"Challenges Facing the Integration of ICT in Saudi Arabian Secondary Schools"

(A Teachers' and Headmasters' Perspective)

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Abstract

The advancement of technology has revolutionised the education sector; the effective integration of ICT in the education sector is vital for improving the teaching quality and enhancing the learning skills of students. The use of ICT resources is considered just as important in the education sector within Saudi Arabia, and all educational institutions are investing heavily in developing sound ICT resources. However, effective integration of ICT has been a significant challenge for most educational institutions. Therefore, the purpose of this dissertation is to evaluate the challenges facing effective integration of ICT in secondary schools in Saudi Arabia. To explore these challenges, this dissertation uses a qualitative case study analysis among four secondary schools in Saudi Arabia; in the study, sixteen interviews, comprising of twelve teachers and four headmasters, were conducted to obtain their perspectives about the challenges that impinge the effective integration of ICT in secondary schools. The results of this study show that both teachers and headmasters consider the role of ICT as vital in improving the quality of teaching, learning and the overall performance of schools; however, there are various barriers that can hinder the effective integration of ICT. These challenges include a lack of resources, including the limited number of ICT teachers in schools, lack of required number of computers in computer classes, slow Internet speeds, change-resistant approaches of teachers toward the use of ICT, lack of training, the stringent ICT policy formulated by the Ministry of Education and tight monitoring and control of ICT processes by the Ministry of Education. By addressing these challenges, schools can integrate ICT effectively in their educational curriculum and save both the financial and human resources that are vital for the effective and long-term integration of ICT in schools and in developing a culture of learning and teaching in schools to build educational excellence.

Acknowledgments

Chapter 1

Introduction

1.1 Background to the Research

Developing countries must actively reform their curriculum in order to improve the level of education they are offering their citizens (World Bank 2017). Success can be closely linked to the quality of education of a nation. The ICT (Information Communication Technology) skills that need to be learned depend on the discipline or sector that they will be used for. This means that, unlike health care or information on public services, for example, different ICT practices and skills need to be taught in schools. This, ultimately, means that investment in the education sector is essential as this will be the starting point for understanding and making ICT a part of work. These skills which would be developed at school level can further be developed and become pragmatically useful later in respective professional careers.   A number of scholars have discussed the importance of educational technology and its implications (Almalki and Williams 2012, Al-Harbi 2014). Teaching ICT skills as a way forward within the global learning environment is a fundamental element of success for developing countries today. According to Shaffer (2001), the teaching skill gap today between the developing and developed nations that have access to ICT is getting wider and wider. Thus, the use of digital technology within developing nations must be effective and efficient within classrooms, so that children can be exposed to the benefits and uses of ICT at an early age. Roblyer (2006) has found that incorporating ICT into the curriculum enhances productivity; furthermore, it also improves the teaching experience. The different definitions of the term ICT are discussed in more detail in Chapter 2.

While Saudi Arabia has seen an improvement in its literacy rates, the quality of education provided still has room for a further improvement in order to match the requirements of the world's labour force (Onsman, 2010). Developments in Saudi Arabia have led to the rapid formation of schools, colleges and universities. Scholars, however, have pointed out that the level of education of people in employment is still below the level needed to produce effective results (Onsman, 2010). However, this is not the only challenge. Pedagogical changes and new skills complement traditional Saudi approaches (Bingimlas 2009). Developed countries invest heavily in the use of and integration of ICT in the education sector (Labelle 2005). According to the World Economic Forum (2017), there has been a huge improvement in the living standards and lives of Saudis who are able to use technology; technology is changing the way people live. Fatani, (2009) further is of the opinion that even the young generation of the Kingdom of Saudi Arabia is quite interested in the use of technology at the recreational as well as academic level.

Recognising the advances and benefits of technology, the Saudi government has invested heavily to effectively integrate ICT into the education system. The 'Tatweer Project' (Tatweer project to boost maths and science teaching standards in KSA) aimed to increase the level of trained teachers in this field with the introduction of development programmes and training (Tatweer, 2017). It was also an attempt to fund digital technology and introduce interactive whiteboards, laptops, projectors and computers inside the classrooms in the belief that ICT encourages students to expose themselves to the greater world, meaning that they can deepen understanding within their fields. This allows the teacher to improve the dependency factors and actually pushes students to think for themselves and become more motivated learners. ICT in schools can save time, money and allow flexibility by offering different learning delivery methods.

In Saudi Arabia, schools are separated by gender and teachers and are often guided by the holy Quran when teaching about the uses of ICT and its use and practical application in other science subjects such as biology, chemistry and genetic engineering. Hamdan (2007) found that in the Arab world scientific materials translated from other languages can lead to some huge religious issues. Therefore, school teachers' skills on how to interpret such issues can vary depending on their personal qualifications and skill levels. Thus teachers need professional development programmes so that they are able to teach and interpret ICT and an appropriate utilization of resources and equipment in other areas of teaching. However, this is in itself problematic for many teachers, this is because they need to be able to understand its importance and spare some time to obtain necessary training. As Jones (2004) observes, in order to teach ICT, teachers must understand its basic operations and applications; they need to be able to use programs such as power point and other applications and software.

Although it has a number of advantages, the use of ICT also has various limitations. A number of skills cannot be gained through the use of ICT alone. Scholars have pointed out that ICT cannot be accepted as a solution to all the problems of education (Zimmerman 2001). This dissertation considers the perspectives and personal narratives of teachers and headmasters within Saudi Secondary schools to highlight and gain an insight into the barriers that teachers and headmasters face with regard to the use of ICT. This includes issues related to training and inequalities amongst students in terms of ICT access: for example; gender preference to the use of ICT in their respective home environments. The qualitative approach this study takes may encourage teachers and headmasters to quite freely discuss their personal views and the factors what causes them to resist adopting this new technology and what, may be the probable solutions to their concerns. The methodology of the study is discussed in further detail in Chapter 3.

1.2 Rationale for ICT in education

The integration of ICT in the education system is still problematic for some. Although it may seem that the benefits of ICT are endless and obvious, people still debate the use of ICT in education. One possible reason is that people often pose a direct *yes* or *no* question when they should really be asking *how* ICT can be used more effectively within education (Roblyer and Doering, 2010).

Without ICT in schools students suffer from a lack of skills that they truly require to join the work force. The lack of integration of ICT in secondary schools is not due solely to the problems that come with using the technology; it is also linked to the way teachers handle this responsibility, the way the curriculum spells out how and when ICT is used and the lack of effective teacher training. These factors all impact on how well ICT is integrated in the school and the positive outcomes of using ICT.

This research will gain an insight into the teachers' and headmasters' world to establish what hinders their use of ICT. It will present the teachers' and headmasters' current reality. Secondary school is where students are essentially being prepared for their future careers; it forms a bridge to the real world of work (Wydick 2012) within which people must be prepared to use and understand different forms of communication. Children in secondary schools are aged 16-19 years in Saudi Arabia. This is a crucial period during which young adults learn how to become active members in society (Eubanks and Eubanks 2002). It is worth to point out there is significantly high proportion of Saudis population which fall under the age of 25. Therefore, it is pertinent to mention here that in an emerging economy, education strategies are very important and schooling plays an important role in preparing students to enter the highly technical global economy successfully. Semenov (2005) notes that, in order to make the most of the advantages that ICT can provide, schools need to incorporate it into the curriculum and work with computer based programs. This study looks at the experiences of headmasters and teachers who sought to transform their teaching methods and school policies to incorporate ICT tools.

As early as 2001, Pelgrum claimed that, "teachers did not have sufficient knowledge and skills regarding ICT" (2001:173), highlighting the fact that teachers will be unable to teach the required skills if they themselves do not have the necessary level of training. Later, many more have argued that successful ICT teaching and its application depend on teachers training skills which would affect the quality of teaching (Pea 2000, Hakami et al 2013). Bringing ICT into the curriculum is not a simple process; the relationship between the teacher and the student and the headmaster and the teacher is crucial and can be a main cause of either success or failure of a student's education. Therefore, inadequate knowledge and teachers' skills regarding ICT are still significant issues in the Middle East developing nations which hamper the effective integration of ICT in Saudi educational institutions (World Economic Forum 2017).

1.3 Aims and Objectives

This study aims to explore the **"Challenges facing the integration of ICT in Saudi Arabian secondary schools from the teachers' and headmasters' perspective."**

1.4 Objectives

The study aims can be achieved via the following objectives:

- To understand the definition and development of ICT concepts.

- To capture the views about incorporation of ICT in education so to ascertain the contemporary state of ICT within secondary schools in Saudi Arabia.

- To understand the barriers that teachers and headmasters face when using ICT in the classroom.

- To determine the degree of satisfaction with the current level of ICT implementation in the classroom.

- To ascertain the contributing or hindering factors regarding the incorporation of ICT within secondary schools in Saudi Arabia.

1.5 Research Questions

In light of aims and objectives mentioned above, subsequent research questions are designed for this dissertation:

➢ What factors in general play a role in the effective application of ICT and particularly within the context of Al Madinah Secondary Schools?

➢ What challenges are encountered during ICT implementation in general and in Al Madinah secondary schools in particular?

1.6 Significance of the Study

As discussed above, there is room for improvement in the implementation of ICT within secondary schools in Saudi. Various factors impinge the incorporation of ICT in the classroom and, thus, it is essential to understand what factors could help bring ICT into the classroom. Scholars, including Almaghlouth (2008), Oyaid (2009) and Al- Harbi (2014), have discussed and worked on this issue for a number of years; however, most studies have largely ignored the personal experiences and concerns of the teachers and headmasters and the barriers and challenges that they face regarding the use and implementation of ICT in secondary schools. This study aims to fill this essential gap in the knowledge in this field. Gaining an insight into the world of teachers and headmasters is a way of identifying the barriers that are faced by the people on the frontline of education. Highlighting their experiences will be a significant way to present the challenges that Saudi secondary schools are facing today.

It is expected that the results will be particularly useful in that they will be able to provide a new understanding of the use of ICT in the classroom and discuss the obstacles that are faced by teachers and headmasters.

The data will provide a way to assess the extent of issues faced within the classroom and this may promote further study into the future use of ICT and the expected support needed from future policies and support systems.

1.7 Research Approach

The research was carried out in three distinct phases. The researcher first carried out a literature review to understand the history and development of information technology over the years in Saudi Arabia. The studies published to date on this subject were critically read and reviewed and guided the methods chosen and the interpretation of this study's results. The literature review provided the background to the traditional roles and responsibilities of teachers and headmasters in Saudi secondary schools. Finally, it also gave a clear indication of the barriers and challenges which schools are currently facing in the use and incorporation of ICT.

The second phase involved understanding the methodological challenges that are involved in the study; that is, the time, costs and the interview procedures that needed to be carried out in order to gather data and then analyse it. This phase also involved dealing with ethical considerations, data protection confidentiality and the questionnaire design. Transcriptions and translations of the interviews were also done as part of this phase.

The final phase included the analysis of the data collected in order to draw conclusions regarding the challenges and barriers that teachers and headmasters face and link them back to the objectives of the study. The data obtained from the teachers was analysed separately from the data obtained from the headmasters. This was done to make a clear distinction between their individual concerns and to ensure that the coding and data analysis was accurate and easy to follow.

1.8 Organisation of the Dissertation
The dissertation has six chapters:
Chapter 1: Introduction

The introductory chapter provides the background to the study, explaining the significance of the research and discussing the choice of data collection and analysis methods.

Chapter 2: Literature Review

This chapter provides a review of the literature. It outlines the understanding and development of the term ICT and looks at the challenges that exist with regard to the integration of ICT and the roles and responsibilities of teachers and headmasters in terms of incorporating ICT within the school system.

Chapter 3: Methodology

This chapter explains the choice of research methodology and provides an account of the study design, the approach and the strategy.

Chapter 4: Qualitative Data Analysis.

This chapter evaluates the data obtained from the interviews and presents the results pertaining to the perceptions and views of the teachers and headmasters.

Chapter 5: Discussion of the Qualitative Data.

This chapter discusses and analyses the main findings in relation to the objectives.

Chapter 6: Conclusion and Recommendations.

This chapter presents the conclusions based on the findings and puts forward a number of recommendations.

Chapter 2
Literature Review
2.1 Introduction

Information and communication technology, abbreviated as ICT, has become indispensable in almost all aspects of modern life. Over the last two decades, ICT has redefined the practices and procedures of virtually all activities and objectives within government and corporate circles. In addition, ICT has changed the mechanisms of interaction among people, leaving an impact on social setups. Education has also been subject to technological changes, despite resistance from various stakeholders.

Education institutions have become both the users as well as incubation centres for ICT, essentially turning such institutions into ICT centres. The use of ICT is reputed to increase any institution's operational and financial performance and education institutions have demonstrated an interest in tapping into the benefits they offer in teaching practice. However, as early as 2003 Markland observes that the adoption of ICT has not been flawless and the researchers suggest that there are still substantial issues around its adoption. This literature review identifies the current and potential challenges inherent in educational ICT. First, however, an overview is given of the actual and assumed benefits of ICT, thus highlighting the untapped benefits when ICT is not adopted.

The purpose of this section is to provide an overview of published literature with regard to ICT integration in educational institutions. The emphasis is on the evaluation of the challenges impeding ICT integration in education. The bias is towards the implications for ICT deployment for head teachers and teachers. The introduction contextualises ICT in education. The general concept of ICT is then explained and the hypothesised definitions tools. This section also describes some forms of ICT currently used in education. This is followed by an overview of the advantages ICT offers to educational institutions. The last section provides an overview of summarises the literature concerning ICT incorporation challenges from the educators' perspective. The conclusion wraps up the main content of the chapter and contextualises the research purpose.

2.2 Definitions of ICT

The widespread growth of technology has resulted in ICT use becoming broad and diverse, as have become its definitions. Kordha, Sevrani, and Gorica (2015) opt for an industry- and, even, sector-centric definition. For example, in the context of manufacturing, ICT is applied for information processing and communication or within electronic procedures to detect, quantify, and/or record or control a physical process or phenomenon including, but not limited to, transmission and display (Kordha, Sevrani, and Gorica 2015). According to UNESCO (2002), ICT is a combination of informatics technology with related technologies, especially those associated with communication. Bundesbank's (2004) states, that ICT encompasses technologies including the hardware, which comprises desktop and laptop computers, and peripherals. In addition, it is depicted by software and connections to the internet, with the intention being to fulfil information processing and communication obligations.

According to Aczel, Peake and Hardy (2008), educational ICT tools can be classified into three: input, output, and others. Inputs revolve around cameras, students' response systems, personal computers, application software, local computer interconnections, and the Internet. Outputs include projectors, displays and monitors, television sets, and interactive whiteboards. Others contain switchers, digital cameras, and recorders. This indicates that Bundesbank's (2004) definition is the best suited for this paper. Appropriate use of these technologies, as Aczel, Peake, and Hardy (2008) state, has the propensity of increasing learners' understanding and performance. It is argued that teacher-centric methodologies are less effective than student-led learning. Technologies provide the pedagogical frameworks and resources that students can independently choose depending on their specific demands. Some technologies can adjust to meet a student's levels.

The advent of newer and advanced technologies, such as web 2.0, has provided an avenue for local and geographically dispersed collaborations using a constructivist learning approach (Kang, Choi, and Chang, 2007). Livingstone (2012) contends that, through ICT, all learners are placed on the same platform, in that, with the appropriate hardware, software, and curriculum activities, even the disabled can access learning. The use of technology, for example, audio-visual computer presentations, makes teaching easier, especially teaching that revolves around difficult concepts. Technology as a teaching tool is also supported by current technological developments, such as mobile phones, to which learners are becoming addicted (Jones, 2014). Sites such as Facebook, Pinterest and Digg, among others, though having the propensity to distract them from learning, can promote their inclination towards spending time online and this can be exploited to make learning an enjoyable activity (DeAndrea et al. 2012). In addition, when the Internet is accessed, an instruction is not constrained to a time limit as the materials are available anytime and anywhere. In conclusion, as technology is future oriented, it provides for independent and interesting learning, the acquisition of learning skills and increased collaboration which, when complemented by the guidance of instructors, can tremendously increase the learning outcomes.

2.3 Challenges of Technology in Education

Saudi Arabia's Ministry of Education has viewed ICT as being integral in promoting the development of higher education. Before evaluating the general aspects that affect ICT integration, it would be prudent to identify a national characteristic. According to Ageel (2011), the Saudi culture has played a negative role in promoting ICT integration, not just in education. Ageel (2011) adds that teachers consider materials, for example those found on the internet, to be unfit for the country's population. This is based on the understanding that the religious demands surpass societal and economic needs and this interferes with the adoption of educational ICT. The following paragraphs discuss the barriers that generally affect ICT integration, including factors that are currently present in Saudi Arabia's educational sector and that may possibly remain in the future. This is especially as some is sourced from nations that have experimented with ICT for decades.

According to Stoilescu (2014), the practice of using ICT consistently in education is a sophisticated one. The opportunities ICT provide to promote learning and teaching are not immune to problems. This has induced educational researchers and practitioners to study the causative factors of these impediments and formulate mechanisms to which appropriate deployment of ICT in education could be anchored. The existing challenges have been categorised differently by different authors. According to Salehi and Salehi (2012), some researchers have categorised them into extrinsic and intrinsic barriers. According to Ertmer (1999) the initial challenges, such as access, time, training, support, and related resources, fall under the extrinsic barrier category. He argues that the second order barriers encompass beliefs, attitudes, resistance and practices.

Al-Alwani (2005) conducted a study on the incorporation of ICT in Saudi Arabia Science Education and found that there are extrinsic barriers created by the organisation as a whole rather than by individuals. Intrinsic barriers are those that are dependent on teachers, administrators and students among others. According to Salehi and Salehi (2012), other researchers have categorised the challenges into two levels: the teacher level and the school level. For example, Jones's (2004) classification categorises the teacher level as an individual barrier created through a lack of, or insufficient teacher confidence, resistance to change, and time constraints. The school level challenges are created through lack of, or insufficient, training and unavailable or inaccessible resources.

Balanskat, Blamire, and Kefala (2006) classify the challenges into micro, meso, and macro, with micro relating to the teacher's approach and attitude towards ICT. The meso challenges include a specific institution's context. Macro challenges are dependent on the wider educational policies and framework. Pelgrum (2001) divides the challenges into the material and non-material challenges. The material element encompasses deficiencies such as insufficient resources, including computer hardware and software. The non-material includes insufficiency in terms of knowledge and skills pertaining to the deployment of ICT, insufficient time, and inability to deploy ICT.

2.4 First Order Barriers

According to Ertmer (1999), the first order barriers challenges are actualised when technological resources are not provided, or are not sufficient. These types of barriers are easy to identify and quantify and relatively easier to mitigate, especially when money is allocated. In reality, most of the support efforts in integration processes are focused on these challenges. This is because there is usually an underlying assumption that integration inherently commences smoothly after all resources are assigned. This informs another assumption that the implementation process must begin after all the necessary resources have been put in place.

Having to address the various first order barriers concurrently can frustrate teachers who are forced to overcome every challenge before the commencement of integration. In Ertmer's (1999) study, when asked the major barriers affecting integration, the teacher respondents recited a myriad of problems, terming every barrier as being paramount. Jimoyiannis and Atsoglou (2012) add that this laundry list demonstrates teachers' frustrations mostly at the beginning of integration, with most of the barriers being perceived as being overwhelming. These types of responses may indicate that some second order challenges are also present. In many ways, the need to introduce technology exposes the need for teachers to roll back to first-year-teacher-mode, needing ways to manage a classroom, different role definitions, adapted lesson development and different ways to discipline.

2.5 Second Order Barriers

As implied above, second order barriers are those that impede fundamental change as integration demands. These barriers are based on long-term teachers' beliefs about learning and teaching and may not be noticeable or obvious to others or the teachers themselves. However, research, as Abrahamson and Brady (2014) argue, suggests that the second order barriers are still prevalent among today's teachers despite the increase in awareness of technology benefits. In addition, these barriers are assumed to induce more challenges that the first order barriers. This may be attributed to their intangibility and invisibility

especially when compared to the first order barriers, in addition to them being more deeply ingrained and personal. Lepicnik-Vodopivec and Samec (2014) have also stated that the traditional perceptions regarding how knowledge, teaching, and learning should appear are major determinants of failed technology integration in education.

However, not all technology use demands a change in the second order paradigm, especially those that are designed to automate an existing practice (Ertmer 1999). Still, technological deployment can induce a radical change in a teacher's style of instruction and their vision of how the classroom life should appear. This new vision changes an instructor's function in some basic ways, diluting the significance of 'chalk and talk', raising the sensitivity towards identifying and addressing student's personal problems and successes, and transforming the class setup. In addition, it may call for a change in evaluation mechanisms, how relationships between teachers are governed, and other numerous particulars that may emerge in daily learning processes, a notion supported by Robinson (2005).

2.6 Resistance to Change

According to Finley and Hartman (2004), resistance to technology is manifested in many forms. Technological advancements in education are considered as being innovations. According to Prestridge (2012), four major determinants shape how individuals or groups identify, evaluate, and accept, resist or totally reject an innovation. These are: the innovation itself, the procedures, its creation, promotion, and adoption, and the attributes of the individuals of groups mandated to execute the required functions. In addition, the nature of the social system is also a contributor. Technology in education requires substantial changes in the ideal and traditional operating procedures in an education institution. Teachers, students, locations, timing and allocation, methods and subjects are highly affected. Some ICTs require acceptance by an entire institution and give little, if any, freedom of individual choice. For example, the implementation of flexible or modular scheduling requires inclusion and the commitment of every member of staff. Other innovations require acceptance of rejection of an independent group, an example being a televised course. From the teacher's point of view, their autonomy is threatened (Hennessy, Ruthven, and Brindley 2005).

According to Underwood and Dillon (2011), teachers' resistance to change is contingent on the type of ICT being employed and the teachers' personalities and attributes. Any spontaneous or formidable change or impact on the traditional role of an instructor and student is inherently expected to induce some manner of resistance. Many administrators and teachers alike contend that adoption of technological tools contributes in mechanising the instructional processes. This, as Johnson, Adams, and Cummins (2012) hypothesise, makes teaching and learning lose humanity, thereby resulting in failure to attest to and address the feedback between teachers and students. This can contribute the notion that teachers are confident in their own instruction methods, thus pre-empting the significance of educational technologies.

Mathipa and Mukhari (2014) state that the degree of complexity of the technologies and the changes they induce, especially those employing equipment, has a pronounced impact on the acceptance, resistance, and rejection of ICT. Prestridge (2012) adds that if the equipment is not technically simple and reliable to operate as well as obtainable, resistance is inherently anticipated. This is specifically so for technologies that have not been tested in the past, despite the excitement that they may induce. Rice (2007) states that ignorance, stemming from unwillingness to understand the technologies, can result in cyclic challenges in its adoption. In some contexts, some causes of the challenges can be psychological, for example, when the ICT does not match with the personality of the instructors. In others, interpersonal relationships may cause the resistance, especially when colleagues have no interest in utilising the technologies. Thus, Rice (2007) suggests that to improve psychology of teachers and to enable them to perceive ICT as a contributing factor aimed at improving their performance, teachers should be frequently provided training for ICT courses and these course should be designed by experts in a manner which should match with the personality of teachers in order to reduce teachers' resistance to change towards use of ICT in schools.

According to Cuban, Kirkpatrick, and Peck (2001), resistance as an impediment to ICT integration is not only attributed to the educator's personal attitudes. This is because Cuban, Kirkpatrick, and Peck's (2001) study found out that the school, as an entity, may not respond appropriately to the kinds of change necessitated by successful ICT integration. According to Cuban, Kirkpatrick, and Peck (2001), the cellular organisation of an institution, indicated by defined departmental boundaries and strict time schedules reduces the cross-fertilisation of concepts and ideas within the departments involved. As their study revealed, only in a few classes where educators planned together, shared ideas, or observed colleagues in practice were technologies used.

2.7 No Perception of Benefits

One major determinant of teachers' attitudes towards technology integration is comprehending how it can benefit their practice and other participants, especially their students/pupils. Snoeyink and Ertmer (2001) advocate the need for teachers to envision the purpose of technology in their teaching, which could be enhanced through customised training that specifically communicates how technology can assist in individual teacher situations. Simply watching videos of other teachers using technologies is not sufficient to motivate them and teach them how they can appropriately use it for their benefit at their specific workstations. Even Cox et al (1999) contend that if teachers see no relevance in questioning or changing their own practice, their enthusiasm for the use of ICT would be inherently imperfect. Thus, the perceived usefulness of computers in educational instruction is a paramount factor for teachers, and should thus be incorporated in any ICT training exercise to ensure that the teachers and other participants are convinced of the benefits of ICT and its myriad number of applications.

Yuen and Ma (2002) argue that, though the perceived ease of use highly determines ICT acceptance, the perceived importance is more pronounced. The authors add that a computer's potential can only be realised when applied to a specific context and that, without an understanding of how computers can be used in teaching practice, the instructors may not perceive ICT tools as being at all essential. Yuen and Ma (2002) cite Mumtaz (2000), who found that some teachers remained unconvinced of the potential of computers even after they were handed palmtop computers. Uluyol and Sahin (2016) advocate the need for training to ensure that educators are fully aware of the wide range of uses and known potential benefits of ICT. Uluyol and Sahin (2016) also states that teachers' perception of benefits regarding use of ICT should be improved by bringing in experts who can illustrate how use of ICT can improve quality of lessons in classroom and stresses the need to provide continuous training as a mean to handle objections of teachers regarding use of ICT and to improve their perceptions of benefits of use of ICT.

2.8 Time Constraints

According to Fiedler and Valjataga (2010), a problem that exists for educators in many situations of their work is insufficient time available to complete important tasks. The teaching of ICT is inherently highly subject to being dropped because of this. Fabry and Higgs (1997) contend that assimilating new skills, regardless of the profession, demands time, and teachers, who have almost exhaustively spent their day teaching and attending meetings with staff and parents, have little time left to commit to the acquisition of new skills. In addition, technology investments are high, as teachers have to experiment with the technologies, interact with others, share experiences and participate in technology related-activities and programs as well as do other tasks. As Rojko, Debevc, and Hercog (2009) illustrate, teachers are usually concerned with the lack of time for technology initiatives and think that more time is needed even for computer basics in terms of planning the integration approaches and the actual use of the technology. Preston, Cox, and Cox (2000) report that teachers view the workload associated with technology as being herculean, as they have to prepare materials for students who have diverse abilities and dig even deeper into the exploration of the materials. Thus, Preston, Cox, and Cox (2000) contends that teachers should use ICT to design workload in a manner which should address the diverse

needs of students as use of technology offers the provision to design courses for students in a flexible manner which save teachers' time and use of ICT should be viewed as a facilitating factor by teachers to reduce the workload of teachers.

Cuban et al. (2001) support this notion, quoting a study carried out in American high schools which found that there was insufficient time for computer and other technological devices to be incorporated into the classrooms. The teachers indicated that they would need time to prepare multimedia materials, preview websites and be trained. This observation was not only made by teachers who made insignificant use of ICT; rather, it prevailed even for teachers who pursued optimum use of ICT, as they had to invest more time to ensure a successful integration. This resulted in exhaustion. The authors add that the dedicated computer-using educators were eventually alienated by the teaching profession, or were relocated to other teaching positions or technical vocations that allowed them more time. Such teacher turnover affects the consistent introduction and implementation of technological innovations in instruction practice (Cuban et al 2001).

2.9 Technical Problems

According to Wahlstedt, Pekkola, and Niemela (2008), technical challenges are a common factor influencing adoption and ICT integration. Ploj and Psunder (2010) categorise technical dimensions into two: the fear of failure, and lack of or insufficient technical support. The first implies fear of equipment failure during a lesson, which can cause damages. In fact, Bradley and Russell (1997) highlight the link between the barriers of fear of damaging equipment and teacher confidence. The authors note that a main source of computer anxiety is teachers concerned with damaging information or hardware components. This anxiety can prevent such educators from attempting to use the computer. If technical glitches occur often, the teachers' take-up of ICT may be affected. The barrier or lack of technical support is manifested when actual breakdowns occur through the extent to which disruptions spread. If there is insufficient support, there is a deficiency in preventative technical maintenance. The longer it takes for glitches and crashes to be fixed and replacements to be found, the more disappointed the teachers and students will be with the use of technologies.

2.10 Lack of Teacher Competence

Raob, Al-Oshaibat, and Ong (2012) state that a critical element that is related to teacher confidence is their competence. Apparently, despite the massive research and literature advocating training, there has been inadequate or inappropriate training, which results in under-confident and unprepared teachers who can optimally use ICT in the classroom and beyond. This lack of competence and inadequate or non-existent training is a major challenge in ICT adoption. Apparently, the main causative factors of teacher incompetence are four. The first is lack of time for training, resulting in teachers spending their own time to train. This propagates slow learning and training benefits. It therefore seems that there is insufficient time to research, receive, and practice what is learned using technologies across the curriculum (Raob, Al-Oshaibat, and Ong 2012).

Much earlier, Veen (1993) found that the teachers did not actively exploit the overwhelming educational benefits offered by information technology. Even latter, according to Enochsson and Rizza (2009), there is an apparent deficiency in pedagogical training. The importance of managing students' learning, both after and during lessons, rather than instilling them with skills on ICT equipment is elevated. Teachers have not been trained on how to blend ICT with their professional life, and thus do not question why or what they need to know, especially in the context of the requirements of pedagogy and ICT. Rizza (2009) recommends in this regard that schools should strive hard to provide training of ICT to both teachers and students so both are satisfied as to why they need ICT training and how ICT use will facilitate them in classroom.

In addition to lack of pedagogical training teachers' age is yet another significant issue which prevents the useful integration of ICT in schools, this is because a good majority of teachers have no prior exposure to ICT skills as confirmed by Lee (1997). Preston et al. (2000) found that teachers had inadequate skills, especially skills relating to technical challenges and comprehending the foundations and workings of technology. This led him to recommend beginning with basic computer operation training before pedagogical ICT training.

According to Lotriet, Matthee, and Alexander (2010), there is an apparent lack of ICT focus during formative teacher training. There is an evident lack of technological knowhow by teachers who had no opportunity as student teachers to use ICT. This affects their understanding of ICT once they are qualified and practising. The lack of exposure to ICT in a typical curriculum as students makes it difficult for teachers to exercise their computer skills. Fokides (2016) adds the lack of effective ICT pedagogical exposure and training in teacher training schools. The result is teachers who have good ICT skills for personal use but have no ability to transfer the skills to the students using these ICT tools.

2.11 Teachers' and Headmasters' roles and responsibilities in ICT

According to Thokchom (2013) teachers are a vital force for change and transformation in schools since they are the ones that can drive and promote the use of ICT. However, Watson (2001) argues that the utilisation of technology is quite vital within the context of developing countries where technology can often be seen as "an imposed and novel outsider" (2001:251). There are numerous reasons why countries such as Saudi Arabia may face some serious obstacles when it comes to implementing ICT into the classrooms. This research is designed to ascertain some of the obstacles which exist when using ICT in secondary schools in Saudi Arabia. As roles and responsibilities of Headmasters and teachers are well designed but question remains how teachers and Headmasters work together to incorporate use of ICT in secondary schools in Saudi Arabia.

Discussion of the different functions of the Headmasters and teachers in promoting ICT in schools raises a number of essential theoretical and conceptual questions. The Headmasters are the leaders in charge of guiding the teachers and the students in the uptake of ICT within the school, but their success depends on the effectiveness of their leadership (Aabed 2006). There is clearly a need for the Headmaster to participate by fulfilling certain roles and obligations, such as, by creating an atmosphere where students are encouraged to use ICT, being able to watch and measure the use of ICT appropriately and being able to guide the staff on how to use the equipment.

2.12 Resources Access and Organisation

Crawford (2009) contends that evidence of appropriate and effective ICT integration is found in institutions that possess high quality resources. Those that lack the necessary hardware, software and competencies can seriously limit the extent to which the teaching practice is informed by ICT. Gunga and Ricketts (2007) argue that teachers' access to ICT is a major predicament which can be understood by evaluating the barriers independently. This is because the challenge may be based on more than one factor. One of the main challenges is a lack of or insufficient hardware. This is perceived as being a major problem, mainly revolving around there being an insufficient number of computers and digital screens for the teachers and students to use. Teachers who tend to use the technology most are the major complainants about the lack of resources. This suggests that, in addition to being a challenge to teachers' first use of ICT, it can also be a barrier to additional ICT development in creative and innovative ways.

Another challenge is poor organisation of resources. According to Penuel (2006), education institutions with low student to computer ratios still complain about insufficient computers. This implies that school managers and the teachers are simply not optimising the use of the available equipment. This suggests that, in some incidences, it is the organisation of the available resources, rather than their lack, that creates a challenge for ICT integration for teachers. The number of computers alone does not guarantee adequate access. In addition, as stated by Bingimlas (2009), the quality of hardware used may be a contributing factor towards inappropriate ICT employment. Kafyulilo and Keengwe (2014) cite a study by British Educational Suppliers Association (BESA, 2002), which found out that the average school in the United Kingdom reported that up to a third of its computers were not effective in teaching the curriculum. Bingimlas (2009) adds that unreliable updating of resources, with the hardware becoming obsolete quickly, escalates the problem.

2.13 Public Examinations Threats

According to Somekh (2002), there is some evidence that suggests that instructors avoid using technological devices when their students are preparing for or sitting their national/public examinations. For example, Somekh (2002) found that teachers felt that time was of the essence in the preparation for examination of Stage 4 English learners (who were between 14 and 16 years old) and thus there was no time that could be spared for ICT. Some teachers thought that there should have been a more substantial introduction and use of ICT before Stage 4. Apparently, in addition to examinations causing time constraints which lead to the lack of use of ICT, there also an understanding that ICT is not to be used during examinations. This implies to the practitioners that ICT is not important in examination syllabuses. Jones (2004) adds that some exam protocols do not allow for coursework to be generated through ICT platforms.

2.14 Age Differences

In Jones's (2004) study, a small number of study participants cited age as a determining factor in the uptake of information technologies in education. The justification is that older teachers have had little exposure to technologies, which, in the context of their advanced age, makes them less likely to employ it. A European Commission (2003) study provides an important insight. The study, which focused on evaluating the use of internet and computers, concluded that the percentage of teachers who used computers decreased as their age increased. However, the percentages reduced over time. Bradley and Russell (1997) argue that initially, older teachers exhibit computer anxiety as their ages increase. However, continual exposure familiarised them with technologies, thereby pre-empting computer anxiety. However, this was in the United Kingdom, where the use of technology is widespread. The same could be assumed for teachers in regions and countries that have not been substantially exposed to technologies.

2.15 Gender Differences

According to Yuen and Ma (2002), there is little evidence that supports the existence of a correlation between a teacher's gender and their understanding and use of technology in education institutions. As indicated by Cavas et al. (2009), 77% of male teachers in a study used computers offline, which was slightly higher than the females' 66%. These figures have quoted in the European context but the gender usage of ICT is much wider in the Arab world. The report further indicates that the gap is even wider when considering the use of the Internet, where 56% of male teachers used the Internet in comparison with 38% of the female teachers. Earlier, Bradley and Russell (1997) had found that there was a relationship between gender and level of technology anxiety, with females having more anxiety than males. For example, in primary schools, in which female teachers outnumber male teachers substantially, the impact of gender difference as an impediment towards technology integration is elevated.

Apparently, the barriers to ICT integration differ from one country or region to another. In New Zealand, Billowes (2001) found that insufficient time for professional development and training in old and new technologies was a major impediment. Other impediments included ICT not being seen to warrant priority, contentment with the traditional learning methodologies and insufficient confidence to include ICT in the curriculum. Jones (2004) conducted a study to identify the barriers in the United Kingdom and noticed that insufficient access to computers and other tools and insufficient teacher confidence were major contributors to failed integration. Some significant determinants related to teachers included lack of awareness of ICT benefits and resistance to change. Chapman, Masters, and Pedulla (2010), in their study of the challenges impeding technology adoption in the United States, found that the most pronounced challenge of ICT use by teachers in high schools was the insufficient number of resources per student. These included computers and time. Teachers in big institutions attributed the sluggish integration to lack of computers, while those that have a bigger percentage of minorities cited outdated and unreliable computers.

Almost limitless resources and opportunities for educational information can lead to the dangers of overload if practitioners and teachers do not have adequate skills to filter relevant information. In addition, some tutors may be unable to conceive an appropriate organising principle. This indicates that lack of teachers' professional development, preparedness, and understanding of technology demands is a contributor to the inability to integrate ICT in their practice. Getenet, Beswick and Callingham (2016) adds that often, when institutions mandate the adoption of a specific technology, teachers are equipped with both tools and skills to integrate the newly found ICT capabilities. The results are unused or underutilised investments, or use that mimics the traditional processes rather than optimising on ICT innovation and creativity benefits.

2.16 Gap in Literature

This chapter has provided a review of the literature; it draws upon theoretical frameworks and presents a critical reading of the challenges of ICT in secondary schools. The purpose of the investigation is to explore these challenges in the context of secondary schools in Saudi Arabia. The effective use of ICT within secondary schools remains a major issue in Saudi Arabia. Although much of the literature addresses issues on the values and importance of implementing ICT within the classroom, it seems that there is little discussion on where the challenges actually are and the voices of the teachers and Headmasters have somewhat been forgotten. Hence, this research is intended at addressing this gap in the academic literature.

2.17 Conclusion

The literature review indicates that despite the actual and perceived benefits of ICT integration in education, there are mainstream challenges that can impede an institution's ability to optimise on such benefits. The teaching fraternity is associated with promoting appropriate integration in

teaching and learning practice but is subject to various general and practitioner-specific functions. It appears that, insufficient resources and support, pedagogical and skill incompetence and personal and institutional resistance to change are the most pronounced barriers. The review has covered the available literature published in regions where technology has been used. Therefore, this literature review has provided some themes pertaining to possible challenges impeding ICT integration in Saudi Arabia and specifically in the Al-Medina secondary schools. Thus, the rest of the research paper details the processes used in the study and the findings relating to the challenges of ICT integration in Saudi schools. To better inform practice, the perspectives of the Headmasters and the teachers are taken into account.

Chapter 3

Research Methodology

This chapter presents the research methodology adopted in the study, including the study design, the approach and the research strategy. According to Allan and Randy (2005), the success of research methodology is evaluated with the help of two principles, firstly, it should facilitate the researcher in achieving the objectives of research and secondly, future researchers should be able to successfully reproduce researches using that methodology. Thus, research methodology which can achieve these two principles are considered to be instrumental in constructing a successful research paradigm as stated by O'Leary (2004). The preceding chapter gave a review of the literature on the subject. This study uses a qualitative approach to gain a more in-depth view of the perceptions and concerns of teachers and Headmasters. Basing the research on interviews carried out with teachers and Headmasters helped ensure a more rounded assessment of the issue and a more accurate assessment of the challenges regarding incorporation of ICT in secondary schools in Saudi Arabia.

This study assesses the staff's experience with ICT integration within schools. This will determine the challenges and specific barriers that they face with regard to ICT implementation. The next stage would be to explore the students' concerns and apprehensions and also to look at the policies the Ministry of Education could issue to facilitate ICT integration in schools; these aspects, however, are beyond the scope of this study.

The first section discusses the research methodology, philosophy of the research and the data and analysis collection method used in this study. An overview of the sampling profile and the interview process is also provided. The next section discusses the data analysis procedure and why it is deemed to be the most suitable method to use to address the research questions. The final section discusses the role of the researcher in the study, the ethical considerations and the study's limitations.

3.1 Research Philosophies and Approach

According to Johnson et al (2006), the research philosophy facilitates the researcher in deriving the knowledge by influencing the course of action which researcher adopts in performing the research. Moreover, Saunders et al (2012) states that research philosophy defines how the researcher perceives the world and resulting knowledge which is derived as a result of conducting such research. Hence, to achieve the stated objectives of this study, this research utilises a qualitative research approach using an interpretive research philosophy which according to Bryman (2016) is instrumental in exploring the phenomenon related to the social world with the help of extensive collaborations to obtain the rich interpretations about the research questions which are designed to be explored by the researcher.

According to Johnson and Christensen (2004), within the academic researches, the utilisation of qualitative research approach has significantly increased because of the rich insight which qualitative research approach provides regarding the conduct of participants and in exploring the research phenomenon by capturing the diverse point of views of participants. According to Neuman (2000), qualitative research approach by providing diverse viewpoints helps the researchers to construct a flexible research design and this also assists the researchers in developing a comprehensive understanding about the human conduct. By contrast, quantitative research approaches are aimed at simplifying the research questions by using statistical inferences and this results in answering the research questions based on quantitative methods of research (Creswell 2003).

The study aims to understand and explore the lived reality of the teachers and Headmasters in Saudi secondary schools and relate this reality to the wider context in terms of how it impacts on the use of ICT. There are a number of approaches that can be used for this type of research including the quantitative, qualitative, constructivist, postmodernist, poststructuralist and mixed methods approach (Greenwood and Levin 2001). The approach which is chosen should be based on the "situation and purpose" (Hammersley 1996:164) of the research. Given the edifying nature of this educational study, a qualitative approach was deemed to be the best fit. This approach will enable the researcher to depict and investigate "intentions, motives, meanings, situations" (Minichiello et al. 2008:5) enabling the collection of a detailed set of data.

Interpretivism allows the interpretation of actions through perceptions and views concerning the questions asked, in this case, the views of the Headmasters and teachers. The research approach is exploratory in nature; this study aims to look at the barriers and challenges of ICT implementation while also exploring the causes and solutions. A qualitative approach helps obtain a "valuable insight" into the lives of the participants. This allows the researcher to capture the complexity of the experiences that the participants go through.

3.2 Data Collection Method

In light of the fact that the teachers and Headmasters have a great impact on the success of the integration of ICT in the Saudi education system, a qualitative in-depth interview was deemed to be the most appropriate method for data collection. For the purpose of this study, a single data collection method has been chosen. The study will investigate a phenomenon at a particular time and, thus, this makes it a cross-sectional study. The in-depth interview aims to pick out dominant themes from what the participants say. These enable a deeper and more meaningful set of data to be collected on the issue being explored. A qualitative research approach tends to focus on a specific small set of participants; this is done deliberately in order to gain a limited but significant set of data (Reid 1996). The aim is, thus, to use the words and phrases spoken by the participants themselves to understand and recognise key meanings. The data is collected in the participant's natural setting and the researcher becomes the instrument for data collection. In this study, the setting is a school, which means that it can be replicated by other researchers in the future.

It is important for this research to evaluate the issues regarding application of ICT from the viewpoints of the teachers and Headmasters. For this reason, the research enquiries begin with an exploration of what they understand by the term ICT and what it means to them. (See Chapter 2 for definitions of ICT). To enable a diverse and real set of data, three teachers and one Headmaster was interviewed per school. This is to gain a clear insight into the current situation. The teachers have an impact on the level of utilisation of ICT in the classroom. They are involved in the direct use and teaching of these resources. The Headmasters have strong links with the Ministry of Education and thus have an impact on the quality and quantity of equipment provided to the schools and policies regarding the utilisation of ICT in their schools. This is the reason why the researcher chose to interview Headmasters as well as teachers. The Headmasters and teachers are the key drivers of success and failure of ICT integration in schools and interviews with helped provide a clear picture of the challenges linked to ICT integration and how to make better use of ICT in schools.

3.3 Sampling Profile

As mentioned above, teachers and Headmasters were interviewed for this study. The study focuses on four schools and interviews were held with three teachers and one Headmaster per school, meaning that sixteen interviews were held in total. The Headmasters were selected in accordance with the guidance received from the Department of Education. The key factors taken into consideration when choosing the schools were that the school was a secondary school and the school's location. Al Medina schools are divided into four key learning areas: the north, east, south and centre of the city of Al Medina. Thus one school per "education office" was selected. This ensured that ICT is available and being used in the schools chosen. The Headmasters from each school were then asked to choose the teachers. The research sample is known as the "entire group of people, events or things of interest that the researcher wishes to investigate" (Sekaran and Bougie 2010:262). Purposive sampling was used to select the four schools. This allowed the researcher to use their judgement on what will be most beneficial for the study.

3.4 In-depth Interviews

Patton (2002) states that conducting in-depth interviews in a research process facilitates the researcher to explore the research process by probing in pertinent questions such as what, why and in which ways personal perceptions of participants are obtained in a research. It is worth noting here that, during the interview process the researcher reflected upon the position of the researcher and how that may shape the results. Lichtman (2006) states that interviews are a very useful tool of data collection which enable the researchers to obtain ideas, outlooks and individual understandings of the participants. Opie (2004) also justifies use of interviews in a research process by advocating that utilisation of interviews encourage participants to nurture their own notions, outlooks and perceptions. Furthermore, use of interviews involve extensive and effective communication skills on part of researcher to engage with participants in most interactive manner in order to obtain diverse viewpoints so to accomplish the objectives of a research (Opie 2004).

Bryman and Bell (2011) states that in addition to in-depth interviews, use of semi-structured interviews equally helps the researcher as researcher may alter the order of questions by probing questions on the basis of answers which respondents provide. Thus, interview questions are used as a guideline to capture maximum views and information about the valid research questions so to arrive at rich picture to accomplish the objectives of a research (Bryman and Bell 2011). The questions prepared for the interviews carried out for this study were based on the findings of the literature review. The interviews lasted around 30 minutes and, during each interview, the researcher attempted to gain a thorough knowledge of "the informant's perceptions and constructions of reality" (Minichiello et al. 2008:51). In this study, this is beneficial as it allowed the researcher to explore and understand the interviewee.

3.5 Data Analysis Procedures

Data analysis methods in a research process provides the guidelines to researchers how to interpret the data obtained so to validate the research answers and to fulfil the objectives of a research. Yin (2014) in this regard suggests that data analysis provides a rich insight to researcher to obtain significant explanations which are deemed relevant to conduct a successful research by utilising the recurring philosophies, designs and subjects from the selected data. Yin (2014) further states that in a qualitative research, inductive approach is best suited to the researcher as it helps the researcher to draw the recurrent themes from selected interpretations which are used to validate the research findings. Braun and Clarke (2006) states that these recurrent themes are significant in the evaluation of data as recurrent themes are grouped into similar categories by providing relevant code which simplify the evaluation of data and strengthens the credibility of research design. This study takes an inductive approach; this can be understood as observation, results and theory (Bryman & Bell, 2015).

The data for this research is analysed by looking into the recurrent themes which emerged as a result of interviews. According to Guest et al (2012), conducting data analysis by using recurrent themes facilitate the researcher to obtain various viewpoints and eventually in obtaining rich picture about the research problem which is being investigated. Another advantage of using themes to analyse data is that it facilitates the researcher to arrange the large amount of data into relevant categories which simplify the data analysis (Pawson et al, 2005). The analysis of data via relevant themes also facilitates the researcher to provide relevant codes to each research theme and interpretation of such research themes gets simplified in the final analysis of data. This method of data analysis has its disadvantages too. Morse (2002) in this regard contends that since research themes are significantly viewpoints of participants and since each participant would provide his/her own view which may have different connotations and this hampers the issue of reliability and validity in a research process. As there is no comprehensive way to analyse up to which extent research themes are valid in answering the research questions and whether research themes have provided credible meaning to the research questions which are being examined (Morse, 2002).

Credibility in this study was ensured by meeting participants before the interview and developing a rapport with them. This means they were fully aware of the aims of the study and understood them clearly. With a relatively small sample of sixteen people, this did not seem to be too much of a problem.

The thematic content analysis method allows for a sound and combined narrative outcome. Since the results are in the form of stories or interview accounts the key themes first need to be identified and then discussed. This systematic approach means that the specific context can be found which provides a structured approach to collate data and assists the researcher to quickly recognise both apparent and underlying questions in the research themes (Guest et al 2012). Moreover, by coding

significant research concepts into relevant themes, significant meaning of themes can be constructed and based on the relevance additional themes can be constructed which enable the researcher to construct a valid and reliable research design (Guest et al, 2012). Another way to enhance the validity and reliability of interviews during data analysis process is by transcribing, exploring and reading the interviews repeatedly till researcher is sure about the significant research themes and this provides a comprehensive way to capture and analyse the qualitative data in valid, credible and efficient manner (Parker, 1992).

3.6 Role of researcher

The role of the researcher is essential in research. The researcher works equally with the participants to understand and make sense of what they are saying. Creswell & Clark (2007) suggests that, in qualitative research, the researcher often needs to reflect upon their own sensitivities. In order to gain an insight into the lives and lived realities of the participants the researcher must focus on their situations; however, personal values and assumptions can often be missed and, thus, recognising them at the outset can help. The identity of the researcher can have a huge impact on the outcome of the research. It can be assumed that the fact that the researcher is a Saudi national will enable easier access and smoother conversations with the participants. The researcher's understanding of the language, culture and values will mean that people will be more sympathetic and comfortable when answering even the more difficult questions.

3.7 Ethical Considerations

Qualitative research requires the researcher to be empathetic and a good listener. A number of ethical principles come with this: such as the participants' ability to make a free choice, privacy and confidentiality and lack of deception. There is also the concern that the researcher can interpret the findings wrongly or that contradictions may come up (Smythe and Murray 2000).

Consideration for the safety and care of the participants is prioritised over the objectives of the research. Ethical considerations are concerned with recognising the participants' choice and will. Ensuring that the respondents have all the necessary information and are voluntarily participating is essential (Kimmel 2007). Questions are to be devised in a way that is easy to understand and are inoffensive. The participants receive an information sheet and a consent form. The research write-up has been appropriately referenced using the Harvard referencing style. The researcher sought to ensure that the participants were not harmed in any way; the dignity and respect of the participant is very important and all information that is private was protected and confidentiality maintained throughout the research process. Anonymity was guaranteed to all participants. In this instance, recordings, notes and transcriptions along with all the personal information and details of the participants were securely stored. Sometimes, even with the use of pseudonyms, individuals can be found or identified. For the purpose of this study any information that could be used to identify a participant was removed.

Role conflict may occur, where the purpose of the research may be obvious at the onset of the research. To ensure that all the participants are well informed on the aims of the research all were given information letter and invited to an introductory meeting. This helped clarify the purpose and the aims of the study. Participants were informed that they were free to withdraw from this study at any time if they felt uncomfortable with any aspect of this study.

3.8 Limitations of the Study

This study has obvious limitations. Educational research is a vast area, and this is an amazing chance to combine experiences through the collection of data. However, the study is limited to the views and perspectives of teachers and Headmasters and does not encompass the experiences of students and how they interact with the ICT equipment and the teachers. This is deliberate omission for two reasons: firstly, there

were limits on the researcher's time and budget; and, secondly, the scope of the study remains the way teachers and Headmasters roles and responsibilities are impacting the incorporation of ICT in the classroom. Thus, research on how others are also influencing incorporation of ICT can be a good starting point for future research.

3.9 Conclusion

This chapter provides an account of the methodology used in this study. It justifies the grounds on which the approach was chosen; giving a clear direction to reach the objectives of the study. The chapter addresses the main issues that arise within the ethnographic research process and explores the role of the researcher in the study. This section has reflected the interpretive philosophy and identifies the development of knowledge as being socially constructed. The study uses in-depth interviews to provide an inclusive understanding of the present situation of incorporation of ICT within the secondary school system in Saudi Arabia.

Chapter 4

Qualitative Data and Analysis

4.1 Introduction

This chapter analyses the data obtained from the interviews and presents the perceptions and views of the teachers and headmasters. This chapter shows the results of the qualitative data, which were collected from sixteen participants (three teachers and one headmaster per school in different four schools); thus, a total of sixteen interviews were conducted to analyse the challenges facing the incorporation of ICT within secondary schools in Saudi Arabia. This section is based on the themes extracted from the literature review, which help show the current state of ICT in secondary schools in Saudi; these themes were also used to formulate the interview questions. The themes consist of individual knowledge and belief of teachers regarding ICT, use of current ICT resources by teachers, challenges that they face and support the teachers believe they need for effective integration of ICT in schools. These

themes are then compared with the interview findings of headmasters to evaluate the headmasters' views and beliefs about ICT, policies that headmasters have adopted for ICT implementation and relevant challenges and support needed for the effective integration of ICT in their schools. This chapter first presents the results of the interviews conducted with twelve teachers within secondary schools and then presents the results of the interviews conducted with four headmasters.

4.2 Results of interviews (teachers)

A total of twelve interviews were conducted with teachers, and twelve questions were asked to determine their knowledge, belief and usage of ICT by teachers and what support teachers require in schools to ensure a smooth integration of ICT; teachers were also asked what challenges they face that hamper the smooth integration of ICT. The results of each interview question are presented next.

4.2.1 Understanding the term ICT

When asked to define their understanding of the term ICT, most teacher participants showed reasonable knowledge of what ICT is about. Most defined ICT as the integration of computer and digital learning in their teaching process to improve the knowledge of both teachers and students and the quality of the teaching experience, saving time and considerable effort of the teachers, senior management, administrative staff and students. Teachers 1, 5, 9 and 11 all agreed on the following:

"ICT is about providing access to information via computers and modern technology, which makes students more competitive and enables teachers to improve the quality of teaching by providing computerised courses to students and saves the time and energy of teachers and students by having ICT tools against relying heavily on traditional teaching tools."

Thus, part of ICT was seen as ensuring that schools have required access to ICT sources, such as computers, information and modern technology aimed at improving teaching process of teachers and learning process of students.

4.2.2 Main teaching subjects

When asked about their main teaching subjects, most respondents stated maths, physics, biology, chemistry, languages, geography and religious studies. Out of the twelve teachers, ten pointed to the above-listed subjects as one of theirs. Only two teachers pointed to ICT as their teaching subject. For instance, three teachers stated the following:

"Majority of teaching subjects are maths, science-based and religious-based courses; however, my areas of expertise are in computer sciences, and considering the fact that there are only three computer science teachers in this school, this is also a challenge for the school to provide quality computer science education to students by increasing the number of existing computer science staff in the school."

4.2.3 Highest qualifications

When asked about their highest qualifications, eight teachers stated they had a bachelor's degree in their respective subjects, and four teachers stated that they had a master's degrees along with their teaching diplomas. Overall, the required level of qualifications was satisfactory. For instance, Teacher 1 commented:

"I have obtained a MSc in biology from a renowned university, and I have also obtained the teaching diploma so as to acquire relevant teaching skills, and I believe that combination of my MSc degree and teaching diploma is benefiting me highly in my current role as I have combined my technical qualification (MSc) with my skill-based qualification (diploma), and I can readily address the complex and ever-changing teaching needs keeping in view the set of qualifications I have."

4.2.4 Reasons for using ICT in teaching

When asked about why they use ICT in teaching, most teachers stated that using ICT in teaching improves the quality of teaching because using ICT-based tools in class creates interactive and more stimulating learning activities for students. Teachers 4 and 6 reported:

"Use of ICT in teaching motivates me more as when I see students more engaged in classroom, they can readily understand the fundamental ideas of lessons, and students take a keen interest in classroom debates and amount of teaching in which we use computer, students remain highly engaged and take active part in classroom presentations mainly computer-based presentations, which improve learning for students and my interests in using ICT."

Other reasons for using ICT were improving the technical skills of students and teachers, personalised and interactive learning, increasing the sources of education for students, especially e-learning, and finding other useful information on digital media, such as YouTube, which provides lectures and other instructions in an accessible and easy manner, reducing students' reliance on traditional teaching methods.

4.2.5 Implementation of ICT in teaching

When asked how they would implement ICT in their teaching, six teachers very keenly presented their ideas of using ICT in teaching, three teachers relied on traditional teaching methods and other three teachers mentioned the use of ICT in teaching in a limited manner. For example, Teacher 7 commented:

"I use ICT to design my lectures as I teach science, so using ICT in teaching strengthens the technical aspects of my lessons as I can readily use sources of information on the Internet to illustrate various experiments which can be easily accessed by students in classroom via YouTube and other available information on the Internet, relevant science journals, blogs; and by readily watching these sources in classroom, students do not need to go to actual laboratories to learn about the science experiments; they can readily learn online about various experiments without physically going to the laboratories, so this improves quality of teaching in classroom and students' learning both in classroom and in their own time too."

4.2.6 Access regarding ICT facilities

When asked about access to ICT facilities, the teachers commented they had limited access in terms of having actual ICT tools in classrooms, such as limited available computers and using old-fashioned ICT tools in classrooms. Internet connection issues were the main factors that affected access of ICT facilities within schools. For example, Teacher 9 commented:

"There are a lot of issues regarding easier access of ICT facilities; there are insufficient computers in the computer lab, the Internet connection is very slow, some subjects use old-fashioned ICT tools such as using an older version of Microsoft office word, excel and PowerPoint in the classroom, which may not be compatible, lack of an effective ICT policy due to high number of students and a limited number of computers [all] make access regarding ICT facilities quite difficult in schools."

4.2.7 Computer skills of teachers

When asked to describe their computer skills, the teachers demonstrated limited understanding. Only three teachers had satisfactory computer skills, and the others' computer skills were limited. When asked to comment about computer skills, Teacher 2 stated, *"I can comfortably use Microsoft word and can draw bar charts in excel, but I am unable to do any statistical calculation in excel"*. Teacher 8 had better computer skills and commented, *"I can use Microsoft word, excel, power point, fix computer problems, send e-mails with ease, use projector and other ICT devices"*. Overall, teachers had limited computer skills, which is a significant barrier to the effective integration of ICT in schools; thus, effective and continuous training is needed to improve the teachers' current skills.

4.2.8 Main barriers to ICT and views about the barriers

Questions 8 and 9 were asked to determine which barriers were considered significant and how teachers viewed these barriers. Most teachers reported a deficiency of means, inadequate funds, inadequate expertise of teachers, looking after ICT and infrastructure-related issues, having to improve and continuously update the quality of ICT courses, lack of interest in ICT training and implementation, unfavourable culture in the schools that did not foster ICT growth and inadequate ICT policy that could effectively align all the stakeholders in schools as significant ICT barriers that required addressing before effective integration of ICT in schools could be obtained. These barriers were viewed as detrimental by most teachers, but most teachers did not support changing the existing culture in schools toward ICT use. Teacher 12 commented:

"There are barriers related to resources, skills of teachers, lack of financial support and lack of involvement of school's senior management in ICT initiatives which, over the years, have created a culture of hostility toward the use of ICT, and changing this culture is almost difficult as teachers have limited interest in using robust ICT resources in their classes and a lack of resources makes it even more difficult, and teachers do not have the required skill sets to implement ICT, and these are significant barriers and would not be resolved unless the state of mind of all stakeholders towards the use **of** ICT is changed, which will only then change the culture of hostility toward ICT in schools."

Furthermore, Teacher 11 commented:

"Students also pose a significant challenge for teachers in schools as during the lessons, students regularly take off the computer cables, and at times, considerable amount of [time] teachers spend is on re-installing computer cables against the finishing the lessons, and this also affects the quality of ICT education in classrooms."

4.2.9 Support required for effective integration of ICT

Question 10 was asked to ascertain the support teachers required for effective integration of ICT in schools. Teachers stated that having sufficient resources, including the required number of computers, infrastructure, such as availability of the Internet in classrooms, availability of financial resources and senior management being effectively involved in training and implementation of ICT in schools, would support effective integration of ICT in schools.

4.2.10 Areas of learning and future of ICT in schools

Questions 11 and 12 were asked to determine areas of learning that teachers would like to develop and to ascertain the future of ICT in schools, respectively. A few teachers commented on improving areas of learning, such as the using projectors in classrooms, being equipped with all the functions of Microsoft Word, Excel and PowerPoint, developing knowledge about using an interactive style of teaching, getting some training in troubleshooting common ICT issues that frustrate both teachers and students. When asked, how they viewed future of ICT in schools, teachers gave mixed views, some commenting that ICT was not as important as traditional teaching methods and not as effective, and even if role of ICT was to evolve, both students and teachers would still be inclined toward traditional teaching methods. This was apparent from the group of teachers (seven teachers) who showed resistance toward a robust implementation of ICT in schools. However, the other group of teachers (five teachers) viewed ICT as being indispensable for the long-term growth of students and teachers and the continuous training and skills development of teachers as essential to strengthening the effective integration of ICT in schools.

4.3 Results of the interviews (Headmasters)

A total of four interviews were conducted with the headmasters of each of the four schools, and eleven questions were asked to determine their knowledge, belief and usage of ICT, including policies they used in the implementation of ICT, what support they required and the barriers that hampered the smooth integration of ICT in their respective schools. The results of each interview question are presented in the following sections.

4.3.1 Understanding the term ICT and views about ICT

Question 1 was asked to determine the headmasters' understanding of the term ICT and to analyse their views about the use of ICT. The headmasters stated that ICT is about integrating information technology and communication in all aspects of teaching, finance and administration so as to meet ICT challenges internally within schools. Headmaster 1 stated, *"ICT is about using modern day technology and communication in teaching and learning to improve the learning process of students and to develop better teaching practices as a means to improve both the performance of teachers and students in schools".*

4.3.2 ICT policies and how they are impacted by the Ministry of Education

Questions 2 and 3 were asked to determine the ICT policies in schools and how the Ministry of Education impacted those ICT policies. Headmaster 2 commented on ICT policies:

"I classify ICT policy broadly into two categories: one is about improving learning and development, and other is about having the required resources to implement effective ICT implementation. Learning and development policy of ICT is aimed at improving training and development of teachers and introducing higher number of e-learning-based courses to improve the learning environment in my school. Whereas, resource policy of ICT is about having the required ICT tools such as computers, slides, projectors, Internet connection, relevant software and regular monitoring and care of ICT sources; [this] is what is called an effective ICT policy. ICT policy is strongly impacted by the Ministry of Education as the ministry sets the guidelines about all policy matters in schools and provides finance for all ICT activities, so any delay in funding from the ministry or delay in the execution process of ICT such as delay in providing ICT staff who can conduct teachers' training or delay from the ministry in terms of introducing new learning and development methods such as e-learning, inadequate resources in libraries to conduct research by teachers and students can significant halt effective integration of ICT in schools."

4.3.3 Main areas you use ICT in schools

Question 4 was asked to determine the main areas of ICT in schools. Headmaster 3 stated:

"The use of ICT was growing in all areas of schools due to greater emphasis by the Ministry of Education to implement ICT in all functional areas of schools, and these include areas such as introducing e-learning, offering up-to-date computer courses to teachers to improve their skills, a fully functional computer laboratory with competent staff to handle ICT issues, and now the use of ICT is being extended to administrative and operation department of schools so to improve the internal efficiencies of administration by replacing paper-based reporting, administration and financial monitoring with computerised software that guarantees both effective results and effective monitoring of all administrative functions within schools."

4.3.4 Use of ICT in teaching

Question 5 aimed at evaluating the use of ICT in teaching. Headmaster 2 commented:

"Effective integration of ICT starts with having committed teachers who are motivated and involved enough to change their existing style of teaching with e-learning, and teachers' training is a fundamental process in building a quality ICT in teaching. In my school, teachers' training needs are identified based on the computerised skills which they have, and the ICT manager is responsible to assess the training needs of teachers and provide training to teachers. Another important part of ICT in teaching is to promote integrated learning, which is aimed at engaging students, and in this regard, the role of e-learning is crucial and by having well-designed and yet easy to follow electronic courses [so that] teachers can improve e-learning process of students. The role of communication is also crucial in developing improved ICT in teaching by listening to teachers' concerns about improving quality of ICT resources and implementing ICT policy in schools,by taking teachers into confidence by headmasters will improve integration of ICT in teaching process."

4.3.5 Barriers regarding ICT in schools

Question 6 aimed at addressing the barriers regarding ICT in schools. All four headmasters agreed that the strong hierarchical administration in the Ministry of Education affected the timely approval of the budget, which then affected ICT implementation in schools. This affected gathering the required ICT resources, the training and development process of teachers, computer facilities and implementing digital facilities within schools. The headmasters also stated that teachers were not involved enough in the effective implementation of ICT because they were reluctant to get ICT training, and this was considered a significant barrier that hampered ICT integration in their schools. In addition to this conflict of interest in the schools, the Ministry of Education was another vital barrier impeding the effective integration of ICT in schools.

4.3.6 Support required for effective incorporation of ICT

Question 7 was asked to ascertain which support headmasters considered effective for integrating ICT. The headmasters commented that a well-developed ICT policy from the Ministry of Education, autonomy given to schools to implement ICT policies in accordance with their school's overall objectives and avoiding undue monitoring and control of ICT processes by the ministry which put headmasters under undue stress were the identified areas where role of ministry of education was imminent to address concerns of school and encourage the flexibility in ICT implementation as pre the school's objectives .

4.3.7 ICT skills and the role of headmasters

Questions 8 and 9 aimed at evaluating the ICT skills and role of headmasters. Most headmasters had strong basic ICT skills, but advanced skills such as numerical literacy using ICT, incorporating ICT to resolve conflicts with teachers and the ministry, such as the use of projectors and slides, and the inability to effectively monitor the training and development process of teachers were significant challenges headmasters

faced. As a result of these challenges, the role of headmasters was more of a mediator between teachers and the Ministry of Education when it came to implementing ICT in accordance with the schools' objectives and the Ministry of Education's guidelines; the headmasters also felt they needed to address conflicting stakeholders from the schools and Ministry of Education via constructive dialogues so as to integrate ICT effectively in schools.

4.3.8 Areas of learning and the future of ICT in schools

Questions 10 and 11 aimed at addressing areas of learning and the future of ICT in schools. The headmasters stated that an area of learning included improving teachers' training and development by increasing the frequency and evaluation of training courses. Improving the quality of e-learning by constantly updating teaching courses was another area for improvement. Headmasters stated that as long as teachers could play a proactive role in the implementation of ICT by taking training and development courses, ICT had a long-term role in building a quality teaching environment in schools.

In light of these findings of interview questions, next chapters presents discussion on these research findings .

Chapter 5

Discussion of the Qualitative Data

This chapter evaluates the chief findings which have occurred from the qualitative investigation in the preceding chapter and validate these findings in light of literature review to identify the challenges which hamper the effective integration of ICT in secondary schools in Saudi Arabia. These findings are discussed in relation to the objectives of this research. First, discussion is presented on the findings of views and perceptions of teachers about ICT and then discussion is presented on findings of views and perceptions of headmasters about ICT in chosen secondary schools.

5.1 Discussion of the findings (Teachers' views)

The findings show that most teachers had reasonable knowledge of what ICT means, and they believed in integrating ICT into the education system to improve the learning process of students and the quality of teaching in schools. Most teachers agreed that ICT was being viewed in school as a means of integrating the use of computer and digital technology to increase the learning pace of ICT-based subjects in schools, and using computerised-based courses reasonably helped teachers improve the content of their courses by creating a stimulating learning environment. These findings are in line with the findings of Livingstone (2012), who states that for an actual incorporation of ICT in schools, all stakeholders and learners, including teachers, students, senior management and administrative staff, must be placed on the same platform so that everyone has a unanimous understanding of the use of ICT in teaching; by using relevant software and audio-visual computer presentations, the whole teaching process becomes easier for teachers and more inspiring for students. Thus, teachers having an adequate understanding of ICT is an enabling factor that can increase the incorporation of ICT in Saudi secondary schools.

One significant issue that was reported by teachers is that in schools, the subjects taught mainly are the maths, physics, biology, chemistry, languages, geography and religious studies. Computer sciences are not a regular part of the academic syllabus, and considering that there are only three ICT teachers per school, the effective integration of ICT is hampered by a lack of inclusion of computer sciences in the academic curriculum. This finding corresponds with Jones' findings (2004), who states that effective integration of ICT is affected by a lack of resources in terms of having the required number of ICT teachers, teachers' change-resistant attitudes and not enough of the required ICT training for teachers. The findings here also state that most teachers had,

as their highest qualifications, a bachelor's or master's degree in addition to their teaching diplomas. This shows that the educational qualifications of most teachers are satisfactory, and some even obtained a master's degree, which means that with their teaching diplomas, they should be better equipped to deal with the complexities of teaching. This sound qualification level of teachers is considered a facilitating factor in the effective implementation of ICT in schools. These findings correspond to the findings of Aczel, Peake and Hardy (2008), who state that reasonable educational qualifications along with the appropriate use of modern technology in education-based, student-led learning methods are more effective in improving students' learning of ICT and in effectively integrating ICT in the teaching and learning process.

The findings also indicate that teachers had different reasons as to why they used ICT in their classes. Although, most agreed that the underlying reasons for using ICT were to create an interactive environment in class that uses e-learning to inspire students to become an active part of lessons and encourage creative thinking in students. The findings here correspond with the findings of Kang, Choi and Chang (2007) and DeAndrea et al (2012), who state that ICT can create an interactive learning environment for students in the classroom because with the use of digital technology, blogs and websites such as YouTube, a significant amount of learning can be acquired by students both in the classroom and outside; here, teachers should focus on exploiting these digital media channels to promote the inclination toward spending time online and in creating an interactive environment in the classroom where learning is an enjoyable activity outside the classroom. This could be considered a facilitating factor in implementing ICT in schools because teachers considered the use of ICT as a means with which to create an interactive learning environment that could enhance the quality of ICT education in selected secondary schools.

The findings on implementing ICT in their teaching methods show this is also a major barrier in schools because most teachers relied on traditional teaching methods. Teachers who taught the sciences were more inclined to implement ICT in their teaching via various means, such as using online sources to illustrate how to perform experiments, conducting a case study analysis, producing reports using Microsoft Word, performing a statistical analysis using Excel and showing how to create presentations using PowerPoint; this offered an opportunity to improve students' learning. However, there were a very limited number of teachers who used ICT in their lectures in classrooms. The non-science teachers did not feel the need to use ICT in their lectures because they felt use of traditional teaching methods was the most appropriate and was in accordance with their cultural and religious beliefs and in harmony with the overall learning culture in schools, which still preferred the use of traditional teaching methods. These findings correspond with the findings of Ageel (2011), who state that the culture in Saudi Arabia has not been conducive to the integration of ICT in education because teachers rely on traditional teaching methods and consider the available online materials as inappropriate for the country's population and their students.

Regarding access to ICT facilities, teachers reported this to be a significant barrier because they did not have adequate access to ICT facilities in schools, and there were issues, such as an insufficient number of computers, slow Internet speeds, old software, teaching via outdated ICT methods, lack of effective ICT policy and lack of ICT training and development for teachers, that prevented effective the integration of ICT in schools. The inability to provide technological facilities is termed a first order barrier in the literature, and the current study's findings here correspond with the findings of Ertmer (1999), who states that first order barriers occur when technological resources are either not provided or are not sufficient to meet the demands of all stakeholders; because these first order barriers are easier to identify, quantify and mitigate, schools should ensure that adequate access to ICT facilities is provided.

Another factor that was considered to hinder the effective integration of ICT in schools was the limited computer skills of teachers. Most teachers felt comfortable using Microsoft Word and PowerPoint, but most teachers were not able to use Microsoft Excel, fix computer errors or work around any other connectivity issues in classrooms, which resulted in a significant amount of time in lessons being spent on taking corrective actions to fix the computer errors. This also illustrates that teachers' training regarding ICT was not adequate, which was another limitation hindering the current incorporation of ICT in secondary schools. These barriers are also classified as first order barriers and should be tackled effectively for a smooth integration of ICT. The findings here correspond with the findings of Jimoyiannis and Atsoglou (2012), who state that issues related to limited computer skills and inadequate training methods are considered overwhelmingly frustrating by teachers because they are required to first learn new technology and then must adopt the new policy in the classroom to integrate ICT in their lessons both to improve the learning process of students and to discipline them in most effective manner which is a time consuming activity and thus, increasingly frustrating for teachers.

The current study's findings also show that most ICT barriers were classified as first order barriers; these included deficiency of means, inadequate funds, inadequate expertise of teachers, dearth of teachers' skill development and relevant training, lack of maintenance of ICT, issues related to the continuous updating of ICT courses and a lack of coherent ICT policy. Teachers also pointed out that as long as ICT courses were offered on a regular basis, teachers were provided the required resources and senior management within the schools were highly involved in devising a coherent ICT policy and keen on implementing it, these significant ICT issues could be adequately handled. These findings are in line with the findings of Salehi and Salehi (2012), who state that both extrinsic and intrinsic barriers are significant barriers that hamper the effective integration of ICT in schools. Extrinsic barriers are the issues related to access, resources, time, training and development and required support. Intrinsic barriers are issues related to culture, beliefs, values, norms, attitudes, resistance to change and relevant practices that hamper the effective integration of ICT in schools. Next, a discussion of the findings of the headmasters' views are presented.

5.2 Discussion on the findings (Headmasters' views)

Findings here state that all four headmasters had a sound understanding of the term ICT and strongly believed in ICT as a way to improve the quality of teaching and students' learning process. The headmasters believed in integrating ICT in all aspects of teaching, finance and administration. The headmasters had the most favourable view toward the easy design and effective implementation of ICT in schools and were keen on providing the required resources and training and development of teachers to motivate teachers to use ICT. Motivating teachers to take training courses was considered important for improving the current state of ICT in schools. The findings here correspond with the findings of Mathipa and Mukhari (2014), who state that to deal with any resistance to change, especially for ICT in schools, the role of senior management, including headmasters, is very crucial because management can take the appropriate steps to ensure that resistance to change is minimised. By showing the new technology is simple and useable enough, not only will the quality of teaching improve, but it will also be easier stimulate teachers' confidence and foster an interactive culture. Hence, the proactive role of headmasters was considered a significant factor in facilitating the application and integration of ICT in schools.

The findings also confirm that having a coherent ICT policy was also considered instrumental for integrating ICT in schools. The headmasters stated that the ICT policy in their schools was based on two factors: improve the current state of learning of ICT in schools and have adequate resources to ensure that ICT was implemented in schools with ease. The lack of training, learning and development of ICT and the required resources to implement ICT were considered first order barriers that seriously hampered the effective implementation of ICT in schools. The findings here also show that the Ministry of Education has a profound impact on the ICT policy of schools because all the regulatory framework regarding the use and implementation of ICT was formulated by the ministry, and funding was also sanctioned by the ministry, so any delay in providing the required financial resources had a profound impact and hindered the incorporation of ICT within schools. These findings

correspond with the findings of Aabed (2006), who states that the role of headmasters is crucial in the effective integration of ICT and in implementing a coherent ICT policy in schools; headmasters are in charge of implementing ICT policy in schools by ensuring that a favourable learning environment is created and by constantly monitoring the appropriate use of ICT in schools.

The headmasters also confirmed that ICT was increasingly being used in all areas within schools, both in teaching and in administrative departments. Because the Ministry of Education has focused on implementing ICT in all secondary schools in Saudi Arabia, the headmasters stated that schools were striving hard to implement ICT in teaching by incorporating e-learning, increasing the frequency of computer training courses for teachers and increasing the number of computers in all schools to ensure that all schools had adequate resources for the effective integration of ICT.

The headmasters also stated that in addition to having adequate resources and timely financing from the Ministry of Education, the role of teachers is crucial in implementing effective integration of ICT; training teachers and identifying their training needs was also seen as important in ensuring that first order barriers were kept to a minimum. The findings here also stated that a lack of ICT teachers and managers in schools were detrimental. The headmasters also stated that involvement of senior management and having effective communication channels were also important in the effective integration of ICT; involving teachers in the design of ICT policy was seen as an enabling factor. These findings correspond with the findings of Thokchom (2013) and Watson (2001), who state that the role of teachers is vital in implementing ICT in schools because they can effectively drive and promote the use of ICT in schools, and teachers' confidence in the utilisation of technology is vital within developing countries because ICT is not viewed favourably in these countries. It is considered more of an imposed and novel outside commodity that if not managed proactively can cause significant issues in the actual incorporation of ICT in schools.

The findings on the barriers of ICT in schools shows that the first order barriers were considered significant. These barriers included the strict hierarchy in the Ministry of Education, which affects the timely sanction of the budget, limited training of teachers, motivation of teachers to learn about new ICT processes and inadequate computer facilities. These findings correspond with the findings of Crawford (2009) and Gunga and Ricketts (2007), who state that having high-quality resources in terms of hardware, software and computer-literate teaching staff are significant in addressing ICT challenges in schools because a lack of resources, especially teachers' access to ICT, is considered a major predicament in the smooth integration of ICT in schools. In addition to this, the lack of required resources, such as having the required number of computers to conduct lessons, is a significant barrier. Thus, a lack of resources was considered a hindering factor, and it required intervention by the Ministry of Education and by headmasters so that ICT could flourish in schools on a long-term basis.

The findings regarding the support required for effective integration of ICT in schools show that because schools were highly reliant on the policies of the Ministry of Education, tight monitoring and control and receiving the required funds were reported as detrimental factors in the effective integration of ICT in schools. The headmasters were of the view that if autonomy were given to schools in implementing ICT policy, schools could contribute toward a greater integration of ICT by devising flexible yet quality e-learning for students and robust training and development ICT courses for teachers. These findings correspond with the findings of Prestridge (2012), who states that resistance to ICT in schools mainly manifests in various forms, including the following: ICT itself, procedures, its creation, promotion and utilisation, characteristics of the teachers, students and other learners who execute the ICT function and the social norms and culture. The current study's findings also show that headmasters thought ICT's future was bright, as long as the resistance from teachers toward ICT processes could be minimised, adequate computer-based resources and financial budget could be provided on time to schools and a culture of interactive learning via the use of ICT could be promoted, along with positive norms, beliefs and a strong culture of learning, training and development strengthened. Therefore, the current study has met its objectives by:

- Understanding the definition and development of ICT concepts
- Capturing the views about incorporation of ICT in education to ascertain the contemporary state of ICT within secondary schools in Saudi Arabia
- Understanding the barriers that teachers and headmasters faced when using ICT in school
- Determining the degree of satisfaction with the current level of ICT implementation in the classroom
- Ascertaining the contributing or hindering factors regarding the incorporation of ICT within secondary schools in Saudi Arabia

Chapter 6

Conclusions and Recommendations

The main findings from this study show that the current state of ICT in secondary schools in Saudi Arabia is substantially weak, and there are a significant number of barriers hampering the effective implementation of ICT. Most teachers interviewed for this study stated that they understood what ICT is and viewed it as a facilitating factor (Hardy, 2008) and as a means to integrate the use of computer and digital technology to enhance the learning pace of ICT-based subjects in schools and help teachers improve their courses by creating an inspiring and interactive learning environment (Roblyer, 2006). Thus, adequate understanding from teachers about ICT is an enabling factor (Thokchom, 2013) that will improve the incorporation of ICT in Saudi secondary schools. The barriers hampering the effective implementation of ICT in schools include a lack of inclusion of computer sciences as a regular subject and required number of ICT teachers in schools (Bradley and Russell, 1997), which is considered to be a major reason for the lack ICT integration in schools. Also, teachers' computer skills are limited, and there are few opportunities for training and development, which is a major reason why they do not feel motivated to utilise ICT in their lessons (Mathipa and Mukhari, 2014). Because of their lack of training, they do not have up-to-date computer and ICT skills, building a negative perception about use of ICT and creating resistance toward its use.

From the findings, effective integration of ICT is also hampered by a number of barriers, such as lack of resources, including computers in computer classes, slow Internet speeds, the change-resistant attitudes of teachers (Jones, 2004), a stringent ICT policy formulated by the Ministry of Education and tight monitoring and control of ICT processes by the ministry. The headmasters in this study stated that if the Ministry of Education allows schools to implement ICT policy in accordance with their school's objectives, ICT could be integrated much easier. In addition to this, the lack of the required budget and inability to receive the budget in a timely manner (Crawford, 2009) are major barriers that prevent effective integration of ICT in schools. Lack of involvement of teachers and senior management in the design and implementation of ICT are reported to be major barriers as well. The negative perceptions about the use of ICT in the local culture (Mathipa and Mukhari, 2014) and negative perceptions of major stakeholders, including teachers, headmasters, senior management and students, are also detrimental factors.

To address these barriers, ICT should be introduced as a regular subject in schools to increase the skills, competencies and competitiveness of students. The role of the Ministry of Education should be more of a facilitator when implementing ICT policy instead of tightly monitoring and controlling ICT policy; it should allow each school to implement ICT policy in line with the school's objectives to facilitate greater integration of ICT (Ageel, 2011). Teachers' training is a significant area of concern; it is, therefore, recommended that the training needs of teachers should be first evaluated to find the gaps in their ICT skills, and then training courses should be designed with various levels in accordance with the training needs of teachers (Watson, 2001). In addition, the frequency of training should be regular, and training courses should be held every three to six months to ensure that the training needs of teachers are effectively addressed. An increased association is required between the Ministry of Education, headmasters and teachers so that there are no flaws in terms of a lack of resources and policy. Once a higher association is established between the Ministry of Education and schools, students can be effectively included in this collaboration (Ageel, 2011). Teachers should regularly update their use of ICT in their lessons

to improve their teaching technique and involve students in the effective integration of ICT (Mathipa and Mukhari, 2014). The Ministry of Education should aim to improve the incorporation of ICT in schools by constantly improving ICT policies and clearly defining the role of all stakeholders within the ministry and schools to avoid conflicting opinions and unintended consequences. The ministry, along with schools, should be required to regularly analyse the ICT syllabi in schools to ensure that it is relevant and in line with the changing educational needs of students and society as a whole. The ministry should approve the timely allocation of a school's budget to ensure that schools have the required financial resources to develop teachers' training and adequate number of computers (Gunga and Ricketts, 2007). Recommendations for prospective research is to analyse the issues regarding the effective incorporation of ICT in primary schools, colleges and even universities to ascertain if similar barriers are faced by other academic institutions in implementing ICT. Further research can be performed by conducting a cross-sectional analysis of secondary schools in other Middle Eastern countries and by comparing those findings with the current study's findings to ascertain to what extent the barriers reported in the current study are found by other researchers. Because this study has not utilised any quantitative data, future research can be performed to evaluate barriers in secondary schools in Saudi Arabia by using quantitative data to establish if the findings are the same.

The few limitations of this study are because of time and financial constraints; only four schools were included, and interviews were used to answer key research questions, so the results could be restrictive because the interviews only present the perceptions and views of a select number of teachers and headmasters. Conducting same study in other secondary schools with a different sample size may generate different answers. Therefore, a blend of qualitative and quantitative means in data collection and increasing the sample size of the schools and participants could be carried out in future studies to offset the limitations of the current study.

References

Aabed, A. I., (2006). "*A Study of Islamic Leadership Theory and Practice in K-12 Islamic Schools in Michigan*", PhD. Brigham Young.

Abrahamson, L. and Brady, C., (2014). "*A Brief History of Networked Classrooms to 2013:Effects, Cases, Pedagogy, and Implications with New Developments*". International Journal of Quality Assurance in Engineering and Technology Education, 3(4), 1-51

Aczel, J. C. Peake, S. R. and Hardy, P., (2008). "*Designing Capacity-Building in E-Learning Expertise: Challenges and Strategies*". Computers & Education, 50(2), pp. 499-510

Ageel, M., (2011). "*The ICT Proficiencies of University Teachers in Saudi Arabia: A Case Study to Identify Challenges and Encouragements*". Available at:

<http://eprints.soton.ac.uk/337733/1/ICT.pdf>
[Accessed 14 February 2017]

Al-Alwani, A., (2005). "*Barriers to Information Technology in Saudi Arabia Science Education*", PhD Thesis: University of Kansas.

AlBugami, S. (2016). "*Developing a strategic approach to ICT implementation in Saudi secondary schools.*" PhD Thesis. University of Salford. Manchester.

Al-Harbi, Q. A. (2003). "*Proposed Alternatives for the Development of the Leadership Role among the Public Secondary School Principals in the K.S.A in the Light of Modern Educational Leadership Trends*". [Online] Available at:

http://www.gulfkids.com/pdf/Gasem.pdf:[Accessed 24 March 2017]

Al-Harbi, H. (2014*). "Towards Successful Implementation of ICT in Education",* The 2014 WEI International Academic Conference Proceedings". Vienna, Austria. The West East Institute, pp.33-46.

Allan, AJ, Randy, LJ, (2005). *"Writing the Winning Thesis or Dissertation. A Step-by-Step Guide."* Corwin Press, California.

Almaghlouth, O., (2008). *"Saudi Secondary School Science Teacher's Perceptions of the Use of ICT Tools to Support Teaching and Learning",* Master of Science Dissertation, Waikato.

Almalki, G. and Williams, N. (2012). "A strategy to improve the usage of ICT in the kingdom of Saudi Arabia primary school", *International Journal of Advanced Computer Science & Application*; Vol. 3, No.10, pp.42.

Bingimlas, A. (2009*). "Barriers to the Successful Integration of ICT in Teaching and Learning Environments. A Review of the Literature".* Eurasia Journal of Mathematics, Science & Technology Education; Vol.5, No.3, pp.235-245

Balanskat, A. Blamire, R. and Kefala, S., (2006). *"The ICT Impact Report: A Review of Studies of ICT Impact on Schools in Europe".* Available at:

http://unpan1.un.org/intradoc/groups/public/documents/unpan/unpan037334.pdf [Accessed 04 February 2017]

Billowes, N*., (*2001). *"ICT Activities that make a Difference".* Wellington: Ministry of Education

Bradley, G. and Russell, G., (1997). Computer Experience, School Support and Computer Anxieties. *Educational Psychology,* 17 (3), pp. 267-284

Braun, V., & Clarke, V., (2006). *"Using Thematic Analysis in Psychology"*. Qualitative Research in Psychology, 3 (2). pp. 77-101.

Bryman, A., (2016). "Social *Research Methods",* Oxford University Press, 5th Edition; Oxford; UK.

Bryman, A., & Bell, E., (2011). *"Business Research Methods"*. 3rd Edition; Oxford University Press; UK

Bryman, A., & Bell, E., (2015). *"Business Research Methods"*. 4th Edition; Oxford University Press; UK

Bundesbank's, Deutsche., (2004). *"The Significance of Information and Communication Technology"*. Deutsche Bank Monthly Report, 56(4), pp. 45-55

Creswell, J. W. (2003). *Research Design Qualitative, Quantitative and Mixed Methods Approach.* (2nd edition). California: Sage Publications.

Creswell, J. W., & Clark V.P., (2007). "*Designing and Conducting Mixed Methods Research."* Thousand Oaks CA: Sage Publications.

Cavas, B. Cavas, P. Karaoglan, B. and Kisla, T., (2009). *"A Study on Science Teachers' Attitudes toward information and communication Technologies in Education"*. Turkish Online Journal of Educational Technology, 8(2), pp. 20-32

Chapman, L., Masters, J. and Pedulla, J., (2010). *"Do digital divisions still persist in schools? Access to technology and technical skills of teachers in high needs schools in the United States of America*". Journal of Education for Teaching, 36(2), pp. 239-249

Crawford, R., (2009). *"Secondary School Music Education: A Case Study in Adapting to ICT Resource Limitations".* Australasian Journal of Educational Technology, 25(4), pp. 471-488.

Cox, M.J., Preston, C., & Cox, K. (1999). "*What Motivates Teachers to use ICT?*" Paper presented at the British Educational Research Association Conference. Brighton. September.

Cuban, L. Kirkpatrick, H. and Peck, C., (2001). *"High access and low use of Technologies in High School classrooms: Explaining an apparent Paradox".* American Educational Research Journal, 38 (4), pp. 813-834

DeAndrea, D. C. Ellison, N. B. LaRose, R. Steinfield, C. and Fiore, A., (2012). *"Serious Social Media: On the use of Social Media for Improving Students' adjustment to College".* The Internet and Higher Education, 15(1), pp. 15-23

Enochsson, A. and C. Rizza (2009), *"ICT in Initial Teacher Training: Research Review",* OECD Education Working Papers; No. 38, OECD publishing.

Ertmer, P., (1999). *"Addressing first- and second-order barriers to change: Strategies for Technology Integration".* Educational Technology Research and Development, 47(4), pp. 47-61

European Commission, (2003). *Commission staff working paper: eEurope 2002 Benchmarking: European youth into the digital age.* SEC (2003) 72 Brussels: Commission of the European Communities.

Eubanks, I.D., & Eubanks, L.P., (2002). "*The importance of secondary education in Education for Sustainability".* Encyclopaedia for Life Support Systems; Oxford: EOLSS Publishers

Fabry, D. and Higgs, J., (1997). *"Barriers to the Effective use of Technology in Education"*. Journal of Educational Computing; 17 (4), pp.385-395

Fatani, R. (2009). "*Access to Online Information and Knowledge"*. Saudi Arabian Strategic Internet Consulting (SASIC), Saudi Arabia: SASI Consulting Ltd

Fiedler, S., & Valjataga, T., (2010). "*Interventions for Second Order Change in Higher Education: Challenges and Barriers"*. Electronic Journal of E-Learning, 8(2), pp. 85-92

Finley, L. & Hartman, D., (2004). *"Institutional Change and Resistance: Teacher Preparatory Faculty and Technology Integration*". Journal of Technology and Teacher

Education, 12(3), pp. 319-337

Fokides, E., (2016). *"Pre-Service Teachers, Computers, and ICT Courses: A Troubled Relationship"*. International Journal of Information and Communication Technology Education (IJICTE), 12 (4), pp. 25-36.

Greenwood, D. J., & Levin, M. (2001). "*Pragmatic action research and the struggle to transform universities into learning communities*." In P. Reason & H. Bradbury (Eds.), Handbook of action research London: Sage.

Getenet, S. T., Beswick, K., and Callingham, R., (2016). *"Professionalizing In- Service Teachers' focus on technological pedagogical and content knowledge"*. Education and Information Technologies: The Official Journal of the IFIP Technical Committee on Education, 21(1), pp. 19-34.

Guest, G., MacQueen, K. M. & Namey, E. E. (2012). "*Applied thematic analysis*." Thousand Oaks, CA: Sage.

Gunga, S. O. and Ricketts, I. W., (2007). *"Facing the Challenges of E-Learning Initiatives in African Universities"*. British Journal of Educational Technology, 38(5), pp. 896-906.

Hakami, A. A., Hussin, A. R. B. C. & Dahlan, H. M. (2013). "Critical success factors necessary for curriculum integration of computer based testing into Saudi secondary schools". *Journal of Information Systems Research and Innovation*. Vol.4, No.3, pp.22-30.

Hamdan, I. (2007). "The Arabicization of Terminologies between Reality and Expectation. Dirasat" *Humanities and Social Sciences Studies*. Vol.34.2, pp.248-264.

Hammersley, M. (1996). The relationship between qualitative and quantitative research: paradigm loyalty versus methodological eclecticism. In: Richardson, J.T.E. (ed.) "*Handbook of Qualitative Research Methods for Psychology and the Social Sciences*." Leicester.

Hennessy, S., Ruthven, K., & Brindley, S., (2005). *"Teacher Perspectives on integrating ICT into Subject Teaching: Commitment, Constraints, Caution, and Change"*. Journal of Curriculum Studies, 37(2), pp. 155-192.

Jimoyiannis, A., & Atsoglou, K., (2012). "*Teachers' Decisions to Use ICT in Classroom Practice: An Investigation Based on Decomposed Theory of Planned Behavior*".International Journal of Digital Literacy and Digital Competence (IJDLDC), 3(2), pp. 20-37

Johnson, L. Adams, S. & Cummins, M., (2012). "*The NMC Horizon Report: 2012*" Higher Education Edition. Austin, Texas: The New Media Consortium.

Johnson, B., and Christensen, L. (2004). *"Educational Research: Quantitative, Qualitative, and Mixed Approaches"* (2nd Edition). Boston, MA: Pearson Education, Inc.

Johnson, P., Buehring, A., Cassell, C and Symon, G. (2006). "Evaluating qualitative management research: Towards a contingent criteriology." *International Journal of Management Reviews,* Vol. 8 (3), pp 131-156.

Jones, A., (2004). *"A Review of the literature on barriers to the uptake of ICT by teachers. (Research Report)".* London: British Educational Communications and Technology Agency,2004. Available at: <http://dera.ioe.ac.uk/1603/1/becta_2004_barrierstoupta ke_litrev.pdf> [Accessed 04 May 2017]

Jones, T., (2014). *"Students' Cell Phone Addiction and Their Opinions".* The Elon Journal of Undergraduate Research in Communications, Vol. 5(1), pp. 74-80

Kafyulilo, A. & Keengwe, J., (2014). "Teachers' perspectives on their use of ICT in teaching and learning: A case study". *Education and Information Technologies: the Official Journal of the IFIP Technical Committee on Education,* 19(4), pp. 913-923.

Kang, I., Choi, J.-I., & Chang, K. (2007). "Constructivist Research in Educational Technology: A Retrospective View and Future Prospects". *Asia Pacific Education Review,* 8 (3), pp.397-412.

Kordha, T. E., Sevrani, K. & Gorica, K., (2015). *Information society development through ICT market strategies: Albania versus other Developing Countries*. Cham: Springer.

Kimmel J. A. (2007). *Ethical Issues in Behavioural Research: Basic and Applied Perspectives*. (2nd edition.). Wiley-Blackwell

Labelle, R. (2005) "ICT policy formulation and e-strategy development Asia-Pacific Development information Programme" a comprehensive guidebook. *New Delhi and Bangkok: United Nations Development Programme-Asia Pacific Development Information Programme (UNDP-APDIP)* Elsevier

Lee, D., (1997). Factors influencing the success of computer skills learning among in-service teachers. *British Journal of Educational Technology*, 28 (2), pp.139-141

Lepicnik-Vodopivec, J. & Samec, P., (2014). The information-communication technology in the home environment of four-year-old preschool children. *Journal of Process Management*, 2(5), pp. 91-97.

Livingstone, S., (2012). Critical reflections on the benefits of ICT in education. *Oxford Review of Education,* 38(1), pp. 9-24.

Lotriet, H. H., Matthee, M. C. & Alexander, P. M. (2010). Challenges in Ascertaining ICT Skills Requirements in South Africa. *South African Computer Journal,* 46, pp. 38-48.

Lichtman, M. (2006). *Qualitative research in education: A user's guide*. Thousand Oaks, CA: Sage Publications.

Minichiello, V., Aroni, R & Hays, T.N. (2008). *"In-depth interviewing: Principles, techniques, analysis."* (3rd edition.). French Forest: Pearson Education.

Morse J. (2002). Critical Analysis of Strategies for Determining Rigor in Qualitative Inquiry.*Qualitative Health Research,* 2015, 25(9). pp.1212-1222.

Markland, M., (2003). Technology and people: some challenges when integrating digital library systems into online learning environments. *New Review of Information and Library Research*, 9(1), pp. 85-96.

Mathipa, E. R. & Mukhari, S., (2014). Teacher factors influencing the use of ICT in teaching and learning in South African urban schools prof. *Mediterranean Journal of Social Sciences,* 5(23), pp. 1213-1220.

Mumtaz, S. (2000). "Factors affecting teachers' use of information and communications technology: a review of the literature." *Journal of Information Technology for Teacher Education*, Vol. 9 (3), pp.319-341.

Neuman, L. W. (2000). *Social Research Methods: Qualitative and Quantitative Approaches* (4ᵗʰ edition.). USA: Allyn and Bacon. O'Leary, Z. (2004). *"The Essential Guide to Doing Research."* London: Sage Publications.

Onsman, A. (2010). Dismantling the perceived barriers to the implementation of national higher education accreditation guidelines. *Journal of Higher Education Policy and Management*. Vol. 32, No. 5, pp. 511-519.

Oyaid, A. (2009). *Education policy in Saudi Arabia and its relation to secondary school teachers' ICT use, perceptions, and views of the future of ICT in education.* Ph.D. Thesis,University of Exeter.

Opie, C. (2004). *Doing Educational Research.* Sage Publications.

Patton, M.Q. (2002). *Qualitative research and evaluation methods.* Thousand Oaks, CA: Sage Publications.

Parker, I. (1992). *"Discourse Dynamics: Critical Analysis for Social and Individual Psychology."* London: Routledge.

Pawson R, Greenhalgh T, Harvey G, Walshe K. (2005). "Realist review - a new method of systematic review designed for complex policy interventions." *Journal of Health Services Research and Policy*. Vol.10, pp. 21-34.

Pea, R. D. (2000). *Introduction. The Jossey Bass technology in learning reader.* San Francisco, CA: Jossey-Bass.

Pelgrum, W. (2001). Obstacles to the integration of ICT in education: Results from a worldwide educational assessment. *Computers & Education*, 37(2), pp.163-178.

Penuel, W. R., (2006). Implementation and Effects of One-to-One Computing Initiatives: A Research Synthesis. *Journal of Research on Technology in Education,* 38(3), pp. 329-348.

Ploj, V. M. & Psunder, M., (2010). Future teachers' opinions on the digital competencies obtained during their studies. *Problems of Education in the 21st Century,* 24, pp. 95-105.

Preston, C. Cox, M. & Cox, C. (2000). What factors support or prevent teachers from Using ICT in the primary classroom. P*aper presented at the British Educational Research Association Annual Conference.* University of Sussex at Brighton. (September2-5;1999).Available at: <https://www.leeds.ac.uk/educol/documents/00001304.htm> [accessed 4 July 2017].

Prestridge, S., (2012). The beliefs behind the teacher that influences their ICT practices. *Computers & Education*, *58(1)*, pp. 449-458.

Roblyer, M. (2006). Integrating educational technology into teaching (4th ed.). Upper Saddle River, NJ: Pearson Education.

Roblyer, M. & Doering, A. (2010). "*Integrating educational technology into teaching*". New York, Boston Allyn and Bacon. 5th edition.

Raob, I. Al-Oshaibat, H. & Ong, S. L., (2012). A Factor Analysis of Teacher Competency In Technology. *New Horizons in Education, 60*(1), pp. 13-22.

Reid, A. J. (1996). What we want: Qualitative research. *Canadian Family Physician* 42, pp. 387–389.

Rice, J. W., (2007). New Media Resistance: Barriers to Implementation of Computer Video Games in the Classroom. *Journal of Educational Multimedia and Hypermedia*, 16(3), pp. 249-261.

Robinson, K., (2005). Examining Perceptual Barriers to Technology: A Study on the Diffusion of Educational Technology and Education Reform. *International Journal of Information and Communication Technology Education*, 1(3), pp. 47-59.

Rojko, A. Debevc, M. and Hercog, D., (2009). Implementation, effectiveness and experience with remote laboratory in engineering education. *Organizacija,* 42(1), pp. 23-33.

Salehi, H.and Salehi, Z., (2012). Challenges for Using ICT in Education: Teachers' Insights *International Journal of e-Education, eBusiness, e-Management and e-Learning*, 2(1), pp.40-43.

Saunders, M. N. K., Lewis, P., &Thornhill, A. (2012). *"Research methods for business students."* (6th edition.) Harlow, England: Pearson Education

Semenov, A. (2005). "*Information and communication technologies in schools: A handbook for teachers or How ICT can create new, open learning environments*", UNESCO. Available at: <http://unesdoc.unesco.org/images/0013/001390/13902 8e.pdf> [Accessed 18th March, 2017).

Sekaran, U., & Bougie, R. (2010). *"Research methods for business: A skill building approach."* (5th edition.). West Sussex, UK: John Wiley & Sons Ltd.

Smythe, W. and Murray, M. (2000). "Owning the story – ethical considerations in narrative research." *Ethics and Behaviour*. Vol. 10 (4), pp. 311-336.

Shaffer, S. (2001). Using ICT for quality teaching, learning and effective management Report. *Seventh UNESCO-ACEID International Conference on Education. UNESCO Asia and Pacific Regional Bureau for Education.*

Snoeyink, R. and Ertmer, P., (2001). Thrust into technology: how veteran teachers respond. *Journal of Educational Technology Systems*, 30 (1), pp.85-111.

Somekh, B. (2002). *Pupils' and teachers' perceptions of ICT in the home, school and community*. London: Department for Education and Skills. British Educational Communications and Technology Agency

Stoilescu, D., (2014). *Studying Challenges in Integrating Technology in Secondary Mathematics with Technological Pedagogical and Content Knowledge (TPACK)*. Available

at: <http://files.eric.ed.gov/fulltext/ED557320.pdf [Accessed 3 February 2017].

Tatweer. (2017). "King Abdullah Bin Abdulaziz Project for the Development of Education."Available at:< https://www.tatweer.edu.sa/Home/Index> [Accessed 14 February 2017].

Thokchom, A. (2013). Learning technology research: Teachers role in ICT, *Voice of Research*, 2 (2) pp. 15-17.

Uluyol, C. & Sahin, S., (2016). Elementary school teachers' ICT use in the classroom and their motivators for using ICT. *British Journal of Educational Technology,* 47(1), pp. 65-75.

Underwood, J. and Dillon, G., (2011). Chasing Dreams and Recognising Realities: Teachers' Responses to ICT. *Technology, Pedagogy and Education,* 20 (3), pp. 317-330.

UNESCO (2002). *Information and communication technology in education.* Available at: <http://unesdoc.unesco.org/images/0012/001295/12953 8e.pdf> [Accessed 14 February 2017].

Veen, W., (1993). How Teachers Use Computers in Instructional Practice: four case studiesin Dutch secondary school. *Computers and Education*, 21(1/2), pp.1-8.

Wahlstedt, A., Pekkola, S., and Niemela, M., (2008). From e-learning space to e-learning place. *British Journal of Educational Technology*, 39(6), pp. 1020-1030.

Watson, M., (2001). Pedagogy before technology: re-thinking the relationship between ICT and teaching. *Journal of Information Technology Education*, 6 (4), pp. 251-266

World Bank (2017) "Information Communications Technology for Development" World Bank Live, Available at; http://liveworldbank.org/information-communications-technology-development; [Accessed 26th July 2017]

World Economic Forum, (2017). World Economic Forum on the Middle East and North Africa. (May 2017), Available online at; https://www.weforum.org/events/world-economic-forum-on-the-middle-east-and-north-africa-2017. [Accessed 25th July 2017]

Wydick, B. (2012). Why Secondary Education is important. Compassion International.

Available at: https://www.compassion.com/press/why-secondary-education-is-important.htm[Accessed May, 2017]

Yuen, A. and Ma, W., (2002). Gender differences in teacher computer acceptance. Journal of Technology and Teacher Education, 10 (3), pp. 365-382.

Yin R. K. (2014). Qualitative Research from Start to Finish. 2nd edition. New York, London Guildford Press.

Zimmerman, I.K. (2001). Building public support: The politics of technology transformation: Successful technology infusion in schools. In J. Lebaron, & C. Collier (Eds.), *Technology in its place.* San Francisco, CA: Jossey-Bass.