; Brisson-Banks, 2010; Schein, 2010).

Failure to take enough Initiative in solving problems shown by head teachers and teachers. This subtheme arose from the comments of a single head teacher, although a few other teachers and head teachers indicated approval. The head teacher's comments were that other teachers and head teachers should have read about the Project and studied a change management course, as she did, to prepare to be ready to manage the educational change when it was introduced.

It is unfortunate for the project that funds for maintenance and repair have been cut off, whether for a short or a longer period, but a much more fortunate development for the project is the reaction of many of the teachers, who have taken an interest in finding ways to mitigate the problem at the local level. It would have been more difficult for teachers to work around the equipment scarcity if they had not shown initiative and creativity in sharing available equipment and in finding ways to procure more equipment outside the school system. Sometimes this has meant spending their own money for inexpensive substitutes, such as blackboards for smartboards. It also requires complicated arrangements and is not by any means a complete solution. It is admirable in that it shows enthusiasm for the possibilities of the new equipment and determination to make the King Abdullah Project succeed.

Just how much can be accomplished by head teachers or teachers is shown by the proactive behaviour of one head teacher. She read about the King Abdullah Project and studied an organisational change management course, to prepare to manage the educational change before it was introduced. Then, no doubt primed by her reading, she showed initiative in talking to head teachers, teachers, students, parents, and people in the community and others about the educational benefits of the new techniques. She also managed to persuade a skilled person to run a year-round tech support centre in her school, which she opened to a few other schools, without spending any of the Project's or the Ministry of Education's money. She reached out to communicate with educators elsewhere in the kingdom and beyond; and proposed a steering committee to join lower and upper level members of the educational system in discussing project problems.

As the active head teacher may have learned from her reading, initiative and leadership at the lower levels of an organization are especially valued by organizational change experts, who recommend that people at the bottom be encouraged to communicate their ideas to those farther up in the power structure. Change can be introduced better in organisations with more widespread communication and distribution of decision making, particularly from the bottom up, because managers and planners need to understand the varied viewpoints and social interactions of the people who will be asked to carry out the change. Lower level workers also need to have their voices heard, before decisions are made by others that could drive them to passive or active resistance, sabotaging the change (Kanter, 1985; Kotter, 1995; Mohanty and Yadav, 1996; Smith, 2001, online; Dannemiller and Norlin, 2001; Burke, 2004; Brisson-Banks, 2010; Schein, 2010).

Leadership and independence can be built in people who are used to playing passive roles at the bottom of an organization by offering them opportunities to share in decision making. Low level workers, including teachers, are empowered to think more independently if their own knowledge and ideas are listened to and respected. This may give them the confidence to work out and try to implement solutions to change-related problems, in much the same way that increased power, confidence and independence in research and discussion help students become more creative (Neumann, undated, on line; Kotter, 1995; Schein, 1996; Senge, 1998, cited in Smith, 2001; Weick and Quinn, 1999; Dannemiller and Norlin, 2001; Smith, 2001, online; Brisson-Banks, 2010).

To summarise, then, strategies to empower lower level participants in a social change to show more initiative include the following: setting up social structures for bottom-up communication and collaboration with top managers; relaxing the traditional rules for everyone; and, finally, perhaps, giving the lower level people change management literature to read!

7.2.4. Theme 4: Lack of foresight in planning (Subtheme 1: The difficulty of the new science and mathematics material; Subtheme 2: Problems of class size; Subtheme 3: Too much student and teacher work for the time available; Subtheme 4: Massive educational change over too short a time)

Two participants in the head teacher interview group spoke out about their perception that the project planners and managers had apparently not foreseen difficulties of implementing the project that many head teachers and teachers, knowing their schools, could probably easily have predicted. Some mistakes of that kind have been described earlier in this chapter. For

instance, the planners and managers seem to have assumed that computer-illiterate teachers could have mastered computers well enough to use them in classes and teach their students how to use them for class exercises, with almost no hands-on demonstrations or practice time. They also may have assumed that trainers without much or any experience teaching could have quickly taught teachers techniques they had never used or seen used before, and that went against their philosophies of how to teach, without follow-up shadowing or monitoring (Theme 2). Also, while it is not clear that cutting off funds for equipment repair was part of the original project plan (as discussed above under Theme 3), surely few people with knowledge of computers would expect inexperienced teachers to use them with inexperienced students without requiring maintenance and repair by experts.

Another example of this lack of foresight was the failure of planners to check the appropriateness of the Arabic in the science and mathematics textbooks, or to discover whether the McGraw-Hill curriculum had covered different material in a different order than the Saudi curriculum up to that point. The language of the text turned out not to be correct Arabic and, in fact, one student joked that he was learning some new English idioms from it. Because of the difference in the order the material was presented in the two curricula, it sometimes took longer for Saudi teachers to present lessons, along with the backgrounds of those lessons, than the new curriculum allowed.

In addition to this lack of synchrony in the order of material in the two curricula, however, there seemed to be more to learn than there had been under the old curriculum. Teachers as well as students commented on this. This may well have been because the Saudi students were memorizing all the facts, rather than reading more quickly for meaning and then using the other details to buttress their memory or understanding. Another explanation could have been that the American teachers had been more adept at making the material interesting and relating it to the real world, so that the American students were learning faster. In either case, we might expect more familiarity with the new curriculum to speed up the Saudi ability to learn from it. Dissatisfaction with the textbook has been high enough, however, that it is going to be sent back, according to head teachers, and more attention will be given to the creation of its successor. But it is doubtful that science and mathematics teachers would have paid as little attention to the new textbook and curriculum ahead of using it as the planners or managers seem to have done. A suggestion for the future would be to involve science and maths teachers with planners in KSA and at McGraw-Hill in designing the new science and math module.

Lack of foresight about differences between time and class-size needs of the two curricula. A source of frequent complaints from students and teachers, although not perceived as quite as serious as the training and repair problems in Themes 1 and 2, was the greatly increased workloads participants were labouring under. These were due to the increased amount of work teachers and students now had to do, in the same amount of time that they had had before. Some reasons for that in the science curriculum are discussed above. In addition, another reason for this was that the new curriculum was often added on top of the traditional work, although some teachers lessened the emphasis given to the traditional memorization and testing (which was not graded), as they learned to put more emphasis on the new activities. Lesson planning was also much slower for teachers who were trying to integrate electronic equipment, especially if they were also planning alternate lessons without electronic equipment.

The research and presentations, planned and carried out by students, monitored and supported by their teachers and presented to classes, competed for time with the traditional curriculum, such as doing and grading homework, teaching and learning the textbook and lecture material, as well as writing, taking and grading tests. Students who were accustomed to playing after school now often started right on their homework or research projects, while their teachers tutored, monitored and received and graded homework by email after school. Despite this extra work, it still seemed too many participants that they no longer had enough time. It is hard to imagine that head teachers or teachers would not have foreseen some of this, if they had helped to plan the new curriculum. In fact, it is hard to imagine a part of the new curriculum that would be more in need of consultation and suggestions from head teachers and teachers than the allocation of time to the different new activities.

Another part of the new curriculum does exist, however, that might be considered to be equally in need of such help. Small group discussions or collaborative learning were stated by a number of teachers not to work well with the large-sized classes of the traditional curriculum. Students explained that this was because teachers tended to lose control of the independent small groups and, apparently, the discussions sometimes degenerated into noisy recreational meetings. Computer work was also often reported to take too long when it was held in traditional-sized large classes. Teachers needed to supervise starting up the computers and using them correctly during classes, and then the students' assignments needed to be printed out, one at a time, at the end. It seemed that either the classes needed to be longer or the

class sizes needed to be smaller. None of these problems seemed to have been prepared for. The head teachers and teachers were surely right to be concerned that they had not been consulted in matters in which they had more expertise than the planners and managers.

But once in place, such problems can be difficult to manage. If class sizes are too large, for instance, smaller classes will require more rooms and more teachers or, perhaps, extended school days. Yet school buildings and schedules are set up to meet the traditional curriculum needs. If class periods need to be longer, other classes may need to be made shorter or taken out of the curriculum completely. Another solution would be to extend the school year far into the summer holidays. (Some students report finishing the science textbooks by themselves, since they are often not finished by the holidays.)

It is possible that, with time, Saudi teachers will become familiar enough with the curriculum to teach it in roughly the amount of time that Western teachers might use. Now, however, the potential for tension and competition between teachers of different classes is evident. Head teachers, teachers and students have suggested lengthening the school day, reducing the sizes of certain classes and even insisting that students do homework immediately after getting home from school. These are simple, practical enough ideas, but they require agreement from multiple parties, including Ministry of Education managers who have the authority to change class sizes and lengths; and teachers whose classes may be cut.

These problems cannot be solved solely between teachers at the local level but, at the same time, top management cannot intervene effectively without understanding the difficulties and viewpoints involved. As has been noted before, widespread communication, including discussion and decision sharing between top managers and empowered head teachers and teachers, are needed. The very active and effective head teacher who was described in Theme 3 has suggested establishing a meeting steering committee for the project, to meet regularly, composed of representatives from the top and bottom of the educational system, to discuss the project's problems. This idea has great promise as a way to solve problems of this kind, which involve a variety of parties in a variety of system levels.

Introduction of too many changes all at once. A small number of teachers and head teachers suggested that too much change was attempted all at once when the project trial was initiated. Instead, they thought, various aspects of the project should have been phased in sequentially, or, at least, gradually, and mastered on different schedules. This idea would allow teachers and students to learn one difficult task before turning to another, which

would result in much less experience of failure for all of them. It seems a good idea, which might encourage more acceptance of the project. Both Hoyle and Wallace (2007) and Thomson and Sanders (2010) suggested that an attempt to introduce independent thinking and collaborative learning into Chinese schools would have faced less resistance if different parts of the new curriculum had been introduced one at a time.

Some project participants even proposed that the King Abdullah Project might be introduced in first grade, so that computers and other equipment could be learned more gradually by both teachers and students. The data in this study have not revealed the reasons for beginning the project in secondary school. There may well be good ones. At any rate, we do not have enough information to discuss this idea. But clearly, any number of trial patterns might be tried, such as starting computers at different levels in different schools or starting independent thinking and collaborative thinking well before computer research is introduced.

One objection that might be made to this whole idea, however, is that a core technique of the curriculum, the research module, depends on the use of computers. Another important technique, presenting lessons as interesting and related to every day experiences, depends to a considerable degree on all electronic equipment. That does not mean that independent thinking, entertaining examples drawn from real life, discussion and debate cannot be encouraged without computers and other equipment, but the techniques would be different and perhaps less powerful.

This argument, however, brings us to an important point about mastering a curriculum in its entirety. It can be argued that carrying out all the goals of a change exactly as mandated is not the only way to make the change a success. Comments in the qualitative data suggest that many project teachers and students have been following different paths of experiment and discovery that are likely, eventually, to lead them to understanding and mastery of the project. At present, however, the methods they are using are original, sometimes tailored to the needs of specific students, but perhaps not as useful to others. Often this process has involved mixing old and new techniques. For instance, one teacher, some of whose students strongly resisted internet research, instead had them learn material from their homework and then teach it and lead the rest of the class in discussion. No doubt much was lost with the loss of the internet, let alone of research, but the advantage of discussion with peers and the teacher might still have encouraged independent thinking and deepened the class' interest and understanding.

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This teacher was delaying teaching part of the project in the interests of more effective learning. Creativity in teaching the new curriculum might have brought students around to identifying with it and accepting it, in the end, whereas trying to force a single, uniform outcome might have had just the opposite effect.

Fullan (1993) has developed an approach to managing organisational change that, unlike many other approaches, leaves quite a bit of room for development of alternative teaching techniques of this sort. Fullan suggests that some methods may work better for some teachers and some students than the original ones they were presented with. He writes:

> You cannot force change. The more complex the change, the less you can force it. Educational change involves people taking on new beliefs, skills and understanding, which takes time. Change is a journey, not a blueprint. Every person is a change expert. Change is too important to be left to experts (p. 21).

Fullan's approach (1993) provides a useful warning against judging slow mastery of the King Abdullah Project as a serious problem or sign of failure. He suggests that compromises or mistakes along the path to a new system may lead to creative new ways to apply it. Another consideration might be that it would be counterproductive to cause teachers to lose their bearings in struggling to abandon what they do well, instead of allowing them to expand their repertoires gradually with new techniques. This is an argument for allowing more freedom to teachers and students to experiment with new techniques. Perhaps project managers themselves should also experiment with the idea.

In addition, discussing and thinking deeply about new ideas makes people more likely to accept them (Kotter, 1995; Smith, 2001, on line; Dannemiller and Norlin, 2001; Brisson-Banks, 2010). This is related to the *unfreeze – change – refreeze* model of change; if people are more open to discussing and questioning traditional ideas, it is easier for them to accept new ideas in their place (Pfieffer and John, 1972; Weick and Quinn, 1999; Burnes, 2004). Furthermore, if there is discussion, it is easier and faster for the members of the organization to discuss the issues and reach some sort of agreement on what the change will be and how it will happen. Management change research has found that widely distributed communication and decision making improves the intelligence and effectiveness with which changes are effected in an organisation (Kotter, 1995; Mohanty and Yadav, 1996; Dannemiller and Norlin, 2001; Smith, 2001; Lee, 2003).

To summarise Theme 4, then, head teachers, teachers and, to a lesser extent, students, have seen mistakes in the implementation of the project which they believe they would not have made. It is not clear that all these mistakes were not foreseen by planners and managers. They may have been chosen over alternatives, for reasons we do not know. Not introducing some project techniques at separate times than others, for instance, may have been chosen for a reason. The withdrawal of funds for repair and maintenance (see Theme 3) could well have been involuntary and unplanned. Failing to make arrangements to prevent too much work for the time available or to prevent classes from being too large to support collaborative learning or computer work, on the other hand, are less likely to have been either deliberately chosen or unintended. The poor training classes given to teachers (see Theme 2) seem most difficult to excuse.

One observation that can be made is that the possibility of lack of foresight is found in theme after theme in this research. Different ways of managing these different weaknesses can be suggested, yet two related causes for lack of foresight can be seen again and again: inadequate bottom-up communication and inadequate bottom-up sharing in decision making. The final theme will therefore be concerned with discussing these overarching causes of weaknesses in the project.

7.2.5. Theme 5: Inadequate bottom-up communication and shared decision making

As shown repeatedly in the data (see Theme 4 above), inadequacy of communication has played a major role in the errors and difficulties of the King Abdullah Project. For example, the failures of project trainers to communicate with their teacher students were believed by many teachers to have held back their understanding of the project. By contrast, the communication and cooperation between teachers in sharing and procuring equipment helped them overcome the lack of maintenance and repair. In fact, it facilitated even more ambitious planning. The failure of planners to communicate with head teachers and teachers in designing the project, as well as while it was being trialled, seems to have led to lack of foresight of a series of mistakes. In problem after problem, the solution seemed to begin with greater and more regular communication between parties who had not understood each other's experiences or viewpoints and who had not communicated much before.

Communication is valuable because it opens doors to people who do not understand what is happening elsewhere in their organization. For that reason, its effect is most powerful when it

occurs between people at the top of a top-down organization, who may never have heard directly from those at the bottom, and people at the bottom, who may not have a clear idea of what those at the top are thinking or doing. In a top-down power structure, which most large organisations, including educational systems, tend to be, it is bottom-up communication which is the rarest, and thus the most valuable, type of communication in facilitating change. It helps decision makers at the top understand how those at the bottom, who will have to carry out the changes, are reacting to them. It also gives a voice to those at the bottom, who can explain their attitudes, instead of having to convey them through means such as, perhaps, passive resistance.

This is a key principle of organizational change management. The importance of bottom-up movement of information is, first, that better and more efficient decisions can be made at the top, if deciders and planners have access to relevant knowledge that exists in the organization, such as the social dynamics of different groups or the viewpoints of groups or influential individuals (Kanter, 1985; Kotter, 1995; Mohanty and Yadav, 1996; Smith, 2001, online; Dannemiller and Norlin, 2001; Burke, 2004; Brisson-Banks, 2010). In the case of the King Abdullah Project, this would include the social dynamics and viewpoints of different schools or of their head teachers, who are likely to be able to carry their teachers with them.

Another reason that bottom-up communication is important is that individuals at the bottom of the system will be empowered to think more independently and creatively, if their ideas are listened to and respected. If those at lower levels are encouraged to take part in discussions and contribute, at least in minor ways, to decision making, they will be likely to be better able to take the initiative in finding original solutions to problems in adapting to the change. This is the same principle that encourages independent thinking and creativity in students whose ideas are listened to and respected by their teachers (Schein, 1996; Weick and Quinn, 1999; Neumann, undated, on line).

A third reason that widespread communication, discussion and sharing in decision making are valued in change situations is that discussing and thinking deeply about new ideas makes people more likely to accept them (Kotter, 1995; Smith, 2001, on line; Dannemiller and Norlin, 2001; Brisson-Banks, 2010). (This is also true of students, who think about new ideas and are therefore more likely to adopt them if they discuss and explain them than if they simply take notes in a class; Neumann, online; Schein, 1996; Weick and Quinn, 1999). People also are more likely to accept changes if they are encouraged to question other traditional ideas and

authority, at least during the period of change. Therefore, both teachers and organizational change experts encourage decentralization of authority and decision sharing with students and lower level members of an organization respectively (Pfieffer and John, 1972; Weick and Quinn, 1999; Burnes, 2004).

Widespread discussion also makes it easier and faster for the members of an organization to reach agreements that all can all live with. Change management research has found that widely distributed communication and shared decision making improves the intelligence and effectiveness with which changes are effected in an organization (Kotter, 1995; Mohanty and Yadav, 1996; Dannemiller and Norlin, 2001; Smith, 2001; Lee, 2003).

Of course, in top-down organisations, it is usually the norm for those at the top not to share decision making or, even, to listen to those at the bottom. This may well have been the reason the trainers failed to engage the teachers they were training; and the reason the planners and managers did not take advantage of advice from the head teachers and teachers. In top-down organisations, top managers tend to expect to pass orders to middle management, who are then responsible to see that those at the lower levels follow the orders. This gives middle managers the power to interpret the orders as they please, and then, again, to distort the reactions of those at the bottom as they pass them upwards. Thus, middle management, perhaps including head teachers, or even teachers, are in a position to obstruct communication between the upper and lower levels, or to facilitate it (Lee, 2003).

Perhaps the most important step that the King Abdullah Project can take, therefore, to manage its problems, is to establish regular channels that guarantee communication and discussion between head teachers, teachers and, perhaps, even students, on the one hand, and middle and higher managers, on the other. Specific steps may be taken to manage different specific weaknesses, but problems of communication and decision sharing seem to underlie many of these weaknesses. If an atmosphere of shared knowledge and understanding is not encouraged, the acceptance of the changes will be slowed down and new weaknesses may arise.

Several head teachers in the project have supported the idea of a project steering committee, which would bring together spokespeople from different levels of the educational system, allowing free discussion of decisions facing the project. Taking part in planning the project, by supplying knowledge and advice, would tend to increase the identification of head teachers with the new system and the new ideas, as well as encouraging them to speak with more

independent voices and take more initiative solving project problems. This would help to improve head teachers' and teachers' understanding of the King Abdullah Project and their interest in contributing to it, but it would help to lay the groundwork for more general understanding and cooperation in the future.

7.3 Conclusion

The findings generated from this study provide information about many factors affecting the management of educational change in the King Abdullah Project being trialled in Saudi Arabia. It is clear from the data in Chapters 5, 6, and 7 that suggestions by participants and principles of organisational change management have not been taken into account adequately by the management of the project.

Two themes were causing severe difficulties and stress to some participants: Project training was perceived as seriously flawed and was thought to be responsible for the slowness with which some participants were mastering the Project methods. New equipment was crucial for the new teaching techniques, but broke down frequently and could not be repaired for weeks or months. This delay was because the schools were paying for repairs, instead of the Project, as in the past. Participants suggested a number of management ideas for addressing these problems, a few of which were already being put into practice. However, the difficulties with the equipment raised doubts about whether the Project would be able to manage equipment repair if or when the Project was rolled out to the whole Kingdom.

This lead to the two subthemes; first a **lack resources** which offered an explanation for the non-funding of equipment repair and a few other matters. Fullan's change management model was invoked to argue that slowness to master the Project or adoption of combination Project-traditional methods was not necessarily a sign of failure of the Project and might even give rise to creative new methods. A second subtheme is involved in the argument described the **failure of most teachers and head teachers to take the initiative** in promoting the Project and solving local Project problems. This would seem a more serious weakness if these participants were not being compared to a proactive, charismatic head teacher who seemed to be building the Project almost single-handedly. The point of this theme is that this head teacher's initiative and creativity might need to be widely imitated by the participants to overcome serious problems.

A third theme described the perception of some head teachers and teachers that most of the problems the Project was dealing with might have been prevented if the planners and

managers had **foreseen** eventualities which would have been quite obvious to most of the participants. Subthemes that contributed to this theme included a number of problems such as perceived needs for longer lessons, for a longer school day, for smaller size classes, for fewer subjects in the curriculum, for cutting down the amount of material taught, and others, as well as the knotty training and equipment maintenance problems. One subtheme was too much change attempted in too little time. This subtheme encompassed comments that parts of the Project should have been phased in over a longer period and that many parts of the Project could not have been expected to be mastered over a year or two.

It seemed clear that an important reason for the lack of foresight, noted by the head teachers, was a lack of communication between the planners, managers and probably higher management, on the one hand, and the students, teachers and head teachers, who knew the values and social dynamics of the schools, on the other. It is a principle of change management that if planners and decision-makers do not understand the entire culture they want to change, they are likely to make mistakes that may interfere with the change, as has happened with the Project. This is a major reason for the change management emphasis on the crucial importance of open communication in any organisation attempting to introduce change.

A highly top-down structure of authority and decision-making in an organisation is likely to inhibit communication. In such an organisation, people at all levels except the very top are not accustomed to question orders or make suggestions and it is unusual for people at the top to consult those at the bottom for information or suggestions. Therefore, it is easy for lack of communication to cause mistakes in planning changes. An example of this is that top managers communicate mainly with each other and with middle managers; and middle management, thus, can easily play the role of gate keepers, filtering orders that go down to the lower levels of the organisation, while similarly distorting opinions and reactions that they report back to top management. That could conceivably happen, for instance, if a change seemed to threaten the security of the middle managers or if they disliked the change for other reasons.

Thus, it is to the advantage of top managers, especially when contemplating change, to open more communication throughout the organisation, and especially from the lower to the higher levels; and to establish structures that allow people from all levels, but especially from the bottom, to have a voice in discussions. This would empower people at the lower levels to have more influence on decision making than they normally would, which would have two important

effects. First, people who took part in decisions about changes, or think about them and discuss them, would be more likely to feel invested in the decision that is made and are more likely, in the end, to accept the changes. People who have change imposed on them, by contrast, may feel they have little stake in whether it succeeds. Secondly, people who take part in organisational decisions are likely to gain self-confidence and to develop independent thinking and creativity and take the initiative in solving problems, which may be extremely helpful to the success of a Project.

A venerable technique of change management is to establish an **unfreeze** period, in which authority and rules are relaxed, lower level participants are included in more communication and decision-making, and, in addition, are freer than before to consider or even experiment with non-traditional practices. People are empowered in such an environment to have the confidence to exercise independence and creativity in considering a change. A person who becomes this open to a non-traditional idea is more likely to accept the change, as mentioned above. (However, the problem here is that some people, empowered by their new creativity and independence of thought, might decide to accept a different change than the one that management wants. Management usually tries to steer participants in particular directions. But also, sometimes, a different change turns out to work just as well for management's purposes in the end.) After the change has been accepted, or largely accepted, the **refreeze** period may be initiated, in which the authority and tradition that were loosened before are re-established, except with the new change now integrated into them.

Something of this sort is already taking place in the King Abdullah Project, as traditional top-down authority is loosened in schools, if not outside them; that is, communication and decision-making are shared by head teachers with teachers and by teachers with students. According to change management theory, this should encourage acceptance of changes and it should also make decision-making more efficient. However, there was a lack of foresight shown in planning the implementation of the project. For example, there was the failure of managers to continue to monitor and to attempt to manage weaknesses in the Project. Thus, in order to set up a committee for discussion and some shared decision-making between top management and the bottom members of the education system, it is suggested that a stronger *unfreeze* phase might be helpful at this point.

This argument leads to a last new theme: Inadequate bottom-up communication and bottom-up distribution of decision making for maximally effective change. This theme has strong

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explanatory power in considering the other weaknesses discussed above. Inadequacy of training, in equipment mastery and mastery of other teaching techniques, seems to have involved a lack of foresight in planning, due to poor communication, especially in the bottom-up direction. (Inadequacy of training may also have been a result of lack of resources.) The Failure to exhibit initiative in solving problems, mentioned by the head teachers, probably owes a great deal to the top-down decision-making and communication structure of the educational system; neither students and teachers nor upper management were accustomed, or probably comfortable, with independent initiative from the bottom. When the Project stopped paying for equipment maintenance, the managers seem to have withdrawn from helping and encouraging the participants. Yet there were initiatives that they could have taken, based on the example set by the proactive head teacher and by suggestions being made by the other head teachers. They could have reached out to local resources for help in maintaining equipment and for help in continuing the training in teaching techniques and in mastery of the equipment. They might also have explored setting up classes for teachers and students in equipment repair. They may have been acting solely on top-down signals, rather than responding to initiatives and ideas from the bottom.

Thus, we are left with three major management policies that might significantly affect a number of the perceived weaknesses of the Project. The first is (1) to continue to widen communication and decision-making in a bottom-up direction, outside the schools. A number of ways of doing this have been suggested, by Project participants, which might lead toward more immediate solutions or partial solutions to specific weaknesses. The second is (2) to experiment with phasing in the Project gradually. This would help to resolve morale problems and might speed up mastery of the individual components, such as equipment use or maintenance of equipment. This would require much re-planning. It is possible that some important parts of the Project, such as integrating computers with teaching, might have to be abandoned, but other aspects of the new techniques could still be incorporated, perhaps with improvement in the students' performance. The third solution is (3) to give up any attempt to continue any part of the Project, because the resources are inadequate to improve student performance even after all the other solutions are applied. Let us hope that this solution can be prevented by a willingness to apply independent thinking and creativity at all levels of the educational system.

The next chapter, Conclusion to the Study, considers the limitations of the study and puts forward recommendations for further research and action by those involved in the delivery of the project.

Chapter Eight

Conclusion and Recommendations

8. Conclusion and Recommendations

8.1 Aims and research

The aim of this research was to investigate the reactions to and perceptions of the King Abdullah Project, from head teachers, teachers and students participating in the Project trial. The voices of people at this level of the educational system are not always heard when educational policies are being created or changed. I wished to understand their views on the strengths and weaknesses of the Project and on the causes of both, and their suggestions on how to improve the problem situations.

The Project, conceived by planners in the Saudi Arabian Ministry of Education and King Abdullah project, has introduced extensive use of computers and other electronic equipment; independent thinking through research, discussion and class presentations; and, finally, self-confidence and creativity, through the research and presentation module, through discussion and collaborative learning, and through freer sharing of ideas and decision making, between head teachers, teachers and students. Finally, material is presented much more visually, using colourful, often internet-generated illustrations, which deliver information faster, more clearly and much more interestingly. The Project is replacing the traditional curriculum emphasising memorisation of verbal information from lectures and textbooks.

The research questions asked in this research were as follows: What are the strengths of the Project as perceived by participants? What are the weaknesses of the Project as perceived by participants? What do participants suggest might be causes for the perceived weaknesses and how do participants suggest managing them?

8.2 Design and its Strengths and Limitations

In order to learn as much as possible about the complex changes being introduced and the varied responses to these changes, I adopted a descriptive approach that included a variety of methods to collect and analyse participant samples. These methods included quantitatively scored questionnaires, with different questions for teacher and student samples; open-ended questionnaires; and individual interviews with head teachers, teachers and students.

The limitations of the study design are the limitations of its individual methods (Denscombe, 2007). Although I used questionnaires, once issued, one cannot explain or reword the questions after they were handed out, unless the rewording was repeated for every participant

taking the questionnaire, so that all the participants would understand the questions the same way. There was always an unforeseen danger that the terms or grammar used in the questionnaire may be ambiguous to the participants or to the researcher analysing the responses. Even though the analysis showed the proportions of how participants responded to each question, I may not always be sure just what the questionnaires meant to all the participants. I tried to address this concern by piloting the questionnaires and ensuring that the language and grammar used were clear.

A major limitation of qualitative methods is that they rely on fairly free discussion or conversation. I could not always control the topic or it was difficult to tell whether an opinion is held by a great many participants or by only a few who speak up for it vigorously.

The greatest strength of the design used both quantitative and qualitative is simply that these limitations complement each other thus ensuring a robust study. Qualitative methods added great value to the depth of the study, by exploring in more detail what questionnaire items meant to participants and, also, why they answered as they did. The topic was explored in depth as participants expanded more and more on their ideas and feelings. Use of questionnaires complemented qualitative data by revealing whether an opinion is that of a large majority or a small minority – or something in between. Using quantitative approaches I was able to assess the level of various views of participants and the results supported the in-depth explorations. The approach used as a study design ensured that I was able to get vital data with limited resources and within the time for the research.

Triangulation between samples of teachers, head teachers or students also sheds light on the differences between widely shared opinions within these groups. Triangulation between methods or groups greatly increases the usefulness of the final view afforded the researcher, because the same topic is seen from different viewpoints and levels. This is an excellent way to maximize the information that can be acquired about a complex situation affecting a large group of people and minimize ambiguity and limitations of a qualitative or quantitative approach.

8.3 Results of the Study

The results, which are discussed in Chapter 7, and in even more detail in Chapters 5 and 6, are summarized below.

8.4   Strengths of the Project

8.4.1 Improvement in the skills and performance of students and teachers

Students, teachers and head teachers believed almost 50 % to 90% of the students' academic performance had improved under the King Abdullah Project. This was one of the strongest patterns in the data. Teachers also felt that their own performance had improved and that they were teaching better than before. There was objective evidence for student improvement in the high average scores that Project schools made on tests also taken in non-Project schools. Teachers gave the credit for this improvement to many of the basic teaching innovations of the Project, such as internet research and discussion of the findings or presenting them before other students; freer sharing of ideas and opinions with teachers and more participation in decision making in classes, by students; freer sharing of ideas and opinions with head teachers and more participation in decision making about teaching and school matters by teachers; and clearer, more rapid and more interesting teaching of lessons because of the use of creative, colourful, often internet-generated illustrations.

This is an important development for the Project, because it has proven its superiority over the old approaches in the eyes of a great many of the participants. The rate of student applications to the Project schools has risen sharply and it seems likely that Project teachers will continue to use Project methods, and spread them to others, even if the Project as a whole, for any reason, is cut short.

8.4.2 Weaknesses of the Project

The other themes all concerned weaknesses of the Project. These weaknesses reflected problems with implementing of the Project to a much greater extent than they reflected problems with the basic techniques and their underlying principles.

8.4.2.1 Inadequacy of training

Poorly planned and taught training classes had held back teachers' mastery of teaching techniques and equipment, but they were slowly learning what they needed to know. The delay, in fact, was giving some teachers more time to adapt to the new ideas and methods. Subthemes of this theme described the lack of understanding or ability to use the new teaching techniques and the lack of mastery of the electronic equipment.

With regard to the failure to apply the new teaching techniques, there was considerable evidence in the data of failure to understand Project techniques and, in a few cases, outright

rejection of them. It was impossible to estimate how widespread this was. Students reported that a number of teachers were not using the new methods, to the frustration of their students, or that they were moving through the new methods without encouraging or calling the students' attention to the attitudes and skills they were supposed to be developing.

However, there was also evidence that some or, perhaps, many teachers and students were on a path of gradual discovery and adaptation to the new Project techniques. A head teacher said that most of her teachers had improved every time she visited their classrooms, having learned to apply more of the new techniques. While in an in-between position of this kind, many teachers seemed to be mixing traditional and new techniques, which probably aided students and teachers to gradually make the transition toward the more complete Project teaching.

8.4.3 Inadequacy of equipment maintenance

Computers and smart boards, the core equipment of the curriculum, were more difficult to learn than the other equipment. But much more serious was the lack of equipment repair, or even technical support, which may have been due to lack of funds or other resources. About a quarter of the teachers were not using each of these two items, perhaps to avoid breakdowns in mid-class or perhaps because they were not sure how to use them or for other reasons. Internet access, essential to the new curriculum, was difficult sometimes, even when computers were working. This was partly due to computers and other equipment not communicating well with each other, which again may have been due in part to lack of resources. The best hope seemed to be to develop local resources of tech support, including repair classes for teachers and students and, also, hiring more ICT-literate teachers. However, it was important for heads, teachers and students to discuss these problems at length with Project managers, because lack of communication during the planning phase of the Project may have led to some of the problems. Also, discussion might well lead to more solutions.

8.4.3.1 Subtheme 1: Lack of resources

This theme remains unresolved. It may be such a serious weakness of the Project that there is no way to overcome it. One possibility would be to offer the Project only to selected schools or cities, but that does not seem to be in accord with Saudi Arabian values. The best hope to overcome this threat to the continuance of the Project seems to reside in the creativity and initiative of participants in the Project to solve the problem of lack of equipment repair locally, on their own.

8.4.3.2 Subtheme 2: Failure to take the initiative

The initiative and energy shown by one head teacher called attention to the relative passivity of other teachers. There was not a strong tradition of teachers or heads questioning authority. However, the Project elements of collaborative decision making among teachers, as well as relinquishment of authority to teachers by head teachers, were slowly having an effect, at least in some schools.

The head teacher in question had prepared for the introduction of the Project by reading about it and then improving her computer skills by taking an online course in organizational change management. Well prepared, and having decided that the Project would be valuable for the school system; this head teacher had taken the initiative to talk to head teachers, teachers, students, parents, people in the community and others about the educational benefits of the Project techniques. She managed to persuade a skilled person to run a year-round tech support centre and also a year-round Project training centre, both in her school, but open to other clients, without spending any of the Project's or the Ministry of Education's money. She reached out to communicate with educators elsewhere in the Kingdom and beyond and was trying to establish a steering committee, combining representatives from the top and bottom of the educational system, to discuss the Project's problems.

This example shows how a single person, with the confidence to talk to others about the value of a programme and to work for it, can solve problems locally that the Project managers had had a harder time with. Another example of initiative is being shown by the Project teachers, who are responding to the lack of equipment technical support and repair by sharing equipment and going outside the school to find substitutes for equipment that is awaiting repair. There have been suggestions that the Project may be held back because its resources are strained by the heavy equipment expenses, as has happened in many other countries introducing independent thinking computer-based programmes. If there is any one factor that may mitigate such a problem, it would be grass-roots efforts in every school to solve the Project problems in their own way and with their own resources.

8.4.4 Lack of foresight in planning

The problems in the three sections above, as well as others such as poor training and lack of equipment repair, needed to be solved as well as possible immediately. However, it is also necessary to recognize that they arose in the first place because of a lack of foresight on the part of Project planners or managers. Head teachers pointed out in interviews that teachers and students would have been able to predict many of the problems that came up, simply because they knew the culture of the school well. The planners were not experienced Saudi teachers and they did not have that knowledge. But even more to the point, neither planners nor managers had consulted with head teachers, teachers, or students in deciding how to structure the Project and how to introduce it. Like most educational systems, the Saudi one is quite top-down. Communication between the top and the bottom, if it occurs, is initiated from the top. Decision-making is also concentrated at the top and, thus, head teachers, teachers and students would probably not ordinarily be invited to critique a new curriculum. Yet, if they had been, the curriculum might have worked more smoothly; and, as has been pointed out frequently in this study, this is precisely the structure that makes it most difficult to effect changes in a system.

8.4.4.1   Subtheme 1: The difficulty of the new science and mathematics material

The McGraw-Hill science and mathematics curriculum was considered too difficult and long to learn by many teachers and students. There were too many facts and theories to learn. Perhaps the students did not understand they were not expected to commit everything to memory or perhaps science and mathematics were emphasized more in this curriculum than in the Saudi curriculum. At any rate, learning the material in the McGraw-Hill texts and lessons added still more to the students' workloads. In addition, topics were being covered in a different order in the two curricula, so that Saudi students were sometimes expected to know background material they did not know, in which case a lesson might stretch over two days. Some students pointed out that most students did not start homework immediately on getting home from school and doing so might lessen their workload.

8.4.4.2 Subtheme 2: Problems with class size

Classes using computers often needed to be smaller than traditional classes, designed for lectures. It took longer to start the computers than for students to prepare to take notes manually and, also, it took longer for students to print out all their work from the day, one by one, than it did for a class to put away their notebooks and pens. Smaller classes meant more

classes, more teachers and more space for classrooms, or else longer classes than the schedule allowed for.

The Project teaching technique of collaborative learning in small groups could be quite disruptive, because the teacher could not supervise all the groups and they sometimes got out of control. This problem could be solved by smaller class sizes, but, again, setting up smaller classes would cause problems for all the other classes.

8.4.4.3 Subtheme 3: Too much student and teacher work for the time available

For a variety of reasons, the new Project work, which has added to as well as substituting for the traditional work, increased the workloads of both teachers and students. Teachers had to prepare classes using the Project teaching techniques and integrating the new Project equipment as well as planning for an alternative lesson if the equipment crashed. Managing the computers in classes invariably seemed to lengthen the amount of class time needed and required smaller size classes, as well. Most teachers continued to present lectures, try to have recitations on the lectures and text readings, and later test the material learned, while also making time in class to help students plan and then monitor their research-and-presentation projects, as well as making time for them in class. Collaborative learning also took extra class time. This double work also fell heavily on students, who studied lectures and texts for tests and also did Project work. The result was exhausted teachers and students and a great deal of discontent.

With time, both teachers and students were learning to do less lecturing and studying for tests and to focus more on Project activities, on which the students' grades were based. With time, too, both would have mastered the equipment better, if they had not been held back by the scarcity of equipment, due to lack of maintenance or equipment under repair. So, some of these difficulties might subside with time. But the present pressures for more time and smaller classes were disruptive; for instance, some teachers were calling for fewer courses to be taught or for the school day to be lengthened.

8.4.4.4 Subtheme 4: Massive educational change over too short a time

This theme also remains unresolved. Change management theory recommends phasing in different aspects of a change, rather than introducing the entire change as a package. There may be practical reasons why phasing in the King Abdullah Project is not feasible, though. This will probably be decided in future discussions.

8.4.5 Inadequate bottom–up communication and shared decision making

The theme generated by this analysis is that the problems of the Project were caused most generally and basically by the failure of top management to encourage open communication throughout the educational system and to fail to distribute decision-making authority downward toward many of the people who knew the system intimately. As has been explained a number of times, including above in this chapter, an open, bottom-up organization would be able to plan change that was more likely to work, would be able to adapt to change more readily and, then, would contribute to more stability once the change had been established. Furthermore, this type of organization would be best able to mitigate the problems created by a lack of widely shared communication and decision making.

8.5 Recommendations

The most general theme to explain problems encountered by the King Abdullah Project: Lack of open communication and wide distribution of decision making within the educational system and the Project.

Perhaps the strongest lesson learned from this research is that the redesign of the King Abdullah Project, before it is rolled out to other trials or to the entire Kingdom, would be the necessity to include extended discussions with the head teachers, teachers and students who have participated in it. This surely sums up the main way in which the quality of education in Saudi schools can be improved. The heads, teachers and students know the difficulties of the Project and the culture of the school's first hand. They have extremely strong interests in eliminating any difficulties the Project creates and, if they have a part in planning the Project, they are likely to feel more involved in working for its success; or, to put it another way, if they have no part in the planning, they may be less interested in working for its success.

Furthermore, there are problems, such as scheduling and sharing space, that require committee negotiations between head teachers, teachers, students, higher management in the Project and perhaps even the Ministry of Education. Also, a number of heads, teachers and students have called for the Project to be rethought completely. This could be done effectively only with participation from all parts of the Project and the educational system.

The importance of open communication and bottom-up as well as top-down flow of decision making and authority in promoting change is a foundational principle of change management theory (see Chapter 3). One reason is that it is difficult for the voices of people at the bottom of a top-down system to be heard by those who are making most of the decisions. Communications and decisions flow downward to the middle managers, who may pass on little or much to the people at the bottom, and the reactions and opinions of those at the bottom may or may not flow back upward to the decision makers at the top.

A great deal may depend on how the middle managers feel and think about these communications and decisions (Lee, 2003). Yet, without understanding how the bottom employees, those who may be most affected by the changes, feel about them, top management may find it difficult to make decisions that will work. If decision makers have access to something close to the full information that exists in an organization, they can make wiser decisions about how to proceed with the change (Kanter, 1985; Burke, 2004; Schein, 2004). Something like this failure has happened in the Project in the past. Many decisions made about implementing the Project seemed to head teachers and teachers to have shown a lack of understanding of how the schools would react.

The second reason change management theory holds is that communication and decision making should be widely shared, especially about issues that affect those at the bottom of an organization; being listened to with respect increases the teachers' (and students') confidence in their own thinking and reactions. It empowers them to be more willing to think independently and creatively, and thus to understand in more depth what different viewpoints mean and more willing to take the initiative in suggesting new ways to solve problems. (These principles also hold with students in educational situations and they are key principles underlying research, presentation and collaborative learning in the Project; see Burnes, 2004; Schein, 1996; Seel, 2000; Weick and Quinn, 1999). Discussion and decision making also make adults and children more willing to think through a change issue and then decide to make the change. Among change management theorists, it is accepted that if people discuss change issues with others and take positions of their own, they are more likely to change.

A third reason is that if there is discussion, it is easier and quicker for the members of the organization to discuss the issues and reach some sort of agreement on what the change will be and how it will happen. Management change research has found that widely distributed

communication and decision making improves the intelligence and effectiveness with which changes are effected in an organisation (Kotter, 1995; Mohanty and Yadav, 1996; Dannemiller and Norlin, 2001; Smith, 2001; Lee, 2003).

8.5.1 The suggestion of a steering committee

One way the education system might be opened up to facilitate change would be through regular interchange between people who do not usually meet and talk. One head teacher suggested that a steering committee might be set up, led by the National Project Director and including people of various backgrounds, including Ministry of Education planners, parents and students This would allow the planners to have regular input from those who would be most affected by their plans, and would enable discussion of Project problems from different perspectives.

Such a steering committee would bring together a variety of decision makers who could help to raise and work out problems that would require decisions from more than one level of the system; such as the need for longer classes, smaller classes, or fewer classes. The question asked by several head teachers of whether the Project should be phased in (following process thinking) rather than being set up all at once (as in project thinking) would be highly appropriate to discuss in a committee with so many decision-making decision makers and stakeholders represented representatives. Many of the difficulties that have arisen in the Project might have been easier to solve one by one; with some adjustments, such as learning to use equipment or understanding and mastering the new teaching techniques, as this seems to take longer than a few weeks or even a few months.

Such a committee might be an appropriate place to discuss the serious problems teachers had with the Project training, such as the times the classes were held, the shortness of the classes, the lack of time for questions, the lack of opportunity to practise techniques, or the absence of practical, knowledgeable information that trainers who were teachers or equipment experts could have imparted.

Of course, a steering committee could generate confidence and more ideas, creativity and initiative from representatives from the bottom of the system. This bottom to top contact might be widened by having revolving membership in the committee or by periodic meetings among heads, teachers and students, at which point others could learn about the thinking of the steering committee and contribute suggestions to be relayed to it.

8.5.2 The suggestion of small organisations to promote Project goals

Heads, teachers and students might follow the practice in many change management models when teaching community organizing methods to people who believe strongly in the change. These people (like the active head teacher who had read change management theory) could talk to people about their experiences with different Project teaching techniques and about the principles, based on research, that underlie them. Like the head teacher, they might reach out to a variety of people, even parents and community leaders, they might hold meetings, distribute fliers or do other things to promote awareness and discussion of the Project and help generate ideas to solve problems. Project managers might be especially important people to reach out to, since some teachers said that they had recently stopped supporting the Project or trying to help people who were having trouble with it, which discouraged teachers.

The active head teacher, who had read change management theory, set an example of the sorts of activities in which members of such small organisations could take part. The head teacher promoted communication and wide distribution of decision making within her school and between head teachers and teachers in other schools. Additionally, she communicated nationally and internationally with educators through contributions to journals and newsletters. Other head teachers and teachers might follow her example, experimenting with more openness, with sharing authority, and telling others of their successes and of the change management research discoveries justifying them.

Small organisations might also be able to carry out activities of the kind suggested in the Participant Suggestions sections and the Discussion sections in Chapter 7. Classes during the summer in which students and teachers might learn techniques to repair software crashes would be one example. Another would be plans for teachers with the most experience and success with Project techniques to explain them to other teachers, perhaps in training centres like that set up by the most active head teacher or as substitutes or supplements for the regular Project trainers, who were not teachers. The possibility of these teachers even making training films demonstrating Project techniques is mentioned in Chapter 7. These small organisations might help to further the sharing of equipment and procurement of substitute equipment from outside the schools, which teachers have already set up. These suggestions are not intended to be final, of course, but rather to stimulate better ideas from people involved with the Project. I will be pleased if this study causes the voices of the teachers and students to be heard more clearly when planning is happening.

A final suggestion as one previous consultant of the King Abdullah Project quoted:

> "In many aspects of the Project, emphasis has tended to be on buying expertise, rather than developing local capacities. This involves the danger that the Project can only be sustained if foreign (or outside) expertise continues to be relied on. It seems that the development of local talent may be the crucial factor in continuity of the Project. I am not talking only about the provision of an ICT infrastructure, but also about the adoption of Western ideas and lesson content. The new Western methods of teaching and learning are invaluable, but they also need to be shaped by Saudi culture. Simply following the Western trends do not help to build fundamental progress in Saudi Arabian education. The balance of global and local content should lead to the development of a harmonious national identity".

8.6 The contribution of this study

This thesis is one of the first research studies that has been done on the King Abdullah Project focusing on change management. I hope that the discussions of findings will add additional perspectives to enable those implementing the project to better appreciate the difficulties and benefits, and to engage change management to integrate this more successfully. The richness of the data, which includes survey questionnaires, open-ended essays and comments from interviews, provides a greater understanding of the dynamics of the implementation of this new curriculum.

This study adds to the trans-national literature on adaptation of traditional curricula to the contemporary student-centred approach. It also adds to the rather sparse literature on the King Abdullah Project in particular. Also, it offers some suggestions for remediating (see chapter 7) some of the Project difficulties, based on organizational change theory, which has proven useful in many studies. The researcher is a native of the Kingdom of Saudi Arabia with experience teaching in Saudi secondary schools, and someone who understands the culture of the country and the culture of the schools better than an outsider might be likely to. This research gives voices to head teachers, teachers and students, whose perceptions are not always recognized at higher managerial levels, and yet should be useful and of interest to the designers and managers of the King Abdullah Project.

The King Abdullah Project is a major step in the right direction and it was recognized as such by a majority of the participants in this study. For the most part, the problems it has encountered are due to problems of implementation of the Project, rather than to problems of core teaching techniques, and can be remediated with better planning and better understanding of the

viewpoints and experiences of the head teachers, teachers and students who have been adapting their teaching and learning to it. The exception is the question of whether resources will be adequate to support the equipment the curriculum uses. I hope that the ingenuity and initiative of everyone involved with the King Abdullah Project will be able to overcome that challenges.

8.7 The limitations of this study

First, I attempted to triangulate between several local samples that were logistically feasible to study, given time and other limitations. However, much wider sampling in different cities and different regions might raise some new questions about the introduction of the Project in different environments.

My data show there might be differences between the two cities in my samples. However, I did not explore the differences between the cities sufficiently to substantiate these differences as generalizable.

Second, where purposeful sampling was used, it raises questions about how representative the samples were. Ideally, there should have been more effort to interview people with diverse opinions, especially those who did not praise the Project or whose open-ended essays and interview comments did not reveal the reasons for some of their survey results. Time and logistics limited these efforts. In-depth interviews or follow-up interviews of some of the same participants in the future might uncover additional interesting factors.

In some cases, viewpoints were probably influenced by what participants felt they were supposed to think and feel. Especially as the Project was endorsed by royalty and by top managers in the Ministry of Education, many participants would probably be vested in giving it their best efforts and support, and put aside any complaints. Several other researchers have noted the extremely centralised nature of the Saudi educational system, which does not encourage much freedom of initiative for teachers or head teachers (see, for example, Alafnan, 2000; Aboulfarai, 2004). However, many participants were quite open, if not outspoken, about sources of dissatisfaction with the Project. As an experienced Saudi teacher, I felt that teachers and head teachers were being quite candid with me.

The data I gathered were undoubtedly influenced by the questions asked in the surveys, the open-ended questionnaire and the *semi*-structured interviews. For logistical reasons, I did not attempt extended, in-depth interviews with single individuals to probe for opinions they might

be reluctant to reveal otherwise. However, questions such as "What do you like best about the Project?" and "What do you like least about the Project?" and "Would you recommend this Project to friends in other schools, and why or why not?" were intended to give participants some freedom to answer in many ways.

Data collection was undertaken using two instruments prepared by the researcher; one was designed for teachers, the other for students. All except the final item asked for a fixed response (*yes/no* or a 5-answer multiple choice scale from *strongly agree* to *strongly disagree*). Because the surveys asked somewhat different questions, the answers from teachers and from students were not directly comparable, but they were designed to explore what appeared, from previous interviews, to be the strongest concerns of teachers and of students.

I did not collect data from school inspectors, parents, computer engineers, or other demographic groups. I would justify my approach on the grounds that the time at my disposal for the fieldwork, my primary concern was with head teachers', teachers' and students' views and opinions. I did not have time, funding or resources to extend my study in many directions that I would have liked to explore. This is the benefit of having analysed the data. However, I believe the study has generated some interesting data, which might serve as starting points for other Saudi researchers to develop.

I found that the process of translating a large number of data from Arabic into English was difficult as well as time-consuming. I take full responsibility for the resulting Arabic and English translations. I was helped by the necessity of travelling back and forth between the Kingdom of Saudi Arabia and the UK, where I had the advantage of discussing the English translations with native speakers while preparing the research instruments. The analysis of the results was also more time-consuming than expected.

Some participants in one of the cities, after first agreeing to be interviewed, decided not to participate. There were, they said, too many researchers in schools seeking information from teachers.

Because there is a lack of observational data in the literature regarding the implementation of the innovation, it would have been helpful for the thesis to have had access to observational opportunities in order to understand how students and teachers approached their work on the programme, as well as the issues influencing their opinions about the programme. In addition, these would be worth noting in order to have a better understanding of these operational contexts, given that I wanted to see what the classrooms were like, including the equipment available and the extent of their use. Unfortunately, a serious limitation was due to cultural norms, the researcher, being a female, was unable to carry out the observation in a male school. Moreover, the female teachers also refused me access to the classroom.

Despite the assessment data indicating significant improvements as a result of the innovation, my research does not provide the reasons for this improvement. This is because I did not have time nor the money or resources to extend my study in many directions that I would have liked to explore.

8.8 Conclusion

This research has been looking at the ways in which Saudi head teachers, teachers, and students have responded or are responding to the challenges posed by a new programme, the King Abdullah Project, which is being trialled in their schools. They reported the demands that were placed on them as a result of the Programme, involving as it did curriculum change in content and delivery and in teaching and learning methods and in Project implementation, including the necessary provision for appropriate training, to support the desired changes. Not least among these are issues relating to the demands of the workload on the parties involved regarding how people respond to any major initiative like the Project. Furthermore, in view of the literature (reviewed in section3.8), it is suggested that there is an ever growing need for supporting pedagogical change in terms of independent thinking. However, embracing this change can be hindered due to a number of apparent challenges. For example, lack of skills, fear of change (on the teacher's side), and not being entirely convinced of the benefits that such change can provide, among others, are some of the most significant factors to affect pedagogical change (Harris, 2003; Le Fever, 2013; Redmond, 2011; Wengrowicz, 2014). Therefore, projects such as the King Abdullah Project show that there are some obstacles that can affect the success of the pedagogical change. However, the participants can overcome these issues by receiving support from top management through open communication and a wider distribution of decision making as suggested by the head teachers in this research.

The King Abdullah Project is a major step in the right direction and it is recognized as such by a majority of the participants in this study. The problems it has encountered can be remediated with better planning and better understanding of the viewpoints and experiences of the head teachers, teachers and students who have been adapting their teaching and learning to it. To further this goal, it would probably be helpful to emphasise and maintain practices from change management models and from the Project itself: keeping channels of communication open in the educational system, especially vertically, between different levels in the hierarchy; nurturing traditions of bottom-up decision making, both inside and outside individual schools; practicing group decision making involving discussion. Nevertheless, the evidence from previous theses suggests that not much has changed from 20 years ago and I found the issues the same. As I have also pointed out, a number of UK PhD studies submitted over the last 20 years have reported concerns in Saudi Arabia about the quality of secondary school education, and the need for qualitative improvement, to buildings, equipment, especially ICT, and to the curriculum (see, for example, Alsaif, 1996, Alafnan, 2000;Ababatain, 2001; Alshowaye, 2002; Aboulfaraj, 2004, Alalwani, 2005; Altraiqi, 2009; AlMaini, 2011; Alsharidh, 2012; Alsolami, 2013).

This surely sums up in a nutshell the main aim of improving the quality of education in Saudi schools. The leader of the project should listen to the voices of participants before rolling out the King Abdullah Project nationally.

Writing this research has, I believe, given me a better appreciation of the complexities of educational change management and the implications for school systems, structures and personnel.

As a teacher who was working in Saudi Arabia and latterly in in-school management, I have been concerned (and still am) about the quality of the education that young people receive. As to the future outcomes of the proposed changes, I can agree with Bridges' view (1995, p.125):

"What it will look like is something that the futurists can debate. The only certainty is that between here and there will be a lot of change. Where there's change, there's transition. That's the utterly predictable equation:

Change + human beings = transition.

There's no way to avoid it. But you can manage it. You can. And if you want to come through in one piece, you must".

Appendices

Appendix 1:

Preliminary Interviews

<u>**Report on the preliminary interviews**</u>

Introduction

As a starting point for the collection of data for my research, I conducted a series of informal interviews with the head teacher, some teachers and students from a school operating the programme. The purpose of the interviews was to find out about their experience of the programme, as I explained to them. As this was a preliminary exercise to help me find out about the sorts of issues raised by participants in the programme. I planned to follow up such issues in the main data collection stage.

My preliminary work was done in a girls' secondary school consisting of approximately 300 students and nearly 30 staff. I interviewed 5 students, 6 teachers and the head teacher.

The procedures I adopted were informal in character, as were the interviews themselves. Initial permission came from the head teacher, who agreed to allow me access to the school. She also gave me permission to approach staff and students to see whether they would be willing to talk with me about their experience, helping me with my research. I promised to treat all information I was given in strict confidence and to keep their identities anonymous. I undertook to keep all records of my discussions with them safe.

The interviews were conducted in various parts of the school, in the head's office, in the staff room and, in the case of students, in the students' common room.

In the case of the teachers, I had a preliminary discussion with a group of ten teachers to talk about my area of research interest and what I hoped to achieve through my interviews with teachers and others. Ten teachers came to talk with me about the work but in the end, seven of them did not wish to be interviewed. However, they said that they shared similar views to the three agreeing to be interviewed.

Teacher B said that "the choosing of training courses should be very organised, for example, when the teachers did the training course on how to use the 'Intel Teach for the Future'

programme they were not given the opportunity to practise this course because they made them do another course which is called 'cooperative education'. (This course is designed to train teachers how to share knowledge/information with one another).

She also suggested that they needed a permanent centre for training course so they can arrange the training course. And they need training during the school year because they just undertook training at the beginning of the programme. However, the programme is useful because the new technology helps not only teachers but also students to improve their performance. Using the text book with a CD helps the teacher to use the computer during the lesson and move the learning on from the theoretical to practical'.

Teacher D considered that the programme was frustrating for teachers for two reasons: (1) 'teachers lack motivation'; (2) the workload, for instance, school activity work is too much for us: 'Why do we have to produce two activity presentation pieces per week?'

Schools face another problem when teachers get extended leave (e.g. long term sickness, maternity leave) and they need to bring in temporary replacement teachers with the right specialist subject. These need training on using the experimental programme, but when they have done their spell as a replacement teacher, they are sent off elsewhere. When another extended leave occurs, the school may again find that the replacement teacher needs training on how to use the programme. The teachers interviewed recognised that this was a problem arising from the experimental programme being piloted in only 50 schools. Nonetheless, they suggested it was a problem that needed addressing urgently.

At a later stage in my data collection, another three teachers came forward and volunteered to be interviewed

Teacher A:

Teacher A, who teaches sociology said that the most important advantages of the new programme are: (1) the way of teaching in this programme is better than the traditional one in terms of improving students' skills and their creativity. One of the most important aspects of this programme is its care of students, 'promoting a very strong relationship between teacher and students'. However, she considered the programme a very demanding one physically and mentally. She asserted that the training course at the start of this programme had led to good relationships between colleagues. Moreover she said the programme encouraged students to search for knowledge and information and gave them more self-confidence when doing their

classroom presentations. It stimulated students and teachers, by encouraging them to use the new teaching methods.

Teacher B:

A maths teacher, Teacher B stated that the new programme had a number of advantages: (1) applying technology in teaching; (2) the new way of teaching has given students the great opportunity to be more creative. However, she believed that distributing laptops to students and letting them take them home was wasting students' time and she thinks is better if classrooms were provided with computers without needing to take them home. And she claimed that some bits of the training course were not useful because they teachers had not had the opportunity to practise these during the course. However, she also considered that the training course for working on this programme was enough at the moment.

Teacher C:

An Islamic Education teacher, Teacher C considered that the programme helped teachers and students to gain mastery of technology and to communicate between teachers and students by email. Moreover, this gave the student more self-confidence because the programme sought to promote independent thinking and increase students' self-confidence. Finally, it gave them freedom in terms of gaining knowledge not only for students but also teachers. However, she asserted that the class size, shortage of lesson time and teacher workloads were the biggest weaknesses of the programme. She said that the preliminary training course should be held in term time not in the teachers' summer holiday. She felt however that the programme with new facilities encouraged teachers and students to improve their performance.

Teacher D:

Teacher D, a biology teacher, emphasised that the new programme had got two strong points: firstly, supplying the school with new technology to help improve the school and also her personal professional development. On the other hand, the programme demanded a lot of homework from students and teachers and a shortage of time. She hopes to get more specific training in the core subject because she thinks the training course was useful. Moreover, she believed that the website was very useful but teacher workload was the main reason for not using the website very much. She said that the programme made relations between teacher and students stronger and better than before. She added that using the internet was one of the most important tools to help students to increase their knowledge. The variety of equipment

available helped teachers to improve their performance and also helped students by making lessons more attractive and interesting.

Teacher E:

Another maths teacher, Teacher E had been working as a teacher for 17 years. She considered that the programme had three advantages: (1) the project scheme was very strong; (2) it introduced new methods in teaching; and (3) the teacher preparation and training was very useful. On the other hand, the programme had currently got three weaknesses: (1) the experimental programme was not being overseen closely enough by the national project leader; (2) there is no motivation for teachers and management team; and (3) having graduated from the programme did not give students any recognition when it came to university places, despite the extra skills they had gained. Furthermore she asserted that 'the training course is very useful and it is helping me develop not only my work but also myself'. She thought the programme website was in general very important and it had got rich reference sources: 'the students find this programme very useful in different ways: (1) science references; (2) new presentation methods; (3) creative ideas. These provide them with great opportunities to discuss their ideas with other students from other parts of the KSA; and (4) they stimulate rich debate between other students locally'. The programme also strengthened relations between teachers and students through the use of email and also helped 'decrease teacher workload' This meant, she explained, that the teacher could correct homework and/or send corrections via email, thus saving the teacher's time. She said that the students developed research skills, enabling them to access knowledge quickly. The programme helped improve students' report writing skills. Another advantage of the programme was that it motivated teachers to develop their teaching skills and to improve their performance.

Teacher F:

Teacher F, an Arabic teacher who had taught in this school for 12 years, said that the programme had got three advantages: (1) it gave teachers and students the motivation to develop themselves and to adopt/adapt to new methods of teaching; (2) it exploited hidden capacities in students and teachers, the new programme encouraging teachers to produce perform better by using new methods which made lessons more interesting with teachers and students developing their skills in using new technology; and (3) the development of students' self-confidence.

She emphasised that the programme made relations between students and their teachers stronger. 'The programme has made students' knowledge broader and strengthened cooperation between one another'. It helped teachers 'to improve their performance and created competition among them to improve their performance'.

Student A:

Student A, a student in year two specialising in sciences, took the view that the programme helped 'to promote students' self-skills and develop cooperation between students'.

'One of the biggest disadvantages of this new programme is that lesson time is very short' but she is very content because she is taking part in the experimental programme. She said 'I never use the website for this programme but I do contact my teachers and fellow students by email'. She prefers the new programme for many reasons: (1) developing collaboration among students; (2) she now felt she grasped subject matter better because the programme involved using new technology and this technology gave students the chance to use the internet; (3) the new methods made the subject more interesting and so she hopes that 'the government will roll out the programme nationally; and (4) relations between teacher and students were now better. However she complained that 'when we do any project for any subject we have very limited time to do it. 'The programme makes us more self-confident because it gives us students the opportunity to present their work in front of fellow students and teacher'. She got more help from the teacher: 'I told her about my ideas and she helped me to improve my ideas and to develop them'. This student liked the programme because it gave students more self-confidence and she got more support from her teacher and family to develop new ideas for their assignments.

Student B:

Student B is a year one student and feels she is getting on very well with this programme. She enjoys using the programme. It makes her more self-reliant. She is very happy with the programme but she thinks she need more time. She is enjoying using the new maths and science curriculum for high schools, which locally is called 'McGraw-Hill', after its American publisher.

This new curriculum comes with a CD so that the science teacher can use PowerPoint presentations with the facility to blow up some aspect of the slide so that students can see things more clearly. The programme has reduced the emphasis on theory making the

teaching/learning of maths and science more practical: 'maths and science have become very interesting'.

She thought that the school day ought to be increased 'so we have time at school to do our homework'. She also considered that reading things in books was better than relying on technology and she is critical of the ICT curriculum: This teaches us how to use elementary things like Word, yet we all know how to use Word. What we need is an ICT curriculum that meets the demands of the experimental programme'. Nonetheless, she said 'I am pleased with my progress because the new techniques are helping me to improve my performance'

She said that 'I prefer the new programme because it involves the use of new methods which motivate students to come to school every day'. Finally she said that there was no specific training for first year students for this programme: 'Simply, the teacher explains to us how to use it'.

Student C:

Another first year student, Student C, said 'at the beginning of this programme, I didn't know how to use a computer very well but now I am an expert in using one. For instance, I can make graphics using Power Point. I feel that I am getting on very well with the programme. 'Many elements (of the programme) make me very content with this programme: (1) cooperation education (building up teamwork skills as well as individual learning; (2) The Intel programme (3) specialist subject classrooms for single subject; (4) 'The students' voice is now very important so teachers and the head teacher listen to us and take our opinions'. She felt that students didn't need extra time (in school) to finish their homework.

She said that some students put off their work till the submission day, which made them more stressed. She did not use the website, although other students and teachers did communicate by email group. She was very much in favour of the new programme because, as she said, 'it gives us chance to develop our abilities'. She found much support not only from school but also from her family.

Student D:

A student from year two arts section, Student D asserted that 'I have become more engaged with the programme'. She found that this way of learning made their education more enjoyable.

'The new methods help us to improve our performance'. She couldn't find any weakness in this programme. She was also happy with all subjects and she was pleased with her progress on the programme. However, she complained that the school website was not active. She preferred the new study programme because they were using methods that helped give students more self-confidence. She was also of the view that she received enough support from school.

Student E:

A student from year one, Student E, said that she was getting on very well with the programme. For her, one of the most interesting things about the programme was its effect on relations between students, teachers and management team. Relations had become stronger. However, she, like some other students, was unhappy about the lack of progress on increasing the length of the school day. She found the whole experimental programme very useful, especially the maths and science element because it was very enjoyable. She felt proud of taking part in the programme. It was helping her to improve her performance and she didn't face any problems with using this programme. She thinks the current programme is the best for many reasons: (1) killing the boredom of the old school routine by having students move at the end of a lesson from one specialist classroom to another instead of staying in the same room; (2) using new methods; (3) communication between students and teacher was becoming easier using the group email to sort out any problems the student faces; and (4) it increased students' self-confidence and presentational skills for reporting their assignments and responding to questions when delivering their presentations. Finally, she got encouragement from school and her family. She likes the whole programme and she doesn't see any weakness in it.

The Head teacher:

This head teacher of an experimental programme school has worked in the field of education about 25 years, having been a teacher of Arabic, a deputy head and now a head teacher. The head teacher of this school for three years, she has led the experimental programme for the last two years. She had been using a computer at home before working on the programme in school, using it to do research in various fields of science, especially management science and leadership skills.

In her view, there were a number of strong elements: (1) 'the project is creating a high-level classroom technology environment'; (2) training for head teachers and teachers; and (3) technicians assigned for the maintenance of equipment when needed.' Classroom equipment included the following: Smart Board and projector display screens and video conferencing facilities. Head teachers are provided with training courses, which she considered made 'a distinct and effective contribution to enriching their skills to lead the programme and to overcome any difficulties they might face in the planning stage, implementation, and dealing with change and with other things'. These included:

1. A programme on leadership concentrating on 20 key skills for head teachers' professional development.

2. A training course, which promotes the management of learning and innovation in schools.

3. A training course to help head teachers develop supervisory and other skills that might be needed in the delivery of the experimental programme, for example, developing presentational skills.

4. A course in all fields of technology available in the delivery of the programme.

5. A course in Total Quality Management.

6. A course on classroom and other activity strategies that are intended to help teachers to develop students' skills and bring out their talents.

(6) A course on classroom and other activity strategies that are intended to help teachers to develop students' skills and bring out their talents.

Operating the programme involved: many staff meetings to discuss the best ways of promoting school performance under Total Quality Management; establishing and maintaining links between programme head teachers to consider the strengths and weaknesses and to find the best way to sort out any issues they may face. 'Under new powers, the head teacher is now the resident supervisor in school and it is part of their job to raise the performance of teachers and students'.

The head teacher also said that she got 'the help of outside expertise, from a Quality Specialist international software analyst and trainer to contribute to assist my school in its work and to

observe the school work and provide training programmes in my school, for teachers and students not just from my school and also for the parents'.

'One of the strengths of the experimental programme is that it gives head teachers the opportunity to evaluate their schools' performance through invited inputs from the school management team, the teachers, students and their parents and others. Thus, the head teacher can have feedback from all members of the school'.

Although the head teacher considered the programme to be 'very strong' she felt that it still had some drawbacks:

Some head teachers did not study the programme thoroughly before implementing it in their schools.

The national programme coordinator had failed to take into account the impact of the changes he proposed before launching the experimental programme into schools.

The training needed to be comfortable with the changes required by the programme was not enough and teachers needed more basic training before being comfortable and confident to address those changes.

The local inspectors' office did not understand enough what was going on in the new programme schools and their aims and objectives.

In her estimation, the training offered in her school was better than in some other schools. Her school had 'a very good trainer and its own in-house training centre. The centre monitors the progress of the school through the school year. The centre also serves other local schools'.

'When the project team coordinator explained the project to us at the start of the experimental programme, I did not have any background on the programme. The inspectors for our region upset us and they thought that the programme would fail. I was very positive and I believed it could be a success. I have tried my hardest to introduce this programme by distributing leaflets explaining the programme and have arranged many meetings to introduce the new programme. At first, I faced problems with the teachers, many of whom were not happy about the change because they were used to traditional methods of teaching. I sorted out this problem by supporting them and talking with them to overcome the difficulties in the work and motivated and persuaded them to work using communication channels including electronic ones. With the passage of time and after much effort the situation has changed. Now they

accept the programme and like the programme better than before especially when they see the effects of the changes in student performance. Students are performing better than before'.

She was very satisfied with the programme and she said 'I spoke to the national programme co-ordinator, because I wanted to help other schools come to terms with the demands of the programme. I would like to introduce useful things to develop education leadership and management, for example, how to evaluate the programme school performance and I have produced a guide to develop organisation in a project school, and to distribute these documents and this guide to other schools'.

Now, the new experimental programme was attractive to many students and their parents. Factors in this were the new curriculum itself, the leadership, the teachers and the creation of an educational environment enabling students to learn through experience linking theory and practice.

'The parents have reacted quite well to the programme, although at first they found it very strange and confusing. Using communication channels with parents we sorted out this problem'.

The website was considered useful for a number of reasons:

1. It offered a good communications channel for all, enabling the exchange of experiences;

2. It offered access to expertise in the local community and further afield;

3. It offered a way to demonstrate the practical character of the new programme;

4. It offered a good way to learn about other cultures, how they work and their achievements;

5. The website helped them to draft articles and to produce them in a distinctive and effective way. Moreover, it had enabled 'us to communicate with everyone and to publicise our work and achievements'.

'The programme has had a huge effect on the working relationships with and among students. It is having a great impact on the teaching learning process and the relationship between teachers and students has become closer'.

'Definitely, the programme makes them (students) more motivated because the programme depends on project assignments. Now the students read more not only from books but also from information on the internet'.

The head teacher was firmly of the view that the programme needed 'serious consideration by the Ministry of Education'. A steering committee was required, led by the national project director and made up of people from a variety of backgrounds, including parents and students. The committee would work with project schools to explore the programme's strengths and weaknesses, proposing appropriate solutions where necessary.

It was important to 'spread the ethos of the project to the local community, I mean, to all the institutions related to the fields of education, creativity and development'. Furthermore, 'project schools and their head teachers should communicate with international education bodies and parties on modern methods of development and change.

Appendix 2

TEACHER QUESTIONNAIRE

Dear Colleague,

A teacher of Arabic, I am doing a Ph.D. in Educational Management at the Manchester Metropolitan University, Manchester, UK. I am interested in your views on and reactions to working with the new project. My Ph.D. research is investigating the perspectives of head teachers, teachers and students on the new project and its operation. My thesis is entitled *"Managing Change in Saudi Secondary Schools: Participants' Perspectives".*

I would therefore be very grateful if you could help me by spending a bit of your time completing the attached questionnaire. It should not take you more than 25-30 minutes to complete. Your answers will help me to find out more about your experience and opinions of working with the project.

I promise that all the information you provide me will be treated in strict confidence and kept anonymous, when I report my findings.

Thanking you in anticipation,

Aishah Alkhatani

SECTION ONE:

1. - Are you male or female?   **M** or **F**

2. - How old are you? **____ years**

3. - How long have you been in teaching?   **__ years**

4. - How long have you taught in the new project? **__ years**

5. - Subject(s) you teach this school year?   **_____**

6. - Hours taught per week **____**

7. - Grades taught this year   Grade 1? (Y/N);   Grade 2? (Y/N);   Grade   3? (Y/N)

8. - Is this your first job in schools?   **Y/N**

9. Do you use any of the following in your teaching?

Overhead projector (Y/N); Audio tape recorder/TV/video/DVD (Y/N), Computer(s) (Y/N) Smart board(Y/N) If *YES*, which do you use most? **_____**

SECTION TWO:

Read the following statements and indicate the extent to which you agree (or disagree) with each:

(where 5 = I strongly agree; 4 =I agree; 3 = I neither agree/nor disagree; 2 = I   disagree; 1 = I strongly disagree)

10. - Lesson planning takes up a lot of my own time. (5 – 4 – 3 – 2 - 1)

11. - Too much of my non-contact time is taken up with paperwork. (5 – 4 – 3 – 2 - 1)

12. - I have a lot of marking to do of students' work, in my own time. (5 – 4 – 3 – 2 - 1)

13. - There is no time for teachers to relax. (5 – 4 – 3 – 2 - 1)

14. - The teaching load in this school very heavy. (5 – 4 – 3 – 2 - 1

15. - Parents do not co-operate with the school as much as they could do. (5 – 4 – 3 –2 - 1)

16. - There are too many students in my classes. (5 – 4 – 3 – 2 - 1)

SECTION THREE:

How likely is that the following factors might prove obstacles to your delivery of the project? *(Please put a tick as appropriate).*

Likelihood of the following factors proving obstacles to your delivery.	Very likely	Likely	Not sure	Un likely	Very unlikely
17.- Insufficient support from my head teacher					
18. - Insufficient knowledge on my part.					
19. - Insufficient practice or skill on my part.					
20. - Lack of time to carry out the changes needed.					
21. - Lack of desire on my part to change.					
22. - Inflexibility of work regulations and rules on the changes.					

SECTION FOUR*:*

Read the following statements and indicate the extent to which you agree (or disagree) with each:

(where 5 = I strongly agree; 4 =I agree; 3 = I neither agree/nor disagree; 2 = I disagree; 1 = I strongly disagree)

23. - The classroom equipment helps improve my performance. (5 – 4 – 3 – 2 – 1)

24. - Implementing ICT requires good technical support. (5 – 4 – 3 – 2 – 1)

25. - The new methods make the subject more interesting. (5 – 4 – 3 – 2 – 1)

26. - Integrating ICT demands time to plan and/practice its use. (5 – 4 – 3 – 2 - 1.)

27. - Classroom facilities help me to use a range of teaching/learning styles. (5 – 4 – 3 – 2 – 1)

28. - The introduction of the new programme is improving the quality of the education. (5 – 4 – 3 – 2 – 1)

SECTION FIVE:

Read these statements about teachers and the programme. Respond to each, indicating the extent to which you support them, by ticking the appropriate box

	Very Much	Much	Not sure	Little	Very Little
29. - Using website helps to strengthen relations with students.					
30. - The website helps to decrease my workload.					
31. - I consider that I am 'computer-literate'.					
32. - Using the website makes the teaching very interesting.					
33. - The internet is a good resource, increasing teachers' knowledge.					
34. - The programme helps teachers to work better together.					

SECTION SIX:

As a secondary school teacher having first-hand experience of using the programme, to what extent do you consider that these statements apply to your students?

Read the following and indicate the extent to which you agree (or disagree) with each :*(where 5 = I strongly agree; 4 =I agree; 3 = I neither agree/nor disagree; 2 = I disagree; 1 = I strongly disagree)*

35-The project helps my students to increase their self-confidence.   (5 – 4 – 3 – 2 - 1)

36-The project makes my students more creative. (5 – 4 – 3 – 2 - 1)

37-The project contributes to improve the students' general computer skills. (5 – 4 –3– 2 - 1)

38- Cooperative education increases the participation of weaker students. (5 – 4 – 3 – 2 - 1)

39-Integrating ICT with the curriculum make lessons more enjoyable. (5 – 4 – 3 – 2 - 1)

SECTION SEVEN:

For the items in this section, please select either YES (Y) or NO (N) for each:

40- The head teacher encourages me to develop my teaching skills. (Y/N)

41- The subject inspector encourages me to develop my teaching skills. (Y/N)

42- I consider that I am a better teacher now than when I used traditional methods.
    (Y/N)

43- I get plenty of in-service training opportunities. (Y/N)

SECTION EIGHT:

For the three items in this section, if you need any more space, please continue your answer(s) on the back of the page. Thank you.

44. - What do you see as the current *strengths* of the programme?

_____
_____
_____

_____

45. - What do you see as the current *weaknesses* of the programme?

_____
_____
_____

46. - What would you like to be done to in order to improve the education of students in the King Abdullah Project schools in Saudi Arabia?

_____
_____
_____

If you need more space for your answers, please continue on the back of this page.

THANK YOU FOR TAKING THE TIME TO COMPLETE THIS QUESTIONNAIRE

STUDENT QUESTIONNAIRE

Dear Student,

I am doing a Ph.D. in Educational Management at the Manchester Metropolitan University, Manchester, UK. I am interested in your views on and reactions to working with the new programme. My Ph.D. research is investigating the perspectives of head teachers, teachers and students on the programme and its operation. My thesis is entitled *"Managing Change in Saudi Secondary Schools: Participants' Perspectives".*

I would therefore be very grateful if you could help me by spending a bit of your time completing the attached questionnaire. It should not take you more than 25-30 minutes to complete. Your answers will help me to find out more about your experience and opinions of working with the programme.

I promise that all the information you provide me will be treated in strict confidence and kept anonymous, when I report my findings.

Thanking you in anticipation,

Aishah Alkhatani

Student details:

School Year	1st	2nd	3rd	Section	General	Arts	Science
*********				*****			

1. Are you male or female?   **M** or **F**

2- How old are you? **____** years

3- Were you using a computer at home before enrolling on the programme? (Y/N)

4- Do you bring your laptop to school every day? YES/ NO/ SOMETIMES/ NEVER

SECTION ONE

Read the following statements and indicate the extent to which you agree (or disagree) with each:

(Where 5 = I strongly agree; 4 = I agree; 3 = I neither agree/nor disagree; 2 = I disagree; 1 = I strongly disagree)

5- The programme is helping me to develop my computing skills. (5 – 4 – 3 – 2 - 1)

6- I have to do a lot of school work at home. (5 – 4 – 3 – 2 - 1)

7- Students now feel freer about communicating with their teachers. (5 – 4 – 3 – 2 - 1)

8- My self-confidence has increased since enrolling in this school.   (5 – 4 – 3 – 2 - 1)

9- My parents are very pleased that I am taking part in the project. (5 – 4 – 3 – 2 -1)

10- Teacher-student relations have become stronger through the programme. (5 – 4 – 3 – 2 - 1)

11- The classroom equipment helps me to improve my learning. (5 – 4 – 3 – 2 - 1)

12- I am pleased with my progress on the programme. (5 – 4 – 3 – 2 - 1)

13- I understand the subject better with the new methods being used. (5 – 4 – 3 – 2 - 1)

14- The programme makes relationships with other students stronger. (5 – 4 – 3 – 2 – 1)

15- Students new to the programme need more training. (5 – 4 – 3 – 2 - 1)

SECTION TWO

For the items in this section, please select either YES (Y) or NO (N) for each answer

16. - Using the website helps me present my opinions. (Y/N)

17.-I now feel comfortable using a computer for school work. (Y/N)

18. - My school has very few problems with equipment maintenance. (Y/N)

19. - I consider that the extra-curricular activities are helping me gain in self-confidence. (Y/N)

20. - Now the head teacher and teachers listen to our opinions. (Y/N)

21. - I use the website regularly to help me do my homework. (Y/N)

22. - I find my new school day more enjoyable than the traditional one. (Y/N)

23. - The website provides me with good resources to increase my knowledge. (Y/N) 24. - The new methods make the subjects more interesting. (Y/N)

25- Our teachers encourage us to participate in discussions.   (Y/N)

SECTION THREE

Obstacles you might face in using the new programme.	Very likely	Likely	Not sure	Un likely	Very unlikely
26- Lack of support from my family.					
27- Lack of support from my schoolmates.					
28- Lack of computer skills.					
29- Lack of knowledge about the new curriculum.					
30- Insufficient practice or skill on my part.					
31- The school day is very short for the work we have to do.					
32- There are too many students in my class.					
33- There is not enough training for new students in this school.					
34- Limited previous computer skills make the programme difficult.					
35- The change from traditional to new methods is very challenging.					
36- Assignments in this school are very time-demanding.					

SECTION FOUR

Read the following statements and indicate the extent to which you agree (or disagree) with each :(where 5 = I strongly agree; 4 =I agree; 3 = I neither agree/nor disagree; 2 =I disagree; 1 = I strongly disagree)

Cooperative learning

37- This is helping me develop my problem-solving skills. (5 – 4 – 3 – 2 - 1)

38- It is helping me to develop my thinking skills. (5 – 4 – 3 – 2 - 1)

39- Not all students in my class participate in group work.   (5 – 4 – 3 – 2 - 1)

40- It is helping me to improve my communications skills.   (5 – 4 – 3 – 2 - 1)

The maths-science curriculum ('McGraw-Hill' :)

41- It makes science and maths theory more practical and easier to understand. (5 – 4 – 3 – 2 - 1)

42- It introduces new methods of teaching. (5 – 4 – 3 – 2 - 1)

43- The programme integrates ICT with the textbook.   (5 – 4 – 3 – 2 - 1)

44- The methods make maths and science easier to understand than before. (5 – 4 – 3 – 2 - 1)

SECTION FIVE

In this section, I would like you to think about the new programme. (If you need more space for your answers, please continue on the back of the page.)

45. - What do you see as the strengths of the programme? – And why?

_____

_____

_____

46. - What do you see as the weaknesses of the programme from your point of view – and why?

_____

_____

_____

47. - What sort of help/encouragement with the programme have you had from parents and teachers?

_____

_____

48. - What sort of skills are you gaining from the programme?

_____

_____

49. - Would you recommend the programme to other Saudi students – and why?

_____

_____

50. - Have you any other comments about the programme that you would like to make?

_____

_____

_____

THANK YOU FOR TAKING THE TIME TO COMPLETE THIS QUESTIONNAIRE

Appendix 3

Student questionnaire

Table 1: Student Level

Student level	n	%
1st	319	37.9
2nd art	78	9.3
2nd science	243	28.9
3rd art	84	10.0
3rd science	116	13.8
Total	841	100.0

Table2: Student perceptions of the strengths of the Project

SECTION (2)	I strongly disagree		I disagree		I neither agree		I agree		I strongly agree	
	N	%	N	%	N	%	N	%	N	%
Gaining computer skills	43	5.1	31	3.7	113	13.4	306	36.4	348	41.4
I have to do a lot of school work at home	66	7.8	127	15.1	218	25.9	237	28.2	193	22.9
I now feel free to communicate	47	5.6	71	8.4	161	19.1	325	38.6	237	28.2
My self-confidence has increased since enrolling in school	81	9.6	93	11.1	225	26.8	231	27.5	211	25.1
My parents give me a lot of help and encouragement	63	7.5	68	8.1	170	20.2	232	27.6	308	36.6
Teacher-student relations have become stronger through the programme	72	8.6	96	11.4	218	25.9	248	29.5	207	24.6
The classroom equipment helps me to improve my learning	55	6.5	74	8.8	203	24.1	261	31.0	248	29.5
I am pleased with my progress on the programme	51	6.1	42	5.0	166	19.7	275	32.7	307	36.5
I understand the subject better with the new methods being used	65	7.7	89	10.6	185	22.0	255	30.3	247	29.4
The programme makes relationships with other students stronger	57	6.8	78	9.3	198	23.5	248	29.5	260	30.9
Students new to the programme need more training.	76	9.0	76	9.0	171	20.3	185	22.0	333	39.6

Table 3: Student perceptions of the strengths of the Project

Section 2	Yes		NO	
	n	%	N	%
Using the website helps me present my opinions.	355	42.2	86	57.8
I now feel comfortable using a computer for school work.	740	88.0	101	12.0
My school has very few problems with equipment maintenance.	635	75.5	206	24.5
I consider that the extra-curricular activities are helping me gain in self-confidence	503	59.8	338	40.2
Not enough training before starting has stopped me	320	38.1	519	61.9
Now the head teacher and teachers listen to our opinions.	528	62.9	312	37.1
I use the website regularly to help me do my homework.	254	30.2	587	69.8
I find my new school day more enjoyable than the traditional one.	577	68.6	264	31.4
When starting on the project I got much support from teachers and head teacher	563	66.9	278	33.1
The website provides me with good resources to increase my knowledge	393	46.7	448	53.3
The new methods make the subjects more interesting.	604	71.8	237	28.2
Our teachers encourage us to participate in discussions	593	70.7	246	29.3

Table 4: Cooperative learning

(4) *SECTION*	I strongly disagree		I disagree		I neither agree		I agree		I strongly agree	
	N	%	N	%	N	%	N	%	N	%
It involves me in developing the curriculum.	33	4.0	33	4.0	71	8.7	104	12.8	176	21.6
This is helping me develop my problem-solving skills.	67	8.6	77	9.9	142	18.2	262	33.5	233	29.8
It is helping me to develop my thinking skills.	53	6.8	66	8.5	156	20.0	247	31.6	259	33.2
Not all students in my class participate in group work.	68	8.7	93	11.9	155	19.9	237	30.4	226	29.0
It is helping me to improve my communications skills.	60	7.7	37	4.8	105	13.5	279	35.9	297	38.2

Table 5: The Mathematics-science curriculum ('McGraw-Hill')

SECTION (4)	I strongly disagree		I disagree		I neither agree		I agree		I strongly agree	
	N	%	N	%	N	%	N	%	N	%
It makes science and maths theory more practical and easier to understand.	98	15.9	70	11.4	115	18.7	140	22.7	193	31.3
It introduces new methods of teaching.	63	10.2	68	11.0	101	16.4	195	31.7	189	30.7
The programme integrates ICT with the textbook.	105	17.0	72	11.7	155	25.2	149	24.2	135	21.9
The methods make maths and science easier to understand than before.	93	15.1	62	10.1	142	23.1	155	25.2	163	26.5

Teacher questionnaire

Table 6: Teachers perceptions of other strengths and weaknesses of the Project

	The classroom equipment helps improve my performance		Implementing ICT requires good technical support		The new methods make the subject more interesting		Integrating ICT demands time to plan and/practise its use		Classroom facilities help me to use a range of teaching/ learning styles		The introduction of the new programme is improving the quality of the education	
	N	%	N	%	N	%	N	%	N	%	N	%
I strongly disagree	2	2.1	6	6.4	1	1.1	1	1.1	5	5.3	1	1.1
I disagree	1	1.1	3	3.2	2	2.1	6	6.4	2	2.1	4	4.3
Neither	8	8.5	6	6.4	6	6.4	13	13.8	5	5.3	12	12.8
I agree	21	22.3	25	26.6	26	27.7	32	34.0	32	34.0	18	19.1
I strongly agree	62	66.0	54	57.4	59	62.8	42	44.7	48	51.1	59	62.8
Total	94	100.0	94	100.0	94	100.0	94	100.0	5	5.3	94	100.0

Table 7: Teachers' preferred ICT and audio-visual teaching resources

Responses to: Which equipment would you most prefer to use in classes if all were equally available? (More than one type of equipment may be chosen.)

Responses	Overhead projector		Audio tape recorder		TV/video/ DVD		Computer		Smart board	
	N	%	N	%	N	%	N	%	N	%
Most Preferred	23	24.5	55	58.6	68	72.4	58	61.8	68	72.4

Appendix 4

Head teacher Interviews

Part one: Brief details of their background:

1-How long have you been working with the project?

2-Do you have a computer at home? How long have you been using one?

3-Do you feel comfortable working with the project?

Part Two: Training:

4-Have you had any formal training in educational management? What did it consist of?

5-Have you had any training in the running of the programme? If yes, what was the training like? How useful would you say it was?

6-Was that training enough in your view? What would you have liked to have had more training on?

7-Is the training long enough for trainees to acquire the skills and knowledge needed?

8- Do you have what you need in terms of in-service training opportunities for the project?

9- What sort of problems do teachers face during training and after training?

10-Do you think that training could have been improved? If yes, how?

Part Three: Curriculum change

11- How would you rate teachers' and students' performance on this new project? And why? Example(s)?

12-Do you think the project and its methods increase students' learning and motivation? Give examples of how it does this. And evidence that it helps?

13-What changes have happened in your school since it became one piloting the experimental programme?

14-Do you think this project helps to improve teachers and students performance?

16-What, in your opinion, are the merits of the programme?

17-What are the drawbacks?

18-How well would you say have the students responded to working with the programme? And what kind of examples can you give of students responding well?

19-How well would you say have the teachers responded to working with the programme? With giving example?

Part Four: Equipment and Maintenance:

20-Do you or your school face any challenges with the repair and maintenance of equipment in your school?

21-What barriers, if any, do you perceive to the successful use of ICT in your school?

22- Have there been any problems with the use of new equipment? Examples? Have such problems been promptly addressed?

FINAL:

23-How much freedom do you and the teachers have when it comes to working with the programme? Can you give an example?

24-Have you visited many classes to see what is going on in the classroom? If YES, what impressions do you have of teaching/learning with the new programme? Can you give me examples of what is seen during those visits?

25-Have you had much support/advice from outside e.g. the Ministry of Education? From colleagues in other schools that are working with the programme? Can you give an example?

26-What do you see as the main issues the Ministry should address so that the programme can be successfully introduced into all the Kingdom's secondary schools?

27-if in their view the interview has covered all the issues/questions. If not then what would they want to comment on?

Teacher Interview schedule

Part one: Brief details of their background:

1-how long have you been teaching in your present school?

2-main subject(s) taught?

3-How long have you been working with the project?

4-Do you have a computer at home? How long have you been using one?

5-What changes have you had to make in the way you teach to meet the demands of the project?

6-Do you feel comfortable working with the project?

Part Two: Training:

7-What sort of training have you had to prepare you for working with the programme?

In terms of the use of equipment. How useful was this training?

In terms of the new curriculum and teaching methods? How useful was this training?

8-Was that training enough in your view? What would you have liked to have had more training in?

9-Is the training long enough for trainees to acquire the skills and knowledge needed? What in their view would be an appropriate length of time?

10- Do you have what you need in terms of in-service training opportunities for the project?

11-How helpful has that training been? In what ways?

12-What sort of problems do teachers face during training and after training?

13-Do you think that training could have been improved? If yes, how?

Part Three: Curriculum change

14-How does the programme curriculum compare with the traditional one?

<u>Materials</u>

15-Have you prepared any materials to use in your lessons? If YES, examples?? And how useful were they?

16-Do you share any teaching materials with a colleague or colleagues? What sort of things?

17- How would you rate teachers' and students' performance on this new project? And why?

18- What do you see as the current strengths of the programme?

19- What do you see as the current weaknesses of the programme?

20- What would you like to be done to in order to improve the education of students in the King Abdulah Project schools in Saudi Arabia?

21- What, in your view, still needs to be done, before the programme is rolled out nationally? And why?

Student assignments and classroom presentations

22-How well do these go with your teaching input?

23-How useful are the new teaching methods? Why? Can you descript the new teaching methods?

24-Do they help to improve the knowledge and attainment of the students? How? In what ways?

Cooperative learning/Working relationships teacher/students.

25- Can you describe the 'cooperative learning'? What do you actually do?

Are these good in your view? Why?

[For maths or science teachers]

26-How useful do you find the maths/science package (McGraw-Hill)? AND why?

Part Four: Equipment and Maintenance:

27-What equipment do you use?

28-What equipment/software/programmes do you use in your daily teaching?

29-How reliable is the equipment?

30-What barriers, if any, do you perceive to the successful use of ICT in your classroom?

31-In your view, is ICT a valuable tool, which can enhance your performance?

32-Do you or your school face any challenges with the repair and maintenance of equipment in your school?

FINAL

33-What challenges has the project presented to you in your teaching? And to your colleagues?

34-What changes have you seen in your students as they come to terms with the project?

35-What still needs to be done to improve the programme and its delivery?

36- Has the interview covered all the issues that are important; have they concerns and comments that they think are important to add?

Student interview schedule

Part one: Brief details of their background:

1-How old are you?

2-Which school year are you in and which section?

3-Were you using a computer at home before enrolling on the programme?

4-Do you bring your laptop to school every day?

Part Two: Training:

5-what help do they think they needed before starting on the programme?

6-What sort of training were you given for understanding this with the programme? How long? Where?

7-What did it involve?

8-How helpful has that training been? In what ways?

9-Do you think that training could have been improved? If yes, how?

Part three: curriculum change:

10-How would you rate teachers' and students' performance on this new project? Please explain your answer?

11-What do you see as the current strengths of the programme?

12- What do you see as the current weaknesses of the programme?

13- One of the aims of the project is to develop what is called cooperative learning, that is, working together. How do you find this activity? What is good about it and what is not so good?

14- What do you think about the Maths-Science programme ('McGraw-Hill' :) Can you give examples of activities that make the programme good, or boring?

15- What would you like to be done to in order to improve the education of students in the King Abdulah Project schools in Saudi Arabia?

16- What, in your view, still needs to be done, before the programme is rolled out nationally? And why?

Part Four: Equipment and Maintenance:

17-In your view, is ICT a valuable tool that can enhance your performance?

18-Do you or your school face any challenges with the repair and maintenance of equipment in your school?

19-What barriers, if any, do you perceive to the successful use of ICT in your classroom?

20- Are there any other issues or topics that we've not talked about that you think are important?

Appendix 5

1-Permission Letter from the head teacher of the school (city 1).

إلى من يهمه الأمر

نفيدكم بأن طالبة مرحلة الدكتوراه / عائشة بنت عبدالعزيز القحطاني قد قامت بجمع عينات البحث الدراسية عن طريق توزيع الاستمارات على عدد من الإداريين والمعلمين والطلاب وقد استهلت هذه المهمة البحثية بتاريخ ١٤٣٢/٤/٢٨ هـ .

وبناءً على طلبها تم تزويدها بهذه الإفادة لإنتهائها من جمع البيانات المطلوبة لبحثها الدراسي من مدرستنا .

وتقبلوا تحياتي ،،،

قائد مدرسة ١،

التاريخ : / / ١٤٣٢هـ   المشفوعات:

زوروا موقعنا على الإنترنت

2-Translation of the Permission Letter from the head teacher of the school (city1).

To Whom It May Concern

We would like to inform that Mrs. Aishah Abdulaziz Alkahtani (PhD candidate/ Manchester Metropolitan University) was given the approval from the school administration, teachers and students to collect data by questionnaire and interview for her PhD research. She completed collection the required data. Mrs Alkahtani has been issued this letter upon her request.

Head teacher of High school

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