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University  
of Glasgow

**The current state of teachers' ICT use in classrooms in  
boys' secondary schools in Saudi Arabia**

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**A thesis Submitted in Fulfilment of the Requirements of the Degree  
of Doctor of Philosophy**

**School of Education**

**College of Social Sciences**

**University of Glasgow**

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## Abstract

The field of education has witnessed many changes and reforms in policy as well as numerous Information and Communication Technology (ICT) operational initiatives attempting to improve the process of teaching and learning. The interest of schools' stakeholders in the potential advantages that ICT offers to the teaching and learning process has been rising (Kong et al., 2014). However, in Saudi Arabia, the ICT use by teachers for teaching and learning is still low, despite many ICT initiatives that the Ministry of Education (MOE) has introduced to improve education quality. Therefore, this study investigated teachers' ICT use in classrooms in boys' secondary schools in the city of Al-Rass in Saudi Arabia.

This research aims to understand the current state of ICT in education in Saudi Arabia; and to understand how ICT is used by teachers in classroom for the process of teaching and learning; and to reveal any factors hindering ICT integration in the classroom. The Human Capital Theory (HCT) and Capabilities Approach (CA) were the basis of understanding why ICT is important in the educational process.

The methodology adopted is an interpretivist qualitative approach using a triangulation method to analyse different methods and sources. Interviews were conducted at all levels of the education system: Five policy makers within the MOE; five secondary schools in Al-Rass city in Saudi Arabia were visited and interviews were conducted with five head teachers, 25 teachers who participated in 25 classroom observations and 25 student focus groups (100 students in total) who attended the classroom observations. The findings were analysed based on thematic analysis.

The study's findings using the triangulation method indicated that the government has paid huge attention to ICT for education development through relevant initiatives. However, the findings revealed the current situation of ICT is unsatisfactory and has not reflected the expectations and goals of the educational development initiatives. The findings revealed the absence of ICT policy, lack of teachers' ICT use in the educational process, and internal and external barriers hindering the successful ICT integration in the process of teaching and learning. This included the absence of ICT policy, lack of professional development training, especially on how ICT can be used in relation to pedagogy and subject, and school management support, especially in terms of the teachers' workload and ICT resource provision requests from authorities.

The main implication the study concludes with is once ICT policy is well designed, all hindering factors could be addressed and as a result the integration of ICT into teaching and learning process could improve.

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## **Dedication**

*My thesis is specially dedicated to*

*The sole of my wonderful mum, who always prayed for me to achieve it*

*My incomparable father, whose life coaching made me do it*

*My beautiful wife and children, who lived the experience of it*

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## **Declaration**

I declare that, except where explicit reference is made to the contribution of others, that this dissertation is the result of my own work and has not been submitted for any other degree at the University of Glasgow or any other institution.

Abdulwahab Rabah Alharbi

# Chapter One: Introduction

## 1.1 Background

Sophia is a Saudi citizen – She is the first humanoid robot in the world to have citizenship in the same way as a human. The Crown Prince of the Kingdom of Saudi Arabia (KSA) announced this on October 2017 during the Future Investment initiative conference in Riyadh. It was part of the announcement of ‘Neom’, a proposal for a future city based on highly innovative technologies, like Sophia.

This sounds amazing and gives an indication that the government wants to transform the country to a digital and technological stage, as they have promised on many occasions. However, is something missing? If this is to be achieved, then a future population needs to be able to navigate this digital future. It is fundamental then, that information and communication technology (ICT) be taught and used in education today, if there is to be any hope of populating this vision of a future put forward by the Crown Prince.

So the question that must be asked is: is the use of ICT in the Saudi education system effective enough to produce students capable of contributing towards this technology-based future? The answer is: so far, not yet. According to Alshahrani & Ally (2017) and other Saudi researchers, there is evidence that Saudi Arabia still needs to effectively integrate ICT into its education system to enhance students’ learning: learning which will increase the opportunities for the students and also for their country and the society they wish to create.

Education is the cornerstone in any country’s development (Kozma, 2005; World Bank, 2015). This is also confirmed in the latest Saudi vision 2030, which aims to map out the development of the country’s economy, society and education (including ICT); covering the learning of students and professional development of teachers. According to OECD (2001a), the advancement of ICT has influenced countries to develop ICT integration in the teaching and learning process to achieve the desired economic and societal development. From this, the current study suggests that in order to understand the importance of ICT in education, it is important to understand the purposes of education. This is framed by two theories, human capital theory (HCT) and capabilities approach (CA), which will be discussed in chapter three in this thesis.

The Saudi government has introduced a number of ICT initiatives to improve the quality of education during the last two decades, especially when the attention has been to transform KSA away from being oil reliant. ICT is seen as the future because according to Kozma (2005, p. 118) “*technological innovation and new knowledge are both the engine and the product of economic growth*”. However, ICT integration to improve the process of teaching and learning in Saudi Arabia is still disappointing. It is similar to what Watson (2001) and Jager et al. (2011) claim: that the development of ICT is witnessed in other fields, but not in education. The use of ICT in other sectors in KSA is increasingly improved, especially in the e-government services, however, this is not the case in education (Robertson and Al-Zahrani, 2012; Alshahrani and Ally, 2017). This is to say, as this study argues, simply providing ICT does not mean ICT integration will be employed in the teaching and learning process to improve learning, but rather how can ICT be effectively used to make the desired change?

ICT has changed our daily lives to such an extent that the term ‘digital illiteracy’ has been coined: attributed to people who do not use digital technologies. In education, ICT is believed to advance the educational process, as students can be creative learners and can learn more independently. Teachers can be innovative and change their approach from explicit instruction towards more facilitation; the whole school can become a collaborative environment (Wasserman & Millgram, 2005; Cachia et al., 2010). So, effective ICT integration can contribute to the improvement of education quality (UNESCO, 2007a), which can in turn be a significant contributor to the development that countries aim for.

According to Abbott (2001, p.11) “*ICT is changing our notion of what schooling consists of and how it should be delivered. Notions of literacy have been changed and developed as a result of ICT and literacy is central to most definitions of education.*” In his 2013 book, Abbott thinks these ideas on the relationship between ICT and education are still valid, that the views of people towards the ability of ICT to make changes in education remain true. However, this view has been based on theory, which has not been put into practice. We have yet to fully understand the factors that hinder successful ICT integration in educational practice.

In particular, when we think of success or failure in the development of education, the main aspect that springs to mind is the very backbone of that development: educational related

policies and the main implementers of those policies, the teachers. As the robot Sophia said, *“we will never replace people, but we can be your friends and helpers”*, which means ICT without teachers will achieve nothing; they are the gatekeepers of this development. So, this study will consider teachers’ ICT use in real practice, in addition to the current state of ICT use in the teaching and learning process and the factors supporting or hindering the effective integration of ICT in the secondary schools’ classroom in Saudi Arabia.

## **1.2 Significance of the study**

Unlike many other comparable studies, this qualitative research triangulated different methods of data collection and different sources from different positions or authorities.

Policy makers from the Ministry of Education (MOE) were approached, real practice was observed in 25 classrooms for whole lessons, 25 teachers and 5 head teachers were interviewed, and a total of 100 students were heard over 25 focus groups. Teachers were willing to take part in this study and welcomed the feedback and recommendations it provides.

Students’ learning is of central importance in education, and they are the best placed in schools to report the effectiveness of their learning, especially in such areas as ICT, because today’s children are the generation of digital technology. They also may find this study interesting by raising their awareness of the significance that ICT can offer them in their learning, as other technologies they use in their daily life do, for a better future.

The views of head teachers in this study were also valuable as they have an overview of everything that takes place in their schools. Their understanding of the study can inform them of how to best support and motivate their teachers towards full integration of ICT in the education process.

Specialist policy makers, who work in the ICT related department of the MOE will, without doubt, find this contribution fundamentally significant. They are responsible for any ICT initiatives, and having the results of a practice-based study of ICT in the education process will help inform these initiatives, including any related strategies or programmes such as professional development training.

The triangulation method and its advantages adopted in this study to enrich the research was intended to contribute in filling in the gap in knowledge in the field of ICT integration in the teaching and learning process in classrooms in Saudi Arabia. This is because, up until the time that the present research was proposed, there was no existing Saudi research in ICT for teaching and learning development, produced by compiled different methods and sources. Most of the related research was based on surveys and interviews.

In addition, as far as can be ascertained, this study is novel in all relevant research in education, in terms of relating the importance of ICT in education with the purposes of education based on HCT, which considers the development of economy for people and their countries, and CA, which concerns the development of wellbeing for people and society. So, this study suggests that understanding the importance of ICT in the educational process is subject to the understanding of why education is important; based on the dominant theories in education (recognised in many other country's policies.)

So, in addition to the main contribution above there are other contributions, which can be helpful to policy makers, the MOE, teachers, students and potential researchers. These are:

1. The study seeks to discover the current ICT use by teachers in the teaching and learning process in KSA: this will help teachers and head teachers to understand the current level and inform them about how it can be improved.
2. This study hopes to motivate policy makers or the government in drawing a special and clear full ICT policy that includes every detail necessary for the development of education quality.
3. This study could contribute towards the activation of the national development plan, including the vision 2030 goals in developing the educational process with the integration of ICT: this is especially true when the vision recognises the role of teachers and the need for their professional training; the role of students in developing themselves; the country and the whole of society; and the role of technologies in improving the quality of education provided for those students.

4. The current research aims to raise awareness within the whole community about the absence of ICT policy and motivate them to influence the KSA government to generate such.
5. This study seeks to reveal the hindering factors affecting the appropriate use of ICT in the teaching and learning process. This can then be brought to the attention of policy makers in order for them to address these issues. This is an important step if successful integration of ICT in education is to take place.
6. This study seeks to unpack successful ICT integration in the process of teaching and learning in classrooms.
7. The findings of this study seek to motivate and encourage policy makers in progressing the current state of ICT use in the educational process.
8. This study could be of interest to other relevant studies in developing the use of ICT in classrooms.
9. The importance of this study is derived from the importance of ICT in everyday life, and that the familiarity of ICT is rapidly increasing in the current world.

### **1.3 Statement of the study problem**

This subject is personally of great significance, and therefore to understand the context from which this study originated it seems appropriate to start this section with a few personal insights gained from my own experiences in order to better understand the motivation and significance of the study.

In 2013, I visited some educational institutions when studying for my master's degree at the University of Birmingham, and these were a primary school, a girl's high school, a secondary school, a sixth form academy and a college. What I saw was, for me, personally amazing and completely new to me. I saw students outside classrooms working on computers, and when asked what they were doing outside the class, they told me that they were doing projects based on their own independent research. I saw children using computers with confidence despite being surrounded by groups of strangers. Two girls escorted my group around the school and answered any questions we wished to ask them. For example, we

passed an office with a maintenance office sign on the door: I asked one girl what it was for and she told me it was the office for the specialist team dealing with technologies in the school. In all the visits, all the teachers used computers in the educational process in the classroom; students were engaged, worked in groups and led activities. I had had mixed feelings until I saw my four-year-old daughter sitting at a computer desk and touching a keyboard in the early years foundation stage in her school in Birmingham. Her teachers told me that they wanted to encourage the children to use technologies, as they are the new literacy in the world today. These stories made me proud of the educational environment; however, it led me to wonder about the differences between technology uses here in the UK and that of in Saudi Arabia. Yes, in history there has been a big difference, but there has been a lot of development since then. However, I was not convinced that the state of ICT in education in Saudi Arabia matched that of the UK.

This was highlighted when I collected data for my Master's degree dissertation: my UK experience was fresh when I visited the Saudi schools where I found everything was different to the UK educational institutions that I had visited. These issues included technical issues, physical issues, and equipment issues. From these stories, it led me to wonder what was wrong in Saudi education. In fact, I had been touched by a culture shock in terms of the education system. Saudi Arabia is the place where I born and raised, completed my public education and university study, and worked as a teacher. I was teaching up until 2011; I had never been trained on any kind of professional training development, nor was I involved in any decisions. I was appointed to three schools at the same time in the very large capital city and non-working computers with dust on them was common. ICT was not among our, the teachers', conversation. I never saw a policy or any kind of ICT document and had never been told if there were any.

Much 'ICT in education' research puts much emphasis on teachers' perceptions and attitudes (or what impedes teachers ICT integration) but many fail to consider the backbone of ICT in education systems, i.e. ICT policy, or the actual practice of the cornerstone of the ICT integration in the educational process, i.e. teachers and their actual practice in classrooms, or the voice of the main target in this process, i.e. students, or the broad purposes of education underpinning ICT integration in the teaching and learning process. All of this is considered in the present research.

The central focus in this study is how teachers use ICT in their teaching. However, it is also important to understand the current situation of ICT integration from the Saudi Ministry of Education (MOE) as the responsible body in that education system. In addition, the barriers affecting those teachers in using ICT in classrooms is considered as well. Therefore, the rationale for focusing on these three main dimensions is because teachers can do little with ICT if the MOE does not support them and encourage them to integrate ICT in their educational process, and that teachers can be prevented from using ICT in classrooms because of particular factors affecting them.

## **1.4 Aims of the Study**

The aims of this study are as follows:

1. To understand the current state of ICT in education from policy makers' perspectives in KSA.
2. To explore and understand how teachers actually use ICT in teaching and learning process in classrooms in KSA.
3. To reveal the factors that might affect Saudi teachers' use of ICT in schools.

## **1.5 Research questions**

Consistent with the aims of the study listed above the following research questions were generated:

1. What are the policy makers' views about the current state of ICT in education in Saudi Arabia?
2. What are the patterns of ICT practice in education in Saudi Arabian boys' secondary schools for the teaching and learning process?
3. What are the factors that affect Saudi teachers' use of ICT in classrooms for the teaching and learning process from a personal perspective, and in terms of the Ministry's policies, and its support and management?

## 1.6 Structure of the thesis

This thesis is structured into seven chapters, including the present introduction chapter. This is detailed in Table 1.1 below

**Table 1.1: Chapter overview of this thesis**

Chapter	Brief description
Chapter one	Gives a brief background, significance of the study and its problem, research questions and aims and the structure of the thesis.
Chapter two	Presents the study context, Saudi Arabia, with brief history, and education system and the development of education and ICT.
Chapter three	Presents the literature review, including the theoretical base, educational main issues, educational change and ICT policy, teachers professional development and its TPACK model, internal and external factors affecting teachers use of ICT in classrooms.
Chapter four	Provides the methodology employed in this study: a qualitative methodology situated within the interpretivist paradigm, a triangulation method of different data collection methods and sources, and thematic data analysis were followed.
Chapter five	Presents the findings of the study from all methods and sources in three main themes.
Chapter six	Discusses the findings of the study presented in chapter five in relation to the literature reviewed in chapter three in order to answer the research question.
Chapter seven	Provides the conclusion chapter, with the limitations of the study, suggestions and recommendation.

## **Chapter Two: Context of Saudi Arabia**

This research aims to understand the current state of ICT in schools, explore teachers' ICT use in classrooms, reveal any hindering factors affecting their ICT use in practice in the context of the Kingdom of Saudi Arabia (KSA), as well as provide insight into the development of ICT in the education system in KSA. To do so, a brief background of the country will be presented, followed by a history of the education system and its development, in order to have an idea of this aspect before moving on to the central feature, which is the education policy in KSA. Having insight into the above mentioned will help a transition to the main issue in this study which is ICT use in education and Saudi Arabia where its policy and development will be presented as well as a discussion on this issue relevant to the current study.

So far, evidence suggests that ICT integration in the process of teaching and learning in Saudi Arabia is far from the successful experience of other countries (Ageel, 2011).

According to Al-Thagafi (2008) despite the government initiatives in the Saudi education system in terms of implementing ICT in education, ICT projects failed to achieve the desired outcomes. In addition, ICT educational resources are almost absent as well as there being a lack of integration of the few resources that do exist into the educational process. However, as a starting point, it is important that national initiatives are adequate for this integration to take place in classrooms.

Despite the efforts the MOE made in compliance with the national development plans, the quality of education is still disappointing in achieving the objectives of the national development plans. Therefore, the role of the MOE is necessary in ensuring the achievement of these objectives through drawing up specific policies and strategies, as well as demonstrating the mechanism of their implementation in practice.

In Saudi Arabia, Aytekin et al. (2012) aimed to examine teachers' attitudes to using IWB (Interactive White Board) in their teaching. They found that, although teachers' attitudes were positive, the majority of teachers revealed their lack of understanding of how to use it in an effective way in the teaching and learning process. The study emphasises that teachers need training to support them tackling this issue in their teaching. The findings of another

Saudi study, across 28 schools in 5 cities, on the use of ICT by teachers conducted by Alghamdi (2008) revealed a lack of teachers' ICT use and professional development training.

An understanding of the wider context will set the scene for, and help to illuminate the specific issues.

## **2.1 Background of Saudi Arabia**

The Kingdom of Saudi Arabia is widely considered to be the origin of the religion of Islam; two holy mosques are located in Makkah and Madinah, both of which are cities in the western region of the country (Vision, 2030). For this reason, Muslims around the world ascribe enormous importance and appreciation to this country as, in addition to being the location of two holy mosques, it is a place which witnessed the life and death of the prophet Mohammad and the location which Muslims are required to face when they conduct their five daily prayers. Makkah is also the destination for hajj (pilgrimage) and Umrah.

Saudi Arabia is country in the Middle East that is geographically located in the heart of the Arabian Peninsula; it is the second biggest Arab nation in the world. According to the General Authority for Statistics of Kingdom of Saudi Arabia (2017a), in 1974 the Saudi population was just over 7 million, had reached over 22 million by 2004, and in 2017 the latest census showed that the Saudi population was recorded at 32,552,336. These statistics included both Saudi citizens and non-Saudi people living in the country. No statistics have been collected in terms of the religion of the Saudi people, as the government considers all citizens to be Muslims.

The political system of the Kingdom of Saudi Arabia currently exists as a monarchy; the country was established in its first manifestation in 1744 as a highly religious state, eventually forming into a uniform Saudi State which followed the same religious system. It was not until 1902 that the final and current form of the KSA was created when King Abdulaziz Al Saud freed Riyadh, the biggest city of the region, from his opponents. In 1932, the King succeeded in uniting the other regions, which is when the modern day Kingdom of Saudi Arabia was officially founded and announced as a united country, with laws and a Constitution largely derived from the Quran and Sunnah. The first article of the Saudi

government's basic law was established in 1992; this included a change in the main Constitution, which stated that the basic Constitution of the country's law is *The Holy Quran, and the Prophet's Sunna (Traditions)* (Saudi Ministry of Foreign Affairs, 2011). The power in the KSA is entirely in the hands of the King, who dictates all laws and orders, alongside the Ministers' council, while the Shura council, or the 'consultative council', gives consultation to the council of ministers chaired by the King (Al-Rushaid, 2010).

The most significant development in Saudi Arabia was observed after the discovery of oil in the country in 1938. After that, the country focused on the development of an administration and the country set up a number of ministries for organisational purposes (Ansary, 2015; Alsulaimani, 2010). As a result, the country has experienced a significant economic transformation since 1970 (Al-Rushaid, 2010).

The Kingdom has urged the government to develop many different fields (Alabdulaziz, 2017). So, the Kingdom is continually planning and initiating work projects in all areas of political resource, as well as social and economic development; this is being undertaken via a number of national development plans, termed '*five-year national development plans*' which began with the first official national development in 1970. The development plans of Saudi Arabia take the form of strategic documents that are released every five years, which mainly outline the strategies of socioeconomic development and include targeted aims to achieve these strategies over a five-year period, including the education system (Ministry of Economy and Planning, 2005). However, these development plans are left for each ministry in the country to develop and plan their projects based on the aims of national development, including the Ministry of Education and its development projects such as those that relate to ICT and teachers.

Although the Kingdom of Saudi Arabia is one of the wealthiest countries in the world, due to its status as an oil-producing nation, the government has realised that this form of income will one day end. Therefore, the government explicitly has put this as a central principle of the national development plans, especially in the latest national 2030 vision (Saudi Vision 2030, 2016).

In May 2016, the government officially announced their 2030 vision to the public, which involved aims to significantly accelerate development in all fields within the country to allow

the KSA to compete with other countries, with regard to development, on a global scale. Education was given significant attention in this vision as it promises the development of education quality through ensuring the provision of training for teachers, curriculum refinement, planning, reforming and evaluation and engaging 80% of parents in their children's learning process as well as in open discussion with the schools' stakeholders. This is to ensure students' acquisition of knowledge, skills, behaviours and morals in order to develop the economy for both nation and individual; and ensure people find enjoyment and fulfilment in their education, personal and social life (Saudi Vision 2030, 2016). However, as this thesis is about teachers and their use of ICT, the vision neither states what kind of training teachers will undertake, except the training to raise their awareness of how to deal with those parents in the open discussion, nor ICT in education. It does promise to improve infrastructure, and specifies broadband with high speed to be available in cities for 90% of households, and 66% in suburban areas. However, education was not specifically mentioned. Similar to the five-year national development plans, the aims and promises of this policy are left to ministries to draw up their planning based on the vision. However, it seems that the MOE is making many changes towards the development of education, although ICT for the development of teaching and learning processes is not explicitly included. but technologies in general, skills and provision, are mostly referred in the discussion of educational development.

### **2.1.1 Islamic view towards education**

First of all, we must understand what the roots of this religion are. Islam is based on the Quran – the word of Allah ‘God’- and the Sunnah - the words and action of the prophet Mohammad, who was the last prophet of God's prophets. So, the sources in this section are based on these two sources. I used King Saud University's Electronic Mosshaf project "Ayat" which is a translation and interpretation project of the Quran holy book; and refer to the Islamic scholars who were collectors of the words of Prophet Mohammad (Hadith).

The philosophy of Islam is an inclusive approach to life, urging people to think, learn and work in an honest and honourable manner (Al-hariri, 2013). Islam sees human beings in a distinctive way because God creates people in different way to other creatures, such as animals, so he gives people different minds, thoughts, and emotional feelings. This high appreciation is mentioned in Quran as *“And [mention, O Muhammad], when your Lord said*

to the angels, *"Indeed, I will make upon the earth a successive authority."* (Sura Al-Baqara, verse, 30). So, Islam urges people to deal and behave with themselves as well as with others in a right and well manner. Islam emphasises the necessity of the supreme values, and the right human and social relationships between people (Al-hariri, 2013).

In regard to education from the Islamic view, in addition to the abovementioned, education is highly encouraged by Islam and education must be made equally available for all males and females without differentiation (Alkhannani, 2016).

Islam urges the importance of seeking learning, the pursuit towards knowledge (Al-hariri, 2013). This is clear and encouraging in the Quran, such as *"Allah will raise those who have believed among you and those who were given knowledge, by degrees. And Allah is Acquainted with what you do"* (Sura Al-Mujaadila, verse 11). Allah in this verse is not only encouraging people to learn but also motivate them by telling them he knows what they do. Another example from the Quran is *"... and say, 'My Lord, increase me in knowledge.'"* (Sura Taa-Haa , Verse 114). Prophet Mohammad also asked God to help him with doing what he has taught him; and teach him what would benefit him; and give him more knowledge (Tirmidhi, Hadith no. 3599).

The view of Islam is to direct education to consider learners in terms of their spiritual, mental, and physical aspects, as well as raise the awareness of learners in terms of right, duties and responsibilities of themselves and others (Al-hariri, 2013). The goal of this is to provide individuals with the opportunity to gain a wide range of knowledge in order to influence their attitude more positively towards sustainable education and life which encourages them to learn lifelong, as well as encouraging them to learn and interact with others locally or globally, since education is inclusive of behaviour, practice, ethics, culture, knowledge and the world (Hassan et al., 2010).

Islam values teachers highly, and urges others to always respect them (Alkhannani, 2016). For example, Allah said in the Quran *"... Only those fear Allah, from among His servants, who have knowledge"* (Sura Faatir, verse 28). The interpretation of this verse is contested, however, the majority of interpretations scholars refer to are about people fearing Allah and his punishment by obeying God's servants, who have knowledge (Translator: Tabri).

Well known Islamic scholars such as those in the 9<sup>th</sup> and 10<sup>th</sup> centuries all confirm the importance of education for themselves and for society, as well as emphasis on the importance of teachers' knowledge and ability to teach learners. From the perspective of Islam, learners do not just receive knowledge, but their effective learning depends on their active involvement in the educational process (Hassan et al., 2010). In addition, because of the importance of the Islamic view towards the significance of education, this has influenced an increase in the number of educational places as well as the method of teaching gradually in the past centuries (Al-hariri, 2013).

### Segregation of gender

Having understood that the whole country's law and policies are based on the Islamic religion, this is reflected in educational policy's principles and objectives, which in turn influence practices and decisions in the education system. One of the decisions is the segregation of gender, as schools are segregated not only for students, but for the staff as well. However, they both share the same curriculum, processes and assessment (Bukhari, 2017). This segregation is not limited to education but it is the culture norm to segregate the genders in all other fields in the country (Baki, 2004). However, as Al-Munajjed (1997) argues, Islam does not support the segregation of gender including in education, but rather puts some exceptional rules between the two sexes based on their created nature. This does not mean they are not equal but Islam emphasises the equality for both males and females in their study and working (Al-Munajjed, 1997).

Recently, from experience, some activists in the country stress, through media sources, the importance of female teachers teaching both sexes of children at the primary stage. This is because they believe that children of this age would learn more from female teachers, given the fact that they stay with, and are influenced by, their mothers more than their fathers. However, such reasoning is more physiologically based rather than educationally. People think this is a religion issue, which may not be the case.

A relevant example of this was the issue of women driving in Saudi Arabia, as it was forbidden, and people relate this as being an Islamic issue. However, during the last decade, activists' requests to remove the driving ban on women did influence authorities, including the speech of Crown Prince of Saudi Arabia, Mohammad bin Salman, and the country's

Minister of Foreign Affairs, Adel Al-Jubeir. They assured people that this ban is not linked to Islam at all but rather it is a cultural issue that is based on social thought but not emanating from Islam. The Saudi vision 2030 promises the expansion of freedom and activity for women in the country (BBC, 2017).

Women's driving has now officially and legally been since June 2018. What we can learn from this example is that misinterpretation of what Islam allows and does not allow will influence the actions and reactions of Saudi people, and that the fact of the long term ban of women driving because of the misunderstanding of the real view of Islam will be the same for the segregation issue in Saudi education unless there is a serious intervention from the authorities to take action and raise awareness that this is not prohibited in Islam and that sexes must not be segregated.

However, the importance here is the question of whether female teachers can make a difference in children's learning. To the best of my knowledge, there is no specified research in the Kingdom that considers this issue, except a recent research study conducted by Wiseman et al. (2018) which is also relevant to this current study. However, there are few studies considering the issue of gender and girls in particular with regards to ICT use by teachers in the educational process. Evidence from recent studies revealed that female teachers outweigh their male colleagues in using ICT in classrooms. As an example, in their study conducted in 2014 in the capital city of KSA of 232 male teachers and 478 female teachers, Wiseman et al. (2018) found that female teachers use ICT in its different types more than male teachers in classrooms. However, this study was survey based and the sample of both groups was not equal in quantity, as the numbers of female teachers were just above double the number of the participating male group. The study could be more credible if these issues were addressed. In contrast, in his study based on 311 questionnaires, with almost equal completion by male and female teachers, Alsulaimani (2010) found male teachers who used ICT in classrooms were using it more than female teachers.

## **2.2 Education and development in Saudi Arabia**

### **2.2.1 Brief history of the development of Saudi education**

Makkah and Madinah have historically been, and remain, the most important cities for Muslims, in part because they are the locations of the two holy mosques; in the eleventh century, the first schools were founded in these two cities due to the symbolic and geographical relationship they had with Islam (Alabdulaziz, 2017). Classes often took place in these mosques, where largely religious lessons were taught (Alshamekh, 1982). Therefore, before the western region of Saudi Arabia was united with the Kingdom and during the foundation of the KSA education system, the two holy mosques continued to expand this system to other mosques in other regions. In these spaces, people learnt how to write and read, particularly with reference to the Quran through *katatib*, which refers to the process by which teachers meet groups of students in a place conducive to, and convenient for, learning. Teachers themselves, with the financial contributions of parents (Alsharif, 2011; Nawwab, 2001), directed the *katatib* education system.

In 1925, the first authority for the management of education in the country was founded (Alessa, 2009). At this time, there were only four schools established, covering two levels of study: the foundation level of three years, as well as the four years of primary education, until post-16 education, were embedded together in one primary level of 6 years (Alsallom, 1991). This authority has been considered by many to be the first instance of an educational policy in the Kingdom. This initiative was the most significant goal proposed by the first King, as there was a focus on building an educated society, which was thought to lead to a strong nation. The first authority was founded 7 years before the country achieved unity, and so members working for these authorities had to meet officially at least once a week.

From that time, a number of developments in the education system were established, such as a system of scholarship, private education and the introduction of a number of new curriculum subjects; this was the case until the system expanded throughout the country, which resulted in the creation of the Ministry of Education in 1953, which established a number of local education authorities across the larger cities instead of the centralised education authority headed by Prince Fahad of the KSA royal family (Hakym, 2000). Education for women was one of the main aims of the Ministry of Education after its

establishment; the General Administration for Girls' Education was founded in 1960, followed by the foundation of the Ministry of Higher Education, which in 1975 became the first authority of higher education (MOE, 1991). In 2015, the Ministry of Education and the Ministry of Higher Education was integrated under one umbrella establishment named the Ministry of Education; two subsidiary bodies exist under this organisation, one for general education and the other for higher education.

So, the stages of Saudi education development since the foundation of the kingdom can be categorised into three main stages as follows:

1. The first stage was to promote and strengthen the conviction of community in education, particularly women's education, and educational policy and system making.
2. The second stage aimed to quantitatively spread and expand education with the equality of education opportunities for males and females without distinction, as well as the pursuit of the eradication of illiteracy.
3. The third stage (and current stage): the goal of this stage is to achieve high quality in educational institutions, and focus on the improvement of students' achievements based on high standards (MOE, 2013).

The latest vision of the Ministry of Education is to improve the quality of education by launching advanced education initiatives in order to build a society with high standards of knowledge that can compete globally. The recent goals of the Ministry of Education include plans to build the Islamic, national and intellectual character of students, and providing education for all across every educational stage and to develop the standards of teacher training and selection. However, it is not clear what these trainings are, or who is targeted in terms of teachers, and how they will be implemented (MOE, 2016a).

There are many proposed initiatives to improve the educational quality of the nation and to improve educational outcomes to achieve developmental and social needs, as well as technical proficiency (MOE, 2016a).

### **2.2.1 Education system**

The Saudi general education system exists under the administration and responsibility of the Ministry of Education (MOE). In addition, there are a number of government authorities controlling education for their students, which follow the same Saudi educational policy and teach the same curriculum, and have the same educational stages and frameworks, for example, the security forces ministries. However, in terms of vocational education, Technical and Vocational Training Corporation (TVTC) constitutes the main body responsible for this type of education (Saudi Arabian Cultural Mission, 2016). It is true, though, that any development, reform, or restructure must come from the MOE.

The Ministry of Education for General Education authorises 42 educational departments located in the main regions of the country and are in charge of administrating and operating education in their regions based on Ministry policies. Of these, 17 are general education departments and 28 are local educational administrations. These departments exist in the regions where the general departments are located (MOE, 2015).

With regards to the implementation of educational policy (which will be presented later in this chapter), this is based on the top down process of education administration. According to King Khaled University (2014) the first responsible body in the implementation process is the MOE by drawing up its plans and strategies based on the national development plans and ensuring the provision of educational needs, including facilities, programmes and educational resources. This is followed up by the local education authorities in every region of the country as an administrative authority. Their role is ensuring that educational policy is implemented by supervising schools and education in their geographical regions; evaluating education in schools, including educational programmes, to assess the extent of professionals' effectiveness in achieving the objectives of educational policy; and being involved in drawing up educational policies, and providing MOE education development proposals.

This ends at the school, where the real implementation of educational policies and related programmes takes place, and where head teachers are responsible for ensuring the educational process is appropriate, and that any regulations and rules that come from the local education authority (LEA) are applied and implemented, including the educational

policies and their related plans and programmes. So, teachers' direct reference is to the schools' management; and the latter is directly linked to the LEA; and LEA is linked to the MOE.

### 2.2.3 Educational Stages

As with most countries, the Saudi education system comprises three stages. The first of these is the pre-primary stage of education, where children under 6 years of age can attend optional education. Next is the general education stage, where children are required to attend classes for the dictated amount of hours; this stage is divided into the primary level, where children must study for 6 years from the age of 5, second level intermediate education, in which they study three more years, continuing their compulsory education at the level of secondary education for a further three years. The third and final stage of the education system is higher education, where bachelors, masters and PhD degrees can be obtained at universities. Education at all stages is free, and all bachelor's students attending any university are paid an estimated expenses fund on a monthly basis to encourage them to complete their studies at the higher education stage, which is optional for all students (MOE, 2016b).

Education is free in Saudi Arabia, but the latest national survey by the General Authority for Statistics of the Kingdom of Saudi Arabia (2017b) (Table 2.1) shows that the number of people not enrolled between the ages 6 and 24 is high. According to this survey, the reasons for this high number are varied, but the most frequent reasons include: work, family assistance, marriage or pregnancy.

**Table 2.1: Enrolled Saudis in public education and not enrolled Saudis (age 6 to 24)**

Public Education level	Enrolled		Not enrolled (age 6 to 24)	
	Male	Female	Male	Female
<b>Primary (6-12 years old)</b>	1,221,082	1,188,154	690,018	639,237
<b>Intermediate (12-15 years old)</b>	591,565	576,368		
<b>Secondary (15-18 years old)</b>	640,997	551,015		
<b>Total</b>	4,769,181		1,329,255	

#### **2.2.4 National plans and Initiatives**

Development in the educational sector has been included as one of the main aims in all five-year national development plans. So, the development in education is mainly based on the national development plans. One of the central goals of Saudi Arabia is to keep up with 21<sup>st</sup> century global development, which includes a heavy emphasis on education. Therefore, in order to keep up with the global development of social life and education, the Saudi government has promised to ensure the implementation of such goals, including the use of technology (US-sabc, 2010).

The principals of national development plans include the following:

- The commitment of the state with the principles of Islamic law (Sharia) and maintaining its related moral and cultural values.
- The importance of achieving social wellbeing and citizens needs by establishing a series of authorities and providing free services to achieve this.
- Support economic freedom within the public interest.

These central principles lead to the following aims:

- To maintain Islamic and moral values through applying the principles of Islamic law (Sharia) and circulate and support them in the country
- To foster the defence on Islamic religion, the country; and to continue to maintain the national security and the social stability.
- To continue balanced economic development by the development of national resources, thus the improvement of social wellbeing can be achieved.
- To reduce reliance on oil as the main source of income.
- To develop the workforce through education, training and health.

- To finish main facilities related to the achievement of all aims of the national development plans.

Among the aims of these plans are ensuring ICT provision is in every school in order to improve ICT integration into the process of teaching and learning, which is in turn preparing teachers and their students for what this century needs. (Sulaimani, 2010).

The seventh national plan of 2000 aimed to generalise primary education, while the third defined aim was to ensure that every child in the KSA received education at a primary level by 2015 (Ministry of Economy and Planning, 2005). The first supreme reform of education in Saudi Arabia occurred when the Ministry of Education issued its 10-year plan, 2004-2014, which aimed to develop technologies infrastructure to improve the quality of education (Ministry of Education, 2004).

In their eighth national development plan, which spanned the years 2005 to 2009, the government of the KSA focused particular attention on the ninth aim in education and technologies development. Further, the fourteenth and fifteenth strategic principles have stressed the development of education systems and training in all areas. This has allowed attention to be paid to their outcomes and facilitates the meeting of changing needs within society, as well as aiding adaptation to the labour market, the requirements of development and advances in knowledge and technologies (MEP, 2005).

Recently, the Saudi government announced that funding for the education system had constituted a quarter of the total budget of 2015, with investment of over 36 billion SAR; this figure is 18 times higher than that spent on the 2007 *Tatweer project*, which will be outlined later (Ministry of Finance, 2015).

As mentioned earlier, the Kingdom has introduced its national vision of 2030, in which education is considered one of the main aims. According to Prince Mohammad bin Salman, when discussing the government's commitment to the 2030 vision with regard to education, Saudi Arabia *"will continue investing in education and training so that our young men and women are equipped for the jobs of the future. We want Saudi children, wherever they live, to enjoy higher quality, multi-faceted education. We will invest particularly in developing early childhood education, refining our national curriculum and training our teachers and*

*educational leaders. We will also redouble efforts to ensure that the outcomes of our education system are in line with market needs.”* In addition, the educational aims of the 2030 vision include plans to develop public education and to improve ICT infrastructure, and enhance the role of teachers by improving their training and evaluating their progress levels; this would culminate in an annually published record of indicators of educational outcome measurements.

Despite these admirable aims, the work “*Reforming the Saudi Educational System*”, written by Alessa (2009) before he was appointed as the current minister of education, criticised the failure of the educational system in the KSA. He claimed that, although there have been a large number of initiatives for education development over the past three decades, they have all failed due to a failure to take into account the problems related to educational systems and the various complications, be they internal or external. He put the current educational policy at the heart of his criticism as he argues this policy is old and does not meet today’s education needs and is not forward thinking, rather it reflects a nation that wants to maintain its religion, heritage and values. The issue of policy will be presented later in this chapter. According to educational policy’s relevant Saudi literature such as Alaqueel (2005) and Oyid (2009) the factor most affecting education in Saudi Arabia is its policy.

### **2.2.5 Education Profession in Saudi Arabia**

Before briefly presenting the role of universities in preparing future teachers, it is worth briefly giving insight into how those teachers are appointed in schools. This is especially so when considering the fact that the situation of offering jobs to teachers in KSA is different to many other countries where applicants can apply for teachers’ jobs directly, in particular where the decision is made by the school. However, in Saudi Arabia, after students, successfully complete their study and obtain their degree, it is the commitment and responsibility of the MOE to offer them their teaching jobs and appoint them in the country’s public schools in the administrative regions and their governorates. Teachers’ prior preference is taken into account but this is subject to job availability in their selected options. However, the MOE cannot guarantee the jobs if Local Education Authorities have not raised needs or scarcity of teaching jobs in their administrative regions or governorates. The determinants of such needs can be teachers’ retirement, opening new schools, teacher’ exceptional leave or study leave, closures of some schools or for financial reasons (Salem,

2004). The first three determinants are the most common. The middle two are less likely to happen, and the financial issue, seems even less likely as the MOE do not appear to have struggled financially for decades; this ministry has had the larger portion of the budget of this wealthy country. In terms of permanently closing some schools, given that the KSA is geographically large with population spread throughout the country, the MOE has annually increased the quantity of new school development and teaching recruitment available for teachers. However, because of the shortage of available Saudi Arabian teachers, the Ministry had to sign contracts with teachers from other Arab countries to teach particular subjects (Alofi, 2014). However, many student teachers are citizens in the Kingdom, who graduated from university and were eligible for teaching jobs, and waited for their recruitment as teachers for up to 10 years when their jobs were taken by those who were hired from neighbouring Arab countries. The purpose of this could either be to improve the quality of education or because the wages of non-Saudi Arabians are largely less than those of national citizens. I have been taught by teachers from neighbouring Arab countries throughout my education, I would say that there was not much difference between these groups of teachers. However, many examples seen in practice could cast doubt on the training quality of non-Saudi teachers and it is also possible some of them have never been trained. For example, Al-Hazmi (2003) argues that teachers hired from neighbouring Arab countries lack good training either pre or in-service training. So, the salary rationale seems to outweigh the rationale of improving the quality of education.

However, the laws of Saudisation have paid the price of getting rid of non-Saudi qualified teachers and instead appointing Saudi teachers who were not only unprepared and untrained but also because some of them found the only employment opportunity available for them to get paid is to teach (Fakeeh, 2009).

One of the main roles played by the Ministry of Education is a responsibility for training teachers (Alquraini, 2010); this role has been partly assumed by the King Abdullah project (Tatweer), aimed at improving teachers' professional development. This project was introduced in 2013 in response to the development of the 'public education strategic plan', which involved preparing 250 experts from all regions of the country, as selected by the executive corporation for the 'King Project for Education Development', or *Tatweer*, who will later train new and old teachers throughout the country via extensive training programmes. This programme aims to change the current situation in education by raising

the skill level of teachers and providing them with all they need in terms of educational experience; this allows them to work in a modern educational environment, developing students' skills and encouraging them to embrace educational creativity and development (SPA, 2013). However, this project is lacking in specific areas of development, as it does not state what exactly teachers will learn in order to develop professionally and, consequently, develop their students in accordance with the set aims of the project. In addition, the project does not mention any new or educational strategies that teachers can learn about for their own professional development.

Universities and, formerly, teachers' colleges are responsible for teaching and training their students in different schools before they are appointed as official teachers. All students have to undertake four years' study in order to take up their main subject related courses, alongside general subjects. Students also have to undertake a course related to teaching methods, which usually takes place during the last semester of their third year (International Bureau of Education, 2011). During their final year, students must undertake an internship and get hands-on teaching experience under the supervision of their module tutor from their university.

Altoderi (2005) revealed that, although the government is continually planning and implementing their ICT initiatives in schools, ICT is still falling short of the aims assigned for those projects. He claims that Saudi teachers need to be competent in ICT skills not only in a technical sense but also, more significantly, in the ways that ICT can be used for learning and teaching practices in an educational environment. The author, then, has stressed the necessity of training teachers not only in-service but also training them intensively through pre-service classes in teachers colleges, universities and other institutions.

In the second phase of King Abdullah bin Abdulaziz's Public Education Development Project (Tatweer), One of the development programmes across a variety of curricula is to have a programme of computers and ICT within the curriculums of elementary and secondary schools; this is one of the more significant developments observed in public education strategic planning. The programme lasted for three days, and started small by training 30 supervisors from IT departments from a number of local education authorities to increase their awareness of the new strategy in regard to development in IT and computer science curriculums and prepare them to be certified trainers representing their LEA (Alegt,

2013). So, they are required to train teachers in their regional education authorities because the programme aims to develop ICT curriculum and train teachers to improve the educational process with the use of ICT in classrooms. However, the number of learners in this programme is very small and is not equal to the 42 LEAs throughout the country, not to mention the large number of schools in each LEA.

In response to the ninth plan, the Ministry of Education introduced its 2010-2014 plan which included a number of proposed projects; one of these projects was a development project surrounding the educational process. The aim of this project was to provide educational services for all public education stages by introducing a number of main projects which were designed to develop teacher competency and performance through programmes such as domestic and overseas teacher training, which aimed to support the in-service training for teachers. Further, these projects included a ‘teaching strategies development programme’, which was designed to improve teachers’ confidence in teaching methods and strategies, particularly in terms of integrating ICT into the classroom (MOE, 2010).

From my experience, in the education field - both as student and teacher, and from Saudi research evidence such as Wiseman et al. (2018) and Amoudi & Sulaymani (2014), the most commonly observed teaching process in Saudi Arabia’s schools is the traditional approach, through which teachers are the instructors and learners are the receivers. Under this framework, students do not engage with the teaching process; instead, they listen to what teachers dictate to them in the classroom and depend upon memorisation to pass their exams.

However, in 2005, the MOE introduced a new project which aimed to develop the teaching and learning strategy termed the “Teaching Strategies Development Project.” The main aim of this project was to transform the process of learning and teaching by prioritising the effective role of learners in the classroom (Alromi, 2012). However, the outline of the project does not specify aims for learners but instead focuses on the teachers and educational supervisors, who are provided with the required skills to choose or construct their own educational strategies. In addition, the project defines a number of roles for learners and teachers; this project dictates that learners should be at the centre of the learning process, which means they must be involved in designing the learning environment and have a say in whether they learn best independently or when cooperating in groups, as well as being given the independence to search for and access resources and utilise them effectively (Addandani,

2011). While the main role of teachers is to encourage students to take part in free engagement and involve themselves in the educational process, they are also there to provide solutions to problems, appropriate educational resources, opportunities for students to think positively and creatively to find solutions and to encourage them to work more independently. Independent work can be fostered through requests for homework and independent projects which will create a learning autonomy. Teachers may also guide students indirectly to avoid student frustration, which could result in negative attitudes toward teachers and learning. Examples of the main learning strategies included in this project are the cooperative learning strategy and the knowledge building strategy (Ahmad, 2012). However, with the lack of teachers' training, it is doubtful whether they will be ready for that. This is also in addition to their lack of involvement and awareness of educational policies and development. These issues will be discussed in the next sections.

Teachers and trainee teachers confront a number of challenges in their training; teachers often, at some point in their studies, suffer from a lack of training, either during their university studies or their service training. Teachers also frequently face challenges related to the financial and reward principle, the lack of resources and the lack of a physical school environment in which to practice teaching (Alzaida, 2008). Other issues are related to ICT provision, management of the schools, evaluation, time and workload. These factors are discussed more in chapter three (Sulaimani, 2010).

### **2.3 Educational policy in Saudi Arabia**

Educational policy is part of the overall policies of the state, and emanates from the religion and belief of the country (Islam) where, worship, legislation, and the system of the whole life are based (Alshaer, 2007).

The first and only educational policy body, up to date, in the country was founded in 1970. The educational policy in KSA is officially controlled and administrated by the government where the Supreme committee of educational policy in the KSA is the only authorised body for drawing up educational policies (Alreshidi, 2016). The committee was founded in 1963; and is presided over by the country's king with membership of some other ministers including the minister of education as the highest responsible authority. The committee's duties include drawing up the educational policy for the KSA; approving the educational

plans and their projects based on the national development plans; coordination of all of the different stages of education and other various sectors of education in order to improve the overall quality of education in the country; and approval of any actions and procedures from the MOE in terms of the curriculum reform to achieve the objectives of the MOE, the educational stage as well as the society (Ismael, 2010).

In the Saudi basic law of governance, Article number 13 states “*the aim of education is to implant the Islamic Creed in the hearts of all youths, to help them acquire knowledge and skills, to qualify them to become useful members of their society, to love their homeland and take pride in its history.*” (Saudi Ministry of Foreign Affairs, 2011).

The document educational policy in Saudi Arabia has been defined in its official document as “*the general guidelines that educational process is based to perform the duty of identifying god and his religion to student who will behave in God’s legislation; and to meet the society’s needs; and to achieve the goals of nation.*” The policy also states, “*the educational policy emerges from the country’s religion which Islam that the country’s people and law and regulation and judgment; and this policy is main part of the basic policy of the country,*” (MOE, 1980).

According to MOE (1995), Saudi education policy expects the teachers and students to achieve the ‘goals of their country’. Whilst the education policy in the KSA was designed and issued according to Islamic and social principles, it encourages influence from international initiatives that do not contradict Islamic beliefs (Alshaer, 2007). The Saudi educational policy states a number of basic principles, including “*(a) the belief in Allah as our God, in Islam as our religion and in the Prophet Mohammed's message (peace be upon him), (b) the complete Islamic visualization of universe, and life, (c) the individual's duty is to learn, and the government's duty is to provide education, (d) females' right to suitable education is equal to that of males, (e) education at all stages should be connected with the general development plans, and (f) the Arabic language is the language of instruction.*” (Alshumaimeri, 2003).

The main objectives of the educational policy effective in the KSA are as follows: “*to ensure that education becomes more efficient, to meet the religious, economic and social needs of the country and to eradicate illiteracy among Saudi adults*” (Saudi Arabian Cultural

Mission, 2016). The primary aims of Saudi education, as it is stated in the educational policy, are *“to have students understand Islam in a correct and comprehensive manner; to plant and spread the Islamic creed; to provide the students with the values, teachings and ideals of Islam; to equip them with various skills and knowledge; to develop their conduct in constructive directions; to develop the society economically and culturally; and to prepare the individual to be a useful member in the building of his/her community”* (International Bureau of Education , 2011, p. 1). The thesis will return to this mix of economic, collective and personal goals for education in a later discussion of human capital and capability theories.

Some have criticised the fact that the Saudi education system and its policy have not been altered since its establishment in 1970, which has led a number of researchers, including prominent academics, Qahtani (2010) and Alessa(2009), to criticise the educational policy in Saudi Arabia. For example, Qahtani (2010) stated that, while the Saudi educational policy does fulfil its role precisely, the policy needs to be refined and reformed as it is no longer logical and rational to apply the same policy with the same words which were designed for a different time, circumstance and purpose. He claims that reform is necessary as the current rate of development around the world, particularly in terms of ICT and curriculum, has led many to call for changes, including those surrounding the first stage of the educational policy. Similarly, Alessa (2009) claims that all policies, including those addressing education, are subject to change according to fluctuations in the development of societies and their cultures. He suggests a number of elements that the new educational policy should consider based on a number of principles which reflect current cultural values; this process should take into account the political, economic and social variables of these values and pay attention to future needs and cultural requirements. One of the proposed elements of this policy is that one of the main aims should constitute the creation of real change in the new generation’s mindset through a process of enhancing their mental capacities, motivating their discovery and search and inquiry, and then enabling their acquisition of mental and manual skills, which in turn will help their future productivity as well as providing skills and knowledge to fulfil their own personal and social life. In addition, Alessa highlights the necessity of increasing peoples’ awareness of the new educational policy by promoting the idea that the developmental needs of society are associated with education; associating any development initiatives in education with essential development needs is a basic principle in

achieving favourable education outcomes. He also emphasises the importance of ensuring the respect of people's freedom in their choices by developing the concepts of human rights and ingraining their accountability towards society and its wellbeing.

In addition, Qahtani (2010) stressed the necessity of utilising ICT and keeping up to date with technological developments when attempting to reform educational policy. He also suggested that the government needs to establish an independent council to reside over educational policy, which should be comprised of experts in this area, who are employed by the MOE. In addition, and arguably more interestingly, Qahtani advised that the final and refined educational policy must be published and given to every single teacher, alongside its guidelines. He also suggested that after reforming the policy, it would then be necessary to produce very clear and detailed strategies in order for the educational policy to be effectively implemented according to its objectives.

Finally, it is important to state that the general education policy is the main policy which all schools abide by; however, other policies from either the general education department or school management are considered to be policies which complement the main educational policy, if there are any.

## **2.4 ICT and development in Saudi Arabia**

Following on from the discussion of the Saudi educational policy, this section will focus more specifically on ICT development in education in the KSA. Education policies have been confirmed as one of the factors that can affect teachers' use of ICT in their schools (Webb & Vulliamy, 2006). Thus, after highlighting the general educational policy in Saudi Arabia, it is also important to consider the ICT development and policy specifically.

The 9<sup>th</sup> national development plan aims for the expansion of ICT use in the country with the provision of training for the workforce, including those in education, in order to keep up with global development through the advancement of technology to improve the quality of education, with the necessity of training teachers in ICT, which in turn will help the improvement of the country's economy growth (Al-Madani & Allafaijiy, 2014). However, in terms of what and how to train teachers in ICT for education, this is left to the MOE to

draw up their own plans and strategies in order to meet the aims of the national development plans.

One aim of the 10th national development plan is to develop human resources, improve the productivity of people and develop their knowledge, skills and experience through allowing extended options. The aspects to be achieved include improving teachers' educational efficiency, and in particular their skills and knowledge capacity, technology curriculum development, provision of infrastructure of education and technology in schools and universities as well as the use of modern means, development of schools' regulations and rules based on fairness and competition principles and development of national professionals' programmes to keep pace with the advancement of knowledge and technology (Al-Habeeb, 2014).

Based on the national development plans, the Ministry has increasingly considered the integration of ICT as an important component of all stakeholder interaction in public education, which includes the Ministry and its local educational authorities, teachers, students, parents and related communities. Therefore, the Ministry set about to review and study approximately 100 educational projects, with the aim to select and apply a number of them based on the interests of the stakeholders (MOE, 2007). This has translated into a number of attempts, via a number of projects and initiatives, implemented in response to the five-year national development plans.

In regard to ICT policy in Saudi public education, it is very necessary to ask this: does the Ministry of Education have a specialised ICT policy? The answer is no. However, the educational policy is regarded as the main policy of education activities and practices, including the use of ICT in schools. However, in this current study the criticism is that ICT related research in the context of Saudi Arabia has extracted the objectives and principles of the Ministry of Education' projects and their related programmes and called them policies of ICT. This could be due to misconception of the policy term or misguidance of what ICT policy is from stakeholders in the Ministry, LEA or schools. This current study wants to clearly clarify this issue in order to avoid any chances of misleading or misunderstanding the nature of the discussion on ICT policy in the KSA. So, this chapter has clarified that the educational policy itself comes from the overall state policies, and that any developments in schools, including ICT, are based on the national development plans that are produced every

five years. In terms of how to achieve what these plans require, this is left to the targeted authorities (including the MOE) to draw up their project plans and strategies and implement them through different programmes based on their special objectives in the development plans.

The eighth development plan (2005-2009) emphasised issues of the digital age, which were then considered in the development plan; with regard to this plan, four aims have been significantly stated and are comprised of the following: the development of ICT infrastructure, increasing internet resources in the Arabic language, minimising the digital gap within society and implementing an e-government (MEP, 2005).

Further, in 2001 the government of Saudi Arabia authorised the Ministry of Communications and Information Technology to design a national plan of ICT, along with the appropriate mechanisms to implement it, in the intended sectors; this was completed by 2006 (Al-Ghadeer, 2011). The fourth of the main seven aims of the plan was in regard to education, which emphasised the *“Optimum use of ICT in education and training at its all levels.”* While useful, this does not define who, specifically, should be using ICT; is it for students or teachers, management staff or for the Ministry staff? The issue here is that after this plan had been announced and applied, the Ministry of Education introduced different initiatives for the application and implementation of a national plan of ICT and, in particular, to achieve the set aims relating to the use of ICT in education. Therefore, the undefined nature of the stakeholders referred to in this aim of the plan could result in lack of clarity across other Ministry-led ICT projects, based on the fourth aim of the national plan. It should be stressed that, during this period, the optimization of the use of ICT over all levels of education by all stakeholders could be challenging; this plan occurred during the second ICT development phase, a time when only a few stakeholders had adequate knowledge or skills with regards to the use of ICT. This has been cited as one of the reasons for the failure of all programmes running at that time (Alghamdi, 2008).

One of the main aims of any initiative in regard to ICT in education in the KSA is to keep pace with the latest advances in ICT transnationally and apply them to the education system (Alabdulkarem, 2008). Therefore, the latest ICT initiatives arise alongside other initiatives, which prioritise keeping pace with modern development around the world, including that in ICT, to achieve the aims of the National Strategy for Public Education Development in the

Kingdom of Saudi Arabia; this programme was designed by King Abdullah bin Abdulaziz as a project for public education development (Tatweer). The strategy was launched based on the basic laws of the kingdom and that stated in the educational policy and the governmental orientations. The vision of this educational development strategy, set to run until 2023, is that *“a student achieves his/her highest potentials, has complete character, participate for his/her social development, his/her loyalty for his/her religion and nation through a high-quality education system,”* (MOE, 2013).

According to Tatweer (2015) this strategy was designed in accordance with guidelines accredited in the best international practices, as well as national and international experiences. The strategy, in regard to ICT parts, include aims such as optimum investment and expansion in the use of appropriate ICT in schools with constant maintenance, the development of an educational portal for teachers and students to share experiences through communication network, by facilitating student learning through the creation of digital content for the curriculum, and by building teachers' ICT capacities to enable them to integrate ICT in their teaching. To achieve these aims, the strategy set a number of procedures, such as the development of rules and regulations for ICT use to be expanded; in addition, the strategy set out to ensure that ICT was consistent with the design of school building and the aims of previous educational policies and ensured that ICT infrastructure be available in all schools, while providing all schools with the ICT resources necessary to ensure all schools members can access essential resources.

However, it has been argued that there is no relation between the strategy formulated by the Ministry and the reality of its implementation. Consequently, the improvement of education through the use of ICT has remained, according to the World Bank, at a low level, though whether this refers to the quality of the teaching, it is difficult to discern (Wahab, 2008). There are a number of factors contributing to the present state of the pertinent policy's outcome.

The first problem with this strategy is that it was set as a counter to the national issue which set up the national development plans, without giving any direction with respect to the process of implementation itself. In addition, it failed to raise awareness of its process amongst teachers and its practical impact on teaching and learning (Allehaidan, 2015).

Almengash (2006) stresses the potential of teacher-led policy implementation, which would be the result of teachers' awareness of the policy's vision and goals. The involvement of teachers in educational policies represents a crucial step forward in the success and quality of these policies, not only for the abovementioned reasons, but also in terms of their professional and financial motivation. Moon (2007) believes that the quality of teaching cannot be improved without motivating factors being present which could help teachers to perform well; this includes financial motivations. As for professional motivation, this may be achieved through the training and preparation of teachers during their university studies (Moon, 2007).

However, provision for teacher development still remains largely inadequate as the service training is optional and offers only a limited number of programmes (Al Mofarreh, 2016). The ICT training designed to aid teachers in the use of technology suffers from similar problems. Moreover, teachers' training programmes in ICT are still challenging for a number of teachers, as most teachers do not possess a base level of ICT skills, and lack sufficient time to participate in the training programmes because of their work load (Alabdulaziz, 2017). Moreover, regardless of the strategy's aims, which are supposedly to provide the teachers with a training programme, it does not specify the required qualities of a person responsible operating this programme in practice.

Another important factor which represents a barrier is that teachers might be confused between MOE policy and directives issued by their local education authorities, especially when they are often more aware of the latter than the former (Alsulaimani, 2010). If ICT to be implemented effectively, teachers should be guided by clear guidelines, and so in this case if the directions or guidelines are different this could be problematic. Moreover, local authorities might not accept the changes imposed by MOE, thus hindering education development efforts (Al Mofarreh, 2016). In his study, Arnolds (2006) stated that not all Saudi teachers are flexible enough to accept externally imposed values and, consequently, prefer to follow their local values. The local authorities are likely to remain unaffected by the proposed changes in terms of improvements to the teaching profession, though they are fully aware of the constant demand by teachers for changes, particularly those related to demands for a reduction in workload.

As this study mainly focuses on teachers, it is necessary to mention that, there is a distinct lack of Saudi literature concerning ICT and general educational policy and concerning the relationship between ICT use amongst teachers and educational policy.

However, from the limited amount of literature available on the subject, it is clear that the current documents of ICT initiatives and plans in Saudi Arabia lacks clarity in terms of the objectives of its implementation; to put simply, they do not explain how the implementation should be performed. It is necessary, therefore, to identify their related matters and possible modifications and improvements, before any policy can be properly implemented.

It is clear that there is no connection or relationship between the available ICT in Saudi schools and its implementation in practice. Therefore, some researchers in Saudi Arabia (Almalki & Williams, 2012; Al-harbi, 2014) argue that this gap requires a careful educational ICT strategy and the ensuring of its implementation in practice.

## **2.5 ICT availability in Saudi schools**

One of the ICT projects from the MOE is ICT labs and the LRCs project where almost 149,000 computers were provided in all elementary and secondary schools. This created a computer to student ratio of 1:10, which according to the MOE is compatible with the global average (MOE, 2013).

According to MOE (2014) every school has learning resources centres (or rooms as it is named in the Ministry and schools in KSA). The aim of this centre is to allow both teachers and students access to the available ICT, including computers, interactive white boards and the internet. Every centre has a room for teachers to use if they wish their session to take place there. However, the availability of learning resources centres is not easy because teachers need to pre-book the centre with the centre coordinator and that usually takes time; and because each school has only one such learning centre. This is especially the case when teachers who are non-users of ICT and traditional in their teaching, book these centres for their traditional lesson to take place, while other teachers who want to use ICT in the centre cannot because of that. All teachers and students have the right to benefit from such educational centres in their schools, so those ICT users will be prevented from the use of ICT in their classrooms because of the lack of ICT resources.

The first recorded attempt to integrate technology in education in the KSA was in 1980, when the King Fahd University of Petroleum and Minerals introduced the computer-assisted-learning project; after two years, this project had been expanded to university students studying computer science programmes and students training in the School of Education at the prestigious King Saud University (Almoghairah, 1993). In the field of public education, which is directed by the Ministry of Education, the idea of introducing technology was one of the main aims of the official governmental plans; however, it took 16 years until the first authority for technology in the education sector was established.

The development phase was aimed at promoting the study of computer science as a subject for students (Ministry of Education, 2003A). Alhakami (2000) reviewed the Ministry's first phase initiative which initially began when the Ministry introduced ICT as an optional subject to high performing secondary schools; this dealt with introductory topics of computer skills, programming, and the use of information systems. However, because of the lack of computer availability in these schools and the fact that the project was only applied in a few schools, this project was not a success (Alabdulkarem, 2008). As a result, the Ministry had to introduce an alternative subject to secondary schools in cases where the use of technology was not necessary for achieving the aims of the new subject, which was later revised and developed to enable student's access to computers in 1994. In 2000, the Ministry of Education made the subject of computer science a compulsory subject for secondary school students for both boys and girls, but for elementary schools this subject became compulsory in 2011.

It should be noted at this stage, that the aim of public education ICT classes was, officially, for students to undertake the subject and be taught theory 45 minutes once a week and practical skills in an IT laboratory for another 45 minutes once a week (Aljobair, 2001). In addition, it is necessary to acknowledge that training programmes were optional for teachers and very few teachers actually enrolled in such training. However, this phase was important as it constituted a transition from theoretical subjects to both theoretical and practical, which went on to contribute more positively in the second phase. On the other hand, it is true that this project has not achieved yet what it has aimed to, similar to the case of teaching English as a subject for 7 years in schools with a consistently low level of outcome (Allehaidan, 2015).

The MOE has continually given attention to the necessity of ICT integration, not only as a subject taught within the school curriculum, but also as a vital component of the teaching and learning process across the curriculum; it has also begun to permeate educational administration in schools, and the second phase is based on the provided software and online resources regarding which the Ministry has adopted a number of initiatives (MOE, 2014). The delay in integrating ICT in the learning and teaching process comes as a result of a number of issues and challenges confronted in the first phase, such as a lack of ICT knowledge, not only for students, but also for teaching and management staff; this has created a complicated attitude toward ICT which will be further explored in the empirical study.

The development strategy of the eighth national development plan considers education development as one of its primary aims and demonstrates that the achievement of this aim depends on a number of policies, such as the inclusion of IT subjects over all general education levels (MEP, 2005). However, as of yet, the inclusion of this subject has only taken place at the intermediate and secondary levels and not at the primary stage. Therefore, since the release of this plan, the Ministry of Education still has trouble implementing this policy in primary education, having been in the works for over a decade.

After discussing the above, the following will present two important projects, which serve as examples of ICT development in the KSA.

### **2.5.1 Watani**

The MOE has introduced programmes aimed at training teachers in the professional use of ICT. The first initiative was launched in 2006 and was called Watani ('national'), which was aimed at improving the use of ICT within the educational process by training teachers in ICT use in education; the initiative also pushed for increased internet use in school through a project called 'Schools Net', which provides a variety of electronic resources for teachers, students and their parents (Tatweer, 2006). The main objective of this project is to develop teachers' capacity with regard to ICT in all educational activities. Other objectives of the project include the development of student learning skills through the use of ICT, the increase of knowledge amongst students via access to electronic resources, and fostering a

sense of preparedness for the future in students, as well as the more general goal of advancing the use of ICT in all regions of the nation (Tatweer, 2006).

## **2.5.2 The King Abdullah bin Abdulaziz Project for Public Education Development**

### **First Phase**

In 2007, the King Abdullah bin Abdulaziz Project for Public Education Development was introduced through approximately £1.6 million of funding; this was designed to be an initiative for reforming the educational system in the country, including the introduction of ICT for the educational process in efforts to accelerate national development. Arguably the most pertinent aspects of this project to this study were that it included the following: developing the educational curriculum, developing teacher competency in ICT, and encouraging the integration of ICT in the teaching and learning process. The project has a number of components, including 'ICT Integration in the Educational Process', which considers school management, e-content and digital curriculum, and ICT-school environments conducive to the teaching and learning process.

The project was first introduced to improve education by modifying the school curriculum and providing the teachers and students in the selected schools with technology devices to be used for the educational process (Tatweer, 2015). This project has encouraged a large number of teachers to attend the assigned training by motivating them financially per training session.

The implementation of this project took place at a few selected schools in each region of the country (Alghamdi & Higgins, 2015). Teachers and students in the selected schools were provided with laptops which had limited access to the internet; however, students were not given any prior training and not all teachers participated in these training programmes Almasoodi (2013). However, since the project commenced, it has not shown any evidence of a successful implementation Alessa (2009).

Almasoodi criticises the failure of this project. Commenting on the project head revealing that the project has not achieved its goals yet, the author attributes this failure to the absence

of the clear planning of the projects and its programmes. He particularly criticised the ignorance of teachers' involvement in this planning, and the absence of adequate training. Teachers, who instead of being given introductory training on any changes to take place based on the project, were rather surprised by being asked to implement the project. He also criticises the absence of the project's programme outcomes, justifying that parents, students and the whole nation needs to know what is out there in education development.

## **Second phase**

The King Abdullah project was planned to last six years; however, because of a variety of issues during the first phase, the project was extended to last another six years. The second phase of this project has been developed as the King Abdullah bin Abdulaziz Project for Public Education Development (*Tatweer, 2016*), with a government fund of about SR9 billion (£1.8 billion). This phase consisted of a number of projects for teachers, students, schools, leaders and local education authorities, with an aim to develop an effective public education system in the country (Tatweer, 2015).

However, this project has not yet achieved its goals, as the head of the project confirmed in an interview with Al-Jazirah newspaper (Al-Tareri, 2014).

Recently, the Saudi government announced that the education system had taken up a quarter of the total budget of 2015, with funding in excess of 36 billion SAR, 18 times more than that spent during the first phase of the *Tatweer project* in 2007 (Ministry of Finance, 2015).

As part of these wider initiatives, in the second phase of the project, around 1700 teachers across the country's schools were trained on transforming the dominant 'traditional' teaching approach into teaching with the use of ICT (Alenezi, 2015).

However, as stated by Amoudi & Sulaymani (2014), it is necessary to acknowledge the complexity of ICT integration in Saudi schools, because merely providing ICT in classrooms cannot guarantee its appropriate and effective usage in the teaching and learning process. These scholars stress that the transition from one phase to another, and that a more advanced phase is needed in order to achieve the ICT initiatives aims. It is generally agreed that it is teachers who should be operating these technologies and applying them in practice.

It is necessary to mention that the actual use of ICT in education in Saudi Arabia only began in 2007, the year in which the ICT national projects were introduced as a means of improving education through the use of new technologies in both teaching and learning. The implementation of technology was also planned for administrative work and communication between different sectors within the MOE. However, in practice, ICT use for administrative purposes has been implemented in order to facilitate Ministry Communication Applications between schools and local authorities. It should be noted that the success of the implementation of ICT has, as of yet, not been empirically proven in the case of teaching and learning practice.

Efforts towards integration can be demonstrated by the following example: The Minister of Education has announced that a new development plan for the use of ICT in education should improve the current state of ICT proficiency amongst students and teachers. Included in this announcement were promises to improve training and provide resource rooms so that there would be two ICT centres instead of one at most schools.

Although the government is continually allocating impressive budgets for educational projects, there is little evidence that these projects have been at all successful (Alessa, 2009). Alessa has criticised the educational system and its development policies in the KSA and has suggested that a number of political issues have been causing the failure of education projects; these issues include the absence of a clear political vision, the lack of crucial management, and flaws in the mechanisms of these projects, including those in charge of these projects. He has also pointed out that the government is not implementing any changes to the general educational policy, which had been designed before over four decades of global and internal political change; in this time, the country had employed scientists from overseas institutions with high standards in this area to design an educational policy which focused on religion objectives in order to protect the youth and the wider society from thoughts inconsistent with the Saudi approach.

So, although there were some ICT programmes introduced to schools, they were limited in terms of implementation (Tayan, 2017). In addition, local studies (Oyaid, 2009; Alharbi, 2014; Almulhim, 2013) have revealed that training programmes with respect to ICT in education for teachers, have failed to meet the aims of successful ICT implementation to improve the process of teaching and learning.

In her Saudi study, Alharbi (2014) revealed that there is a lack of professional development training, including ICT training, and that most teachers confirmed that they have never attended any ICT training, while half of teachers confirm the same absence for professional development programmes.

In Saudi Arabia, Alsahli (2012) conducted a study in the western region of the Kingdom and aimed to find out the needs of teachers in ICT training. The study found a lacuna between teachers' ICT use and their knowledge of ICT use. The relationship here means the knowledge teachers need in order to use ICT for effective teaching is a learning process (see section on the TPACK (Technological Pedagogical and Content Knowledge) framework in Chapter three).

While implementation in schools has been patchy, according to Al Mofarreh (2016) Saudis have recorded high usage of the internet, namely Twitter. Their use has been in the top in the Arab region, while YouTube users are sharing the highest rate around the globe.

According to the findings of Al Mofarreh's study (2016), culture is one of the significant factors influence successful policy implementation. According to Al Mofarreh (2016) the culture of Saudi Arabian citizens promotes ICT use as ICT is prevalent in everyday life, that includes smart phones, laptops, iPads and the internet network. Therefore, he added that schools' culture and value in terms of ICT in education were positively affected as a result of the digital trend among Saudis. Despite these contextual facilitators, again, school use remains inconsistent.

Giving the prevalence of ICT and its constant changes, together with its close influence on people, the MOE needs to recognise that in the Saudi Arabian general educational policy as well as introducing a good ICT educational policy, ensuring its clarity and that it is the direct source for the integration of ICT in education. This will not only be a reference for teachers and school management but also for students, parents, all stakeholders and the wider community.

## 2.6 Conclusion

This chapter has provided a national and policy context for the study. As an oil-rich nation, KSA has experienced rapid economic growth in recent decades. The attempt to diversify the economic base and translate economic prosperity into other forms of development has been reflected in a range of policies with diverse goals and significant investment. There is a great deal of faith in education by the royal family and the government, and within education, faith in ICT as both a tool and outcome of learning. Development, education and ICT all need to be understood in the context of KSA as an Islamic state, and so, for example, internet use is restricted; however, KSA residents and citizens are wide users of the internet and social media. Despite this policy faith and the national popularity of ICT, project intentions and investments have not consistently translated into improved use of ICT in schools, or improved learner outcomes. This study hopes to provide evidence that will help to illuminate and explain these issues with a view to improving the situation.

## **Chapter Three: Literature review**

This chapter will review the international and national literature surrounding the relationship between the way teachers use information and computer technology (ICT) in the classroom and the policies and other factors that affect teachers' use of that technology.

The chapter is split into three main sections. The first section considers ICT and learning within the context of human capital theory (HCT) and capabilities approach (CA) as a way of understanding the major requirements of ICT use in education. The second section considers ICT policy, educational change, and theory of change to help in understanding ICT policy within different contexts and related projects or initiatives. The third section discusses teachers' ICT use in practice, their development, and factors affecting their use of ICT in the classroom.

It is important to note that the phrase 'ICT use in the teaching and learning process' is used interchangeably with the word 'integration'.

### **3.1 ICT and learning**

The field of education has witnessed many changes and reforms in ICT policies as well as numerous ICT operational initiatives, all of which attempt to improve the process of teaching and learning. The interest of schools' stakeholders in the potential advantages that ICT offers to the teaching and learning process has been rising (Kong et al., 2014). For example, according to Higgins (2003), ICT is capable of offering a dynamic and effective process of teaching and learning. Many studies show the advantages that ICT can offer learning, for example, Kozma (2008); Webb & Cox (2004); Loveless (2011); Law et al (2008). However, some, (Livingstone, 2012) contest that the evidence does not clearly show that ICT is the cause of those advantages. Simply introducing ICT in classrooms does not mean the process of teaching and learning will be effective (Law et al., 2008; Kozma, 2008). Therefore, as will be discussed in more detail throughout the thesis, research suggests that although there has been huge investment in ICT around the world during the last two decades, the use of this in classrooms for teaching and learning is still at a low level, including in Saudi Arabia (Aljohani, 2006). Why is this investment in ICT not being utilised? This will be explored in

Section 3 of this chapter. A useful aspect to consider is why ICT is important in the classroom, and for that, knowing the purpose of education generally is an appropriate start. Therefore, this study hopes to contribute to the knowledge gap by considering this issue and finding out what different theories on education and development can say about the role ICT should have in education. Following the discussion on the purposes of ICT and the role of ICT (in the next section), interrelated educational issues in relation to education purposes and the use of ICT will be presented respectively. This is because achieving the goals suggested in the purposes of education requires certain conditions which lack relevant research in relation to the use of ICT for the process of teaching and learning.

### **3.1.1 Purposes of education**

The world is witnessing a vast increase in the use of ICT, both in our work activities and our daily lives. This influences countries to formulate change, and reform their policies in different fields, including education. However, ICT policies focus mainly on the technologies and the provision and preparing of teachers in the use of these technologies, but they fail to provide solid reasons for why ICT is important (Kozma, 2008). The importance of ICT is dependent on the perception of the wider purposes of education. So, for the present study, these purposes will be discussed within the context of two dominant theories in education: human capital theory (HCT) looks at how education can contribute to expanding both the economic growth for individuals and their nations; and the capabilities approach (CA) (Tikly & Barrett, 2009), which looks at the fulfilment of individuals' personal and social lives when acquiring new capabilities.

Each theory has a different view towards and implications for ICT and education and thus they will be presented in two different sections. The following section begins with human capital theory and the role of ICT in education.

#### **3.1.1.1 Human Capital Theory (HCT)**

Human capital theory refers to people's collective knowledge, skills, competencies, advanced abilities (Ugal & Betiang, 2009) and aspects that consequently contribute to their economic productivity (Garibaldi, 2006). While this definition is limited to overall abilities that contribute to productivity, other definitions like Becker's (1981) emphasise the value of

these abilities and the importance of investment in human capital. A clear but broad definition is the OECD's (2001a, p.18) where human capital is defined as "*The knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being.*" So, individuals reflect those aspects from a particular context such as education and career, and the higher the quality of human capital of individuals: the higher the resulting productivity. Relating that to the role of individual teachers, it would follow that if a teacher effectively used ICT in the educational process then the quality of that education can improve and consequently students are expected to gain higher human capital. This then would mean that they would be expected to use this human capital to make significant contribution to their nations and in return be more prosperous themselves.

The assumption of HCT is that economic growth is not achieved exclusively by its financial input but rather is gained via people's human capital, skills and knowledge. The enhanced productivity resulting from a better knowledge base in areas such as ICT contributes to the development of economies around the globe. The quality of this human capital determines the quality of the economic development (Sulaiman et al., 2015).

The intended knowledge and skills are usually acquired in education. Therefore, education is an essential key towards any country's economic development (DfEE, 2001; Andersson & Hatakka, 2010). The rationale of human capital theory has influenced governments towards reforming their educational policies, in order to improve the quality of their education including the acquisition of ICT skills (Coupal, 2004; Tullao et al., 2016). The idea is that the quality of education is enhanced overall by the use of ICT, and human capital is increased by teaching students to use ICT effectively within a world which is rapidly adopting ICT in all areas of productivity. However, this is only under some conditions, which will be discussed in the quality section of this chapter and further on in this thesis. ICT skills and knowledge are also, in themselves, contributors to economic development as they are required in many jobs and sectors.

The next part of this section will consider the role of ICT in education in relation to HCT and how this can be integrated.

Contribution to building and improving human capital to achieve economic growth and subsequently development is one of the main motivations of education (Menashy, 2011). Thus, access to and investment in education has been a priority in education policies and initiatives in developing countries in order for their communities to become involved in the knowledge economy (Tikly & Barrett, 2009); and thus to improve their economic growth (Masino and Nino-Zarazua, 2016). An example is from the context of this study, as education is regarded in the Saudi vision 2030 as a significant contributor to developing human capital. It does this by offering what the labour market requires and needs: education contributes to the diversity of economy income, resulting from students with high skills, creativity and productivity, rather than one single source of income, i.e. oil. This relates to one of the central aims of this vision: economic development (MOE, 2017). This vision considers the importance of developing the use of technologies in the educational process and developing teaching, by providing teachers with training which can improve educational quality for the students who are the future economic and social builders for their countries (Saudi vision 2030, 2016). From the human capital perspective, investment in education to improve the economic rate is not solely for countries but also for individuals as well. So, based on the HCT assumption, acquiring knowledge, skills and other characteristics in education means the human capital of individuals will increase their productivity and eventually lead to higher incomes (CIPD, 2017; Coupal, 2004; Cairncross & Poysti, 2003). However, ICT itself will not change anything; rather people who use it are the real contributors to the intended development. Therefore, based on this theory, teachers need to understand how ICT integration in their teaching can improve their students' learning, which in turn can improve their human capital.

One of the crucial investments of human capital in education is ICT integration. Wheeler (2001) asserts that increasing students' skills in using ICT in schools not only enhances their capabilities for learning but also prepares them for their employment. Because of this, education is viewed as the main path towards the development of individuals in their jobs in the future, countries have been interested in developing the use ICT in education in order to improve quality in schools as well as to expand the economy growth in their states (Stienen, 2007).

Consequently, Yusuf (2005) places emphasis on the need for the expansion of ICT and human capital in education through addressing their issues in the relevant policies. For

example, in the province of British Columbia in Canada, the application of business rationale and practices into education have taken place as a result of the HCT influence where the ICT skills of future workforce is a desirable outcome for the government (Coupal, 2004). However, one may ask why ICT is expected to be the way towards higher human capital, and the answer is that when ICT is appropriately integrated in education, this means changes in pedagogies will take place, Teachers and students are expected to gain more skills and knowledge, thus forming the main components of human capital.

The assumption of the educational productivity model is that the goal in educational policy is not only for the provision of services but also for producing outcomes in order to assist human capital development (Crocker, 2002). The education ICT policies in countries such as Taiwan, India, the UAE and Egypt have planned and invested in ICT in education by introducing ICT related initiatives as attempts to improve human capital which increase the development of their countries (Colclough & De, 2010; Young & Ku, 2008; UAE Vision, 2016; Egypt National ICT Strategy, 2012). An example of a national policy concerning human capital is that from KSA. In Saudi Arabia, human capital theory has been used as the framework for education policy, plans and initiatives. For example, Alwakeel (2007) states that one of the Saudi nation's objectives is to prepare Saudi students for economic competition worldwide through the integration of ICT in the teaching and learning process as this will increase employment and productivity opportunities. In another example from a different context, Indian education policy is designed to restructure the tertiary and vocational education system through the introduction of ICT to assist in the acquisition of human capital (Colclough & De, 2010).

However, as stated before, it is important to note that the investment in ICT itself cannot produce a distinct productivity; instead, more complementary investments are required in order to gain a positive impact. As Fitzsimons (1999, cited in McIntyre, 2002) stresses, if education is to contribute to growth and investment in human capital, there is a need to consider a number of factors in education, including, but not limited to quality, equity, pedagogy, resources, support, stakeholders and policies, and teachers. These will be discussed in later sections of this current study. It is especially important to warn that human capital's related factors are different from one country to another and that countries need to be aware of this variation (Cairncross & Pöysti, 2003).

Despite the apparent benefits, HCT has been widely criticised. However, in line with the focus of this research, the criticism of the theory will be limited to its relation to education. Since the main assumption of HCT is that education is regarded as a central place to invest in to develop human capital, this has been problematic for authors who have criticised the theory and its assumptions in relation to education. For example, Nussbaum (2010) argues that education is no longer regarded as a primary component of people's freedom and development but rather an additional element of the economy. So, the goals of education policies in this regard are not like policies supporting human rights and flourishing in full, such as the capabilities approach, but rather they are narrowly economy derived to decrease countries' costs and instead turn individuals into 'machines' taking on the entire load (Field, 2000). Other critics believe that HCT does not clarify the investment in education in education systems (Sidorkin, 2007).

To conclude, as argued by Shields (2011), the failure of ICT integration programmes in education around the world is driven mainly by the HCT perspective, and this might be considered a limitation. In order to address this issue, giving attention and consideration to the freedom and rights of people in their own lives needs to be addressed. The following section will focus on the Capabilities Approach (CA) as an alternative purpose of education that needs to be addressed.

#### 3.1.1.2 Capabilities approach (CA)

Beyond economic prosperity and growth, the other broad education purpose considers the freedom of people to achieve what they are capable of, which is the concern of the capabilities approach (Sen, 1979). So, the well-being of individuals is determined by their freedom and choices in their lives rather than simply by their earning or expenditure (Frediani, 2010).

Referring to the conclusion of the previous section, it could be justified that the debate on ICT in education has moved from considering HCT to improve the future of the economy through ICT introduction to more human aspects such as equity, social inclusion and the right to education (Shields, 2011). However, as mentioned earlier, the development of individuals through education is not only to develop human capital for productivity in their

future jobs and for economic growth, but also for individuals to fulfil their personal and social lives through the acquisition of capabilities.

The Capabilities approach (CA), developed by Amartya Sen, concerns the development of people through expanding their capabilities and enabling more opportunities for their capabilities to be used towards their freedom of choice. Sen's example of two people, one is fasting and has made a choice not to eat while the other person is starving and has no choice to eat because food is not available, is an illustration of having freedom to choose. In this research, teachers effectively integrating ICT into their teaching and choosing which pedagogy is most appropriate to use is opposite to teachers whose opportunities are limited by not having the capabilities to do the same.

Although Amartya Sen was originally interested in the economy as an economist, he was much more concerned about social justice and human rights (Sen, 2004b, 2009). Both Amartya Sen and Martha Nussbaum focus on the freedom of people to achieve well-being based on personal capabilities (Robeyns, 2011). However, Nussbaum (2011) identifies a set of ten fundamental capabilities, while Amartya Sen deliberately avoids making any such list and instead leaves capabilities open as they are various and multiple; this is because capabilities have to be sensitive to different factors such as 'geographic region, social history, and cultural values' (Jacobson, 2016, p. 794).

The central concern of the capabilities approach is linked to what people can do in an effective manner and be based on the available resources they have. The aim of this approach is to expand people's capabilities in order to enhance their well-being. However, the approach is concerned with evaluating whether they are able to achieve the 'doing' and 'being' they value as a part of life (Sen & Nussbaum, 1993).

The capabilities approach consists of different terms which are inseparable in terms of their importance as one may misunderstand them or view them as complex. This was predicted by Sen (1993, p30) when defining CA in his book *The Quality of Life*: "*Capability is not an awfully attractive word. It has a technocratic sound, and to some it might even suggest the image of nuclear war strategists rubbing their hands in pleasure over some contingent plan of heroic barbarity.*" Therefore, these terms and the relationship between them will be

highlighted below for a better understanding of this approach. Although they are interrelated terms, their meanings are different.

*'Functionings'* refers to the achievement of a person, i.e. *'what a person is able to do or be'*. Sen (1993) sees this term as part of an individual's life, and in the capabilities approach, it refers to the valuable things that a person can do or be in terms of leading his or her life.

*'Capability'*, in Sen's approach, is different to the original meaning in dictionaries. However, the term pairs with the functionings term as it refers to *'the opportunity to achieve valuable combinations of human functionings'* that reflects the freedom of individuals in making life choices (Sen, 1993). The coupling of the two terms is significant as individuals will need to be capable to choose from various functionings which they have reason to value (Jacobson, 2016).

*'Freedom'* refers to what a person values himself or herself doing or being (Sen, 2009). So, this is determined by the former, i.e. functionings *and* capabilities.

*'Agency'* or *empowerment* refers to the ability of individuals and their achievement judgement is subject to their own values (Sen, 1999).

*'Value'* refers to what people value regarding functionings. Sen (1993, p. 31) points out that the value of functions can differ from being highly valued, *'such as being adequately nourished, being in good health, etc..'*, to the more complex - accepting its values despite being heavily valued, *'such as achieving self-respect or being socially integrated'*. He also warns that people may be different in valuing different functionings even though all are valuable, and so to assess the benefits of individuals in society this difference has to be taken into account. To illustrate this from the research, some teachers may value their capability to integrate ICT in the educational process but have limited access to internet or are restricted in their access to resources, so they may not be able to function, i.e. ICT integration.

*'Happiness'* refers to well-being, i.e. the condition of people when they achieve what they value in their life through valuable functionings. This is part of the well-being that Sen aims for in his CA, and he argues that even happiness is an obvious desire in terms of well-being, however it is still not the only direct indication of well-being due to the fact that happiness

is mentality related and thus disregards other well-being aspects. Consequently, the view of other mental actions, '*such as stimulation, excitement, etc.*' may be significantly limited (Sen, 1993, p. 189). However, Kotan (2010) suggests that happiness should be a value sequence of functionings, which is recognised by Sen (1993) who believes happiness is a result of functionings.

What is interesting in the capabilities approach is the possibility of its development and application in many areas of research (Alkire, 2002). This includes studies of social sciences related fields such as education and ICT in education.

The capabilities approach views education as fundamental towards people's well-being. According to Saito (2003), education can develop learners' capabilities through developing the abilities and opportunities that develop their choices regarding aspects of life they have reason to value. For example, 'education for all' considers the expansion of individuals' capabilities and freedom (UNESCO, 2007b). Education in itself is a primary capability, such as being able to read or write, towards the development of other capabilities. Therefore, for Amartya Sen, the freedom learners have to effectively do and be what they have reason to value is not exclusively for their present but also for their future. As a result, in the context of education, this approach moves from the focus of the previous initiatives on the right of children to access education to a greater focus on the actual quality of education (International Bank for Reconstruction & Development, 2011). So, in regard to ICT in education, the benefits of ICT integration are not only for their students learning during their study but also for their future to benefit from what they have learnt in their education, and to give them choices in how they might use it.

In measuring the value of education in terms of the capabilities approach and human capital approach, the obligation of the community is to allow children to study at no less than basic education regardless of their growth contribution (Wigley & Kkoyunlu-Wigley, 2006). This is because the former is for doing and achieving what they have reason to value, while the latter contributes to growth.

In the capabilities approach, Sen (1999) claims the arrangements of society should enable the expansion of people's capabilities, i.e. their freedom towards valuable doing and achieving what they want to. So, in his capabilities approach, Sen (1991) emphasises the

capabilities of individuals in education who can benefit from the possible advantages and choose among various patterns of life. Therefore, Sen refuses to consider whether the resources are sufficient but rather suggests focusing on how these resources can provide advantages to people to expand their freedom (Walker, 2005). The view of the capabilities approach sees ICT education as something that can be meaningful only through enhancing the capabilities of individuals and thus expanding them, allowing individuals to prioritise the areas of their lives they value (Bass et al., 2013).

Therefore, from the capabilities approach view, focusing on ICT towards people's valuable functionings of '*beings*' and '*doings*', the use of ICT is not sufficient, but rather it is necessary to consider how those people can effectively engage with ICT in order to create opportunities (Zheng, 2009). Therefore, although the availability of ICT resources is necessary, it is more important to ensure these resources can provide wider benefits, for example in improving pedagogy. Research within the field of ICT in education stresses that ICT in education has advantages for learning, however, these only can be achievable if teachers have the capability to effectively integrate ICT in pedagogy by acquiring the adequate knowledge and skills in this regard; as simply accepting and valuing ICT in education is insufficient (Chigona & Chigona, 2010). Teachers need extensive knowledge and skills of ICT and pedagogy regarding how ICT should be employed for an effective ICT integration. This is a significant factor, as although teachers' acceptance and values are fundamental in this regard, they are not sufficient (Cox et al., 2003) if the teachers lack the knowledge and skills to integrate ICT pedagogically. According to research such as Becta (2003), the capabilities and constraints of teachers are among the significant factors affecting the effective integration of ICT in the teaching and learning process. From the CA view, these capabilities are affected by personal, management, and organisational factors. So, this research will consider the importance of teachers and their capabilities, and the other interrelated factors affecting their capabilities with regards to the successful integration of ICT in the pedagogical practice later in this thesis.

To put some capabilities approach related terms into an ICT in education context, the following examples are intended to simplify them. '*Functioning*' is, for example, when teachers employ ICT in their teaching to enhance the process of teaching and learning. So, when they are supported with access to ICT and the required kinds of knowledge and necessary resources, (i.e. technological, pedagogical and content knowledge, see TPACK

section, 3.3.5) this means they acquire real opportunities and freedoms, and can choose when and how ICT is appropriately integrated into the process of teaching and learning (*capabilities*). In terms of ‘*well-being*’, if those teachers value their capabilities, fulfilment of both teachers and students can be achieved. This then contributes to the improvement of education quality, which means that learners receive a better education and effectively acquire knowledge which is helpful for the development of their individual lives and greater society.

The capabilities approach developed by Amartya Sen has been criticised in different aspects. One of the criticisms is that it focuses on the individuals but also implicitly considers social policies such as education policy (Jackson, 2014). The author argues that the focus of the capabilities approach would influence these policies if it is expanded to include these as they usually lack consideration of capabilities. In order for these policies to focus on the capabilities of individuals, they need to consider the space of individuals to decide which capabilities will lead to fulfilment and consequently people will be empowered to choose their own lives.

To conclude, HCT and CA have different ideas; the latter approach considers the flourishing of people in the fullest sense over the expansion of economic life. In the view of human capital theory, one can conclude that the capabilities approach is enhanced by human capital theory since the latter implies that it is people’s skills and knowledge together with their ability to work in their job which all combine as a set to enhance the capabilities of those people towards achieving their living goals (Thapa, 2011). Thus, the combination of both approaches seems to be logical as fundamental purposes of education because this will consider people’s well-being and knowledge economy both in their freedom and economy life.

It is worth noting that whilst the previous section has intensively discussed the purposes of education and their roles towards ICT integration in education, HCT and CA were not the direct focus of the thesis. Reviewing these two contrasting theoretical frameworks allows this research to show how different the aims ICT policy reforms can be depending on their own understanding of the aims of education. Although they were not directly applied in the research questions, they indirectly informed the interrogation of the policy ideas behind the views of policy makers in relation to ICT in education in Saudi Arabia.

Having discussed the aforementioned broad purposes in education, the current study will be able to explore and understand different educational issues that relate to the use of ICT in education in the following section, starting with quality issues in education.

### **3.1.2 Quality**

Two children living in the same environment but attending different schools during their first year could be an example of the necessity of improving the quality of education in order to improve the human capital and capabilities of individuals. The latter may be different between the two if the quality of their schooling experiences is different. However, the same situation could happen if they attended the same school but the quality of their study is different, which could be due to a difference in enthusiasm to learn, or variation in the quality of teaching.

The concern of quality of education is not newly realised, especially in developing countries where education policies aim for development, including growth in the economy through improving their education quality. So, for example, according to World Bank (1980) training teachers to improve their teaching abilities and reforming curriculum to improve students' learning were funded to enhance the quality of education. However, Hanushek & Luque (2003, p. 482) reveal that defining quality in education in a precise way is difficult, but they refer to it as *"the knowledge base and analytical skills that are the focal point of schools."* However, based on the broad purposes of education discussed earlier, Tikly and Barrett (2011, p. 9) define good quality education as *"education that provides all learners with the capabilities they require to become economically productive, develop sustainable livelihoods, contribute to peaceful and democratic societies and enhance individual well-being."* This definition seems to be appropriate for this research as it focuses on the broad purposes of education based on the theories in education discussed in the earlier sections.

Based on their framework which was drawn partially from the capabilities approach by Amartya Sen as well as the social justice approach, Tikly & Barrett (2011) identify three inter-related dimensions of good quality education: 1. Inclusion, which considers the students' access to the inputs of quality in schools in order to improve their capabilities and the obstacles and factors related to institutions and culture; 2. Relevance, which concerns the extent to which the outcomes of education are meaningful for all students, whether the

society values these outcomes, and whether these outcomes are consistent with the priorities of the national development in the era of global change; 3. Democracy, which considers students' voice, the way of governing the quality of education decisions and the involvement of debate locally, nationally and globally.

Given that the definition of quality of education is complex in nature, determining its resources or components is complex too. However, among research considering this issue, Hargreaves (2016) highlights a number of resources regarding the development of education quality and one of them is that ICT can potentially improve the quality of education. Also, Higgins and Packard (2004) stress the capacity of ICT in improving the quality of education. This is because of the advancements ICT can offer for the learning and teaching process (Bingimlas, 2009; Hussain et al., 2011). So, the outcomes of this is improving students learning, thus improving their capabilities in achieving their life freedom and contributions to their personal and national economy.

According to Lee (2002, p.3) there are different reasons why ICT should be used in education, and one of them, where this study focuses, is related to the pedagogy quality improvement that ICT can contribute *“by providing rich, exciting and motivating and new environments for learning.”* However, this cannot happen just because ICT is provided, but it does only under some conditions which will be discussed later in this thesis.

In addition, Lowther et al. (2008) stated that ICT with its various features is a crucial means in terms of improving the quality of the teaching and learning process if autonomy, capability and creativity elements are achieved by teachers and learners. A high level of motivation and engagement of students and adequate skills for both teachers and students are needed for effective utilisation of ICTs, plus improved ICT training for teachers (Amin, 2009). Glennan & Melmed (2000) emphasise the professional development of teachers, including training, in order to improve the quality of education. This is because teachers are a significant factor affecting their students' learning quality (Hargreaves, 2016). However, ICT training for teachers needs to ensure that teachers use ICT as an integrated approach in the process of pedagogy. Furthermore, it is important to clarify that the quality of ICT tools is a significant condition to the desired quality of education (Tinuoye, 2013).

As this research argues, it is important to note that ICT in itself cannot automatically improve the quality in education, but it can accelerate its contribution to the quality of education if important learning environment related issues are addressed. The learning environment may be commonly understood physically; however, the learning environment here refers to the education organisations, school community, pedagogies, resources, ICT and other materials, and the school's physical environment (Lai, 2008; Tullao et al., 2015). In order to achieve the desired quality, there are some conditions that must be met. For example, Gupta & KPN (2012) reviewed a wide range of literature on the role of ICT in improving the quality of education and found a number of conditions in this regard: although infrastructure, teachers' training and e-literacy are important, they are not sufficient, and more conditions are required including ICT integration into the curriculum and pedagogy. Thus, each condition on the list relates to a number of sub-conditions such as policies, policy makers, students, schools, technical support and curriculum reform, as all of them are significant factors affecting the quality of education in terms of ICT integration. Again, these factors are discussed in section 3.3.6 in the end of this chapter. As mentioned above, all of these factors determine the achievement of the goals of HCT and CA.

To conclude, in order to achieve the broad purposes of education, quality of education needs improvement in addition to other interrelated issues discussed in the following sections. As it was claimed earlier, pedagogy improvement is one crucial way to improve the quality of education, and therefore, the next section will consider the issue of pedagogy.

### **3.1.3 Pedagogy**

In the process of ensuring quality in education when ICT is employed, pedagogy is another essential aspect that needs to be considered. In relation to ICT in education, some researchers, such as Watson (2001, p. 262) and Smith et al. (2005), refer to "*pedagogy before technology*" as an indication to focus first on pedagogy and its relationship with successful ICT use in the professional educational environment, rather than assuming that providing ICT resources will in themselves improve quality. So, this section will focus on this feature and its relation to effective ICT use in the classroom.

In brief, according to Wang (2008, p.412), pedagogy refers to "*...the teaching strategies, techniques or approaches that teachers use to deliver instruction or facilitate learning.*"

Loveless (2011, p. 302) defines seven interconnected dimensions of pedagogy which are: *“goals and purposes; views of mind and knowledge; views of learning and learners; learning and assessment activities; roles and relationships; discourse; and tools and technologies.”*

Why the use of ICT varies in different educational contexts despite ICT use being practiced in classrooms in those contexts is a significant question. The reason behind that is related to different conditions and one of them is related to pedagogy (Means et al., 2009). Hence, the quality of education can also be different from school to school. For example, the same ICT resources are used in two classrooms, A and B, but class A is a constructivist classroom where students construct their own knowledge and actively share and interact with others with the use of ICT, so students' engagement and achievement is higher than in class B. In class B, there is lower engagement and achievement, as they are not involved in the use of ICT and students are only instruction receivers while the dominant user is their teacher, whose lesson is a traditional classroom based one.

As mentioned previously, merely providing ICT cannot make change in the classroom and in students' learning if teachers do not understand how ICT can be employed or integrated in their practice to obtain the potential advantages (Sumalatha & Ramakrishnaiah, 2007). So, as highlighted in the British Educational Communications and Technology Agency's 2003 review of research literature in ICT and pedagogy, in order for teachers to use ICT and decide which resources are suitable for their lessons they will need extensive knowledge about ICT. However, ICT has been expected to create change in pedagogy which is based on traditional teaching styles but it does not replace or improve pedagogy in its own; instead, it depends on how ICT is integrated in the classroom (Becta, 2003; Kozma, 2003a).

To benefit from the use of ICT in education, education systems need to use innovative pedagogies in classrooms to develop the students' knowledge and skills for their own personal and social development in their future lives. According to Becta's literature review, there is significant evidence regarding the contribution of ICT to students' attainment, however, the evidence reveals these advantages require teachers' knowledge and skills regarding which resources are useful and appropriate in their lessons, and how to integrate them in classrooms or beyond. Therefore, this section will consider, based on constructivism

theory, different pedagogies within the use of ICT for learning that can be employed in the classroom or outside the school's premises to enhance students' learning.

### 3.1.3.1 Constructivism theory

Research has suggested that under the right conditions, ICT has the potential to help the transformation of teacher-centred pedagogy into student-centred pedagogy (Ertmer et al., 2012, Castro Sánchez & Alemán, 2011). This is especially the case when acknowledging that children today are fairly knowledgeable and familiar with different ICTs. Moreover, children in the 21<sup>st</sup> century often have more knowledge of technologies than their teachers do (Pickering, 2011). Therefore, if teachers want to effectively integrate ICT in both teaching and learning, they are required to have appropriate knowledge of how ICT can assist in facilitating student-centred pedagogy (Ertmer & Ottenbreit-Leftwich, 2010).

Historically, the dominant education approach was based on instructing knowledge rather than constructing it, which is based on what is called instructor or teacher-controlled/centred education (Westbrook et al., 2013). In such an approach, learners are not knowledge constructors but rather receivers, which Schweisfurth (2013, p. 10) pictures as *"...a teacher pouring knowledge into the empty vessel of the learner."*

The teacher-centred approach is based in part on *Behaviourism* theory, which views knowledge as acquired by instruction rather than being constructed (Downes, 2010). Teachers in this theory follow a direct instruction method and their students' learning is assessed through answering questions verbally or in writing. Knowledge is sent to the students from their teachers based on fixed curriculum content with inadequate interaction and voice from the students (Westbrook et al., 2013). Thus, while teachers' instruction is the dominant style, students can be passive and fail to process the information they receive because of the time constraints of such teaching methods (Parkinson, 2014). In this case, the quality of education that HCT and CA require cannot contribute to achieving the intended development because students' knowledge and skills are determined by their teachers and content rather than by openly constructing their own knowledge.

So, on the other hand, another approach is the student-centred education which usually embodies the constructivism theory (Roblyer & Doering, 2010). Wilson (1996, p.135)

defines constructivism as '*a philosophical view on how we come to understand or know*'. Mascolo & Fischer (2005) broaden this by defining constructivism as "*the philosophical and scientific position that knowledge arises through a process of active construction.*" Students in this theory of learning are active as they have pre-knowledge and thoughts which they can apply later to construct their knowledge during their learning (Taber, 2006). One aspect of active learning through knowledge construction is the interaction between students themselves and teachers that can be enhanced with the use of ICT (Swan et al., 2007).

The constructivist learning theory does not separate students from their social contact with others, but emphasises the construction of their knowledge and meaning through interaction with their peers and teachers (Orlando, 2013). Therefore, Woolfolk (2006) asserts that this theory regards the role of teachers as crucial and considers the continuous need for professional development as necessary. This is because students can best construct their own knowledge if their teachers guide and support them towards that (Sang et al., 2010). The interaction and relationship between teachers and their students is always an integral part in the success of the pedagogical process. Therefore, in this research, teachers need to understand the views of HCT and CA when using ICT because this can influence their choice of which pedagogy is used for specific content in their subjects. This is in itself capabilities acquisition by teachers, which in turn will reflect on the improvement of their students' learning and give them capabilities they can utilise for their personal and social life.

Employing ICT in classroom can enhance the constructivist classroom because of the advantages that are offered for gaining and constructing knowledge (Pedersen & Liu, 2003). According to Senapaty (2005) research has suggested that constructivist learning theory can be enhanced when ICT is employed as ICT enables teachers to act as facilitators for the learning and teaching process through revealing students' existing knowledge and understanding. So, the author advises that in such an environment, students can be teachers because of the knowledge they may have from the mass of information they gain from the Internet, which teachers may not be familiar with yet; while teachers act as coaches because in this environment they can find themselves transformed from instructors to guiders and facilitators to students. However, these advantages also create challenges for schools because if they decide to establish ICT in their infrastructure, training for teachers, curriculum structures and reformation of their practices in classrooms becomes necessary

(Livingstone, 2012), in order to integrate ICT in the educational process effectively and develop learners' human capital and capabilities.

An example of using ICT to support a constructivist classroom is that based on three case studies conducted by Erstad (2002) in Norway, and the findings revealed the emergence of different learning activities with the integration of ICT in the educational process. Citing studies conducted by Yelland (2002) and Xin (1999), Webb & Cox (2004) also state the findings of these studies show better collaborative learning in groups who had been involved in the use of ICT than other groups whose learning was traditional. These examples indicate evidence of the ability that ICT offers in enhancing the constructivist learning approach.

In order to adopt this theory for successful use of ICT however, there are a number of requirements that need to be met. For example, those stated in the European Commission (2013) which begin with the necessary availability of well-designed digital equipment, and the assurance of the availability of the required equipment that is needed for the teaching and learning process, and the infrastructure of the school. In addition to those issues, teachers' professional development is an essential need for successful ICT use in a constructivist classroom (Fu, 2013).

This theory has been criticised in several ways. While students in constructivism can construct their own knowledge and meaning, their meaning is not necessarily the same as the meaning of their teachers. In other words, learners may fail to gain the required knowledge expected by the teachers or examinations for the subject in question (Shumba et al., 2012). Proponents of teacher-centred education justify that the extensive experience of teachers regarding the subject and content means they are in the best position to deliver information to their students (Lancaster, 2017). However, this information may be limited and fixed especially if it is based on subject content.

It is important before moving to the next section to clarify that when claiming there is a lack of ICT use in the process of teaching and learning, this does not mean neglecting the ICT advantages offered for teaching and nor does it mean teachers who do not embrace constructivism cannot make use of ICT. Evidence (see the use of ICT in section 2 of this chapter) in most cases in different contexts confirms the benefits of ICT for teachers in their teaching and that ICT is actively used, for example in their lesson preparation, presentation

and assessment. However, students are passive in such environments (Gibson, 2001), which is against the views of HCT and CA where high knowledge and skills are important for their development. In addition, as discussed in section one, the focus in this study is about teachers' ICT use for the process of both teaching and learning, which is the basis of effective integration in order to achieve the broad purpose of education which is to prioritise learning. Therefore, the present study discusses the role of ICT and student-centeredness as an effective approach of constructivist pedagogy, where students are more active and engaged in the classroom (Ertmer & Ottenbreit-Leftwich, 2013).

### 3.1.3.2 Student-centred education

In order for ICT to achieve the advantages that are offered in enhancing the student centred pedagogy, the integration of ICT has to be clearly stated in the relevant educational policies and translated into real practice. As discussed, the main aim of integration ICT in education is to enhance the educational process and improve students learning. One effective way to achieve this is to enhance student centred pedagogy through the integration of ICT as suggested by Ertmer et al. (2012). Mckenna (2013) regards the meaning of student-centeredness simply as moving students from being ignored to more centred in the classroom. It may be this basic. According to Schweisfurth (2013a, p. 10) defining student-centred-education is not simple because of its interrelated terms despite the minimal differences in their targets and concepts, for example *constructivism* and *child-centred education*. Therefore, she offers an approach towards better understanding of this type of education by contrasting it with three opposing aspects in education. The first contrast is that learning in this approach is opposite to one where fixed content curriculum is the only option, which is the case in a large number of countries, thus a student centred approach becomes difficult because "*what needs to be covered and at what pace are not negotiable.*" The second contrast refers to teacher-centred education as the descriptive term itself as *a strange* term and *pointless* because teachers' values are centred in their students' learning. In, TCE (Teacher- Centred Education), teachers transmit knowledge to students, teachers have control over teaching and students are less likely to be involved in the class. The third contrast is that in LCE (Learner-Centred Education), knowledge is constructed; lectures are limited while teaching and learning is based on more collaboration.

Having discussed the three contrasts suggested above to understand what LCE means, Schweisfurth (2013a, p. 20) then defines LCE as *“a pedagogical approach which gives learners, and demands from them, a relatively high level of active control over the content and process of learning, what is learnt, and how, are therefore shaped by learners’ needs, capacities and interests.”*

In this approach, students can construct knowledge by themselves as being engaged in a more collaborative learning environment (Zhang et al., 2006).

Students’ voices do not have a space in traditional method of teaching as their participation is limited to either answering their teachers’ questions with prior hand-raising, or each student works alone on their given tasks with no cooperation from their peers. Students in TCE are passive learners and receivers of teachers’ knowledge, as the teachers have control over the content of the subject, teaching methods and assessment (Ahmed, 2013). Alternatively, a student-centred-approach enables teachers to allow their students to engage in classroom activity and participate actively by collaborating with their peers and with their teachers, and to think and construct new knowledge. While the focus in teacher-centred classrooms is around teaching practice, the focus in student-centred classrooms concerns the learning of students (Weimer, 2002). In contrast to TCE, learners in LCE are active and have a significant input into what, how and when they learn (Ahmed, 2013). Students in this approach learn by what they do and experience instead of relying on their teachers’ knowledge (Brown, 2008). Weimer (2002) sets five dimensions of teaching change towards the student-centred approach: the balance of power involving student decisions on the content; the function of content, with content motivation towards learning and skills development; the role of the teacher who must be a facilitator in the learning environment; the responsibility for learning of students themselves; and the purpose and processes of evaluation of summative and formative assessment.

Integration of ICTs in learning and teaching processes can assist in building and increasing the cooperation and collaboration among students (Van Merriënboer and Brand-Gruwel, 2005). For example, a study conducted by Uribe et al. (2003) in Colombia attempted to discover the possible impact of a collaborative approach to learning via the use of computers as mediators for students to solve undefined problems. The chosen practitioners, who were provided with online materials to guide them with instruction on how to deal with the

proposed task, were divided into two different groups according to how they would work: working in pairs, or working independently. The study found that students who worked collaboratively achieved more effectively than those who did their work individually to solve the problem. Reimann & Goodyear (2004, cited in McKay, 2007) go so far as to argue that for this approach to be adopted properly, ICT is required to be an indispensable component, otherwise the approach might not be feasible.

Combining both learner-centred and teacher-centred approaches when using ICT in the teaching and learning process may be possible however, because although students' knowledge construction is a good practice, the instruction and guidance of their teachers is the first step. For example, DeCorte (1990) advocates the need for blending and balancing both the use of teacher-centred education (instruction), and student-centred education (construction) approaches when employing ICT in classrooms.

As already noted, the introduction of ICT itself however does not replace or improve pedagogy, or make it more learner-centred, and instead this process is reliant on how ICT is used in practice (Lowther et al., 2003). For example, in a study conducted in two American high schools, Cuban et al. (2001) confirm that teacher-centeredness was dominant even though computers were the base in classrooms. Another example is from Woodvale middle school in the American Northwest, where a study conducted by Windschitl and Sahl (2002) examines how three teachers apply what they have learnt in the *laptop computer programme*. This study reveals that although all students had their own computers, this was not sufficient to help two teachers change their teacher-centred pedagogy to the student-centred approach while only one of the three teachers felt computers were a motivation in transforming their teaching approach. However, it is important to note that this teacher was also not satisfied with her prior experience of traditional methods.

The role of teachers in LCE is to be facilitators and guide their students towards achieving their goals (Ahmed, 2013), but this approach may not occur if teachers themselves, for personal, cultural, professional, or institutional reasons, are not yet ready to fully embrace new roles for themselves and new technologies in education. In his review of some UKICT initiatives, Watson (2001) revealed that ICT skills taught to students in special classes (in response to the ICT skills courses development strategy) experienced a lack of ICT skills practice in the real classroom in other subjects. This gives the distressing impression that

students are not given the opportunity to learn how to apply these ICT skills in their taught classes, or even not allowed to use these ICTs. Different authors, such as Ertmer et al. (1999) and Rogers (2000), suggested that one of the reasons behind students' passive and rare use of ICT skills in the classroom is related to the issue of teachers' workload. This is because if the planned lesson is not finished in time due to students' participation in using ICT, this may require teachers to take on additional time or pressure themselves to combine it with other sessions (Cuban et al., 2001). Another teacher-reported issue that affects students' practical use of ICTs in the classroom is teachers' limited time for planning lessons. In a study conducted by Preston et al. (2000) evaluating teacher motivation in ICT, teachers revealed that their lack of time to plan lessons using ICT, such as to find appropriate material related to the subject content, was a problem.

Overall, in the case of ICT, the role of teachers in at least including a student-centred approach in their repertoire, facilitating the available ICT resources and allowing their students to use them are essential. Harrison (2010, p. 69) refers to Squires' (1997) five important aspects of teacher development in both in- and pre-service training programmes in order for teachers to adopt a student learner-centred approach and be facilitators and guides for their students. The five elements are "*ICT skills with particular applications; Integration of ICT into existing curricula; curricular changes related to the use of ICT including changes in instructional design; Changes in teacher role in the face of ICT; Underpinning educational theories.*" A study on the use of technology in the classroom conducted by Dwyer et al. (1991) reveals that teachers are hesitant when technology is used in the classroom. Dwyer and his colleagues refer to teachers' perceptions about how the teaching and learning process will happen. It is similar to the students' view in the UK's study conducted by Ferguson et al. (2015) on 19 students working on Web 2.0. The students wanted the restriction of ICT resources in school remain restricted due to believing that students attend school to learn, not to chat with friends. However, it should be noted the students' view here was one-sided, and they forgot that chatting and communicating with others could bring different information and build knowledge.

However, Kharade & Thakkar (2012) add that, in order for teachers to be able to apply these innovations in their constructivist classrooms, they will need professional development to meet the required skills in applying ICT. They also need to be aware of the importance and potential difficulties they might face in regard to these innovations before they implement

them in their practice. This should encourage teachers to try these innovations for better learning and understanding.

For this reason, according to Dimock & Boethel (1999), teachers who lack the required skills for the ICT enhanced classroom will consequently not be able to transform their traditional approach to teaching and therefore will experience difficulties in facilitating the constructivist classroom. Rakes et al. (2006) also support this contention as they stress that teachers with modern technology skills are likely to have an influence on the constructive classroom environment. Consequently, teachers should be able to transform their way of teaching to a more constructivist one (Drenoyianni, 2006).

In her reviews of 72 learner-centred education related articles which all explore the nature of LCE and its implementation, Schweisfurth (2013) concludes that these articles and a wide range of other research have a large gap in terms of the views of developing countries' students, and that filling this gap would not only be servicing the evidence base but also the term of this pedagogy may be reconceptualised. Therefore, this study is different to other local studies as it considered students and their voice in terms of the pedagogical approach with the use of ICT, as well as including teachers and observing practice.

### **3.1.4 Equity**

According to UNESCO (2009), equity in education is a quality issue. This is similar to the issue of pedagogy discussed in the previous section, which is also an issue of quality that implies both issues need to be addressed, i.e. pedagogy and equity, in order to improve the quality of education if the purposes of education discussed earlier are to be achieved.

Returning to the education purpose, the capabilities approach can offer education policies with an effective framework considering the issue of equity, which social policies such as education usually lack (Jackson, 2014). Therefore, it is very important that education policies focus on the equity issue as this will form as guidance to stakeholders in schools to overcome this. Additionally, based on the assumption of human capital theory, the economic growth in a country will be poorly distributed if equity in education is not promoted (Wils et al., 2005).

The issue of equity has been considered in policies and initiatives both internationally and locally. For example, UNESCO'S EFA emphasises the importance of accountability and efficiency to improve education but also stresses the importance of overcoming the equity issue (UNESCO, 2008). The OECD Policy Brief (2008) highlights that there are two fundamental dimensions of equity in education: fairness and inclusion. For the purpose of this study, ICT access needs to be fair for all teachers and students regardless of personal and social conditions; and ICT should be integrated in the learning and teaching process for all of them. From the CA perspective, limiting the access to any information via the use of ICT is an equity issue because freedom to access a wide range of information affects capabilities when it is deprived. Similarly, the view of HCT is that this exclusion can deprive their opportunities to develop their human capital towards their economic future.

According to OECD (2008), there are three central areas in policy which can affect equity in education and suggest how to improve them. The first area is the education system design. Sorting students based on their attainment can affect equity, especially in their early years as those outcomes can be affected. Thus, if this kind of streaming and sorting has to be used in an education system, the benefits need to be proven, and postponing this for higher school years is required. However, a bigger issue than the basic structure is the socio-economic structure in the education system because of the different outcomes experienced by different schools. Selecting students based on their achievement is another related issue. To ensure equity based on the structures of the education system, students of low and higher achievement need equable support. Education, especially for those in higher grades, should be more attractive in terms of quality to prepare them for their futures.

The second policy area affecting equity is related to practices in and out of school. Educational practice is another issue affecting the issue of equity in education, but also learning practice at home is another issue in this area. Students who fail to attain the required outcomes in some countries repeat the year, as is the case in KSA, and there is little evidence this will help or improve their attainment in the following academic year. Part of student learning is at home where they can be supported by their parents or others, however, some may lack this support for different reasons. To avoid these issues, students' attainment can be improved by adopting different learning approaches and teachers need to be trained in these methods. The relationship between schools and home is important in improving

students' learning, and for those who have an issue with home support the school needs to maximise support for work at home.

The third area of policy affecting equity in education is that of how resources are allocated. These resources include educational resources, including ICT, and teachers, which also affect the issue of equity in education. Education systems need to ensure strong education for all, particularly in basic education, through the required resources. They also need to provide extra resources for students with an extra need to improve their attainment. This will enable them to improve the quality of teachers in order to improve the attainment of students, especially those with greater needs. Kozma (2008) emphasises the significance of infrastructure development policy in providing ICT resources in schools by addressing the issue of equity, giving an example of Malaysian policy where the goal was to provide one computer for every ten students by 2005, and by 2010 to every five students, and also one to every five teachers in the first period and to every teacher in the second period.

There may be some misunderstanding regarding what equity refers to in education as some education policies clearly refer to access to available resources. Some policies may also refer to equity in different aspects of education but lack clarity in such references. For example, the goal of the Chilean *Enlaces* initiative for ICT in education aims not only to provide the required resources equally to all schools and for all educational purposes, but also to enable them to connect locally in the school communication network (UNESCO, 2002). However, as confirmed by the editors of *Equality in Education: Fairness and Inclusion* book, access does not mean that the entire equity in education is addressed even if the access is extensive (Zhang et al., 2014). Thus, equity is not only access to resources, but it also refers to a number of issues in education such as equity in pedagogy, decision-making involvement and engagement that results in students becoming more knowledgeable and prepared for a better life as defined in HCT and CA. Haßler et al. (2016) found that the transition from access to quality to equity has been the focus of recent literature as the outcomes of students' learning has been the focus of attention. ICT resources distributed fairly and used effectively and consistently can improve all of these.

UNESCO (2008) also suggests that not only quality of teaching and learning but also equity in education can be enhanced and improved by the use of ICT in education and, therefore, many programmes of educational reform consider quality and equity in education to be the

top priorities in their objectives. When considering the issue of ICT and equity in education, we often consider three broad areas: access, experience and outcomes. Kozma (2008) gives two access examples of Chile, one is the example of the Chilean *Enlaces* education ICT programme that provides computers to urban centres and rural regions, and two is the technical support and training for all schools in the country as attempts to address the equity issues. Tanzanian and Ugandan ICT policies are other examples considering equity in access to ICT by teachers, students and administration team in schools everywhere (Hennessy et al., 2010). In their review of recent literature concerning equity and quality,

When discussing equity and ICT, it is important to consider what is the so called Digital divide. This term, according to OECD (2001b), is defined as the gap of access to or use of ICT by people and societies at different socio-economic levels. According to Enochsson & Rizza (2009), the digital gap forms a vital concern as students use ICT practices in the classroom less than when outside school. It is especially significant to note that the equity problem in education could be worsened by the digital divide if this is not well addressed (Kelley-salinas, 2000). Therefore, it is crucial to address the issue of equity in any ICT policy otherwise inequities may be increased as a consequence. In realising the huge digital divide between developed and developing countries, the Harvard *Readiness for the Networked World Guide* hopes to guide developing countries towards the starting point of planning a strategic approach of ICT in their countries' communities, including the education community. The guide consist of five interrelated categories that are Network Access: this is about the ICT resource availability; Network Learning: this considers ICT in educational processes and training programme availability; Network Society: this considers the extent of ICT use in work and people personal lives, and whether there are any ICT skills opportunities; Network Economy: this is about the way that governments and businesses interact with each other and with the public by their ICT use; and finally, Network Policy: this consider the extent of policy role in promoting or hindering ICT use (Information Technologies Group, 2000).

Gibson reviews the literature on digital equity and describes it in terms of users and non-users of ICT. He describes ICT users as those who have instant access to knowledge wherever they are around the world; communication and interactions with any other users are possible in the 21<sup>st</sup> century and thus they can compete and have power. However, most of the non-users of ICT cannot access or achieve their desired outcomes, as their access to

knowledge is not comparable with those with immediate access, meaning their possibility of competence is weak. Therefore, learning levels are different between the two groups and one way of bridging this gap is the use of ICT as an integral part of the education process.

According to Anthony and Padmanabhan (2010), the term digital divide was originally based on the access to ICT but later research considers inequity between those who learn with ICT and those who do not or do not have access as an attempt to bridge this divide (Assar et al., 2010). Referring back to the HCT and CA, understanding these views can help in bridging this gap. This is because, as mentioned earlier, while teachers who are aware of these views can contribute to the effective integration of ICT and so enhance their students learning, policy makers also can address any issues hindering effective ICT integration in the educational process, including the issue of equity and by doing so can help the development of students' lives.

Inequity caused by the digital divide requires consideration by the whole community, including those in schools and policy makers (Anthony & Padmanabhan, 2010). Further attention to bridging the digital divide is essential in order to improve the equity issue in education.

Gorski (2005) proposes seven principles of the *Shifting the Digital Divide Paradigm* based on equity in order to eliminate the issue of the digital divide. Gorski argues that the most important principle is that a novel approach to the digital divide must consider the inequities in education and society as a whole. The second principle considers the necessity of transitioning from access to more equitable support in educational and professional practice. The third principle is to expand access to more equitable resources and experiences. In the fourth principle, critical examination of computers and internet users is required, as well as showing that these aspects are used by students and their teachers. The fifth principle requires consideration of the high significance of ICT for education and society through socio-political and socioeconomic motivation. The sixth principle considers capitalistic propaganda such as advertisements of children that announce their use of technologies as a message to the world that ICT is available and should be available for everyone, which could create feelings of exclusion. The final principle stresses rejecting any idea purporting that bridging the digital divide is only possible by providing computers and internet in schools or elsewhere.

Therefore, Resta & Laferrière (2008, p. 768) stress that digital equity in education is much more than simply accessing computers and connecting to the internet, and thus suggest five dimensions: *“access to hardware, software and connectivity to the Internet; access to meaningful, high quality, culturally relevant content in local languages; access to creating, sharing, and exchanging digital content; access to educators who know how to use digital tools and resources; and access to high-quality research on the application of digital technologies to enhance learning.”* If the improvement of digital equity in education is needed, these dimensions must be considered.

The issue of equity can be affected by several factors. Naseem (2010) highlighted a number of inequity factors that are related to the extent and type of use, including the attitude of teachers, knowledge and practices in classroom, the extent to which students interact with the ICT, lack of resource availability, lack of teacher training, and expensive resources including connectivity. As argued earlier, ICT can enhance the equity in education, and all of these factors are necessary to ensure the effective use of ICT. Consequently, they will be covered in a later section of this thesis.

### **3.1.5 Summary**

In section 3.1, two central purposes of education were presented as an attempt to understand the importance of ICT in education. The HCT and CA theories in education differently frame the way that teaching is understood, with HCT alone being potentially limiting for students. This links to quality issues and the pedagogical implementation of ICT, and the resultant teaching in classrooms, which a combination of the HCT and CA approaches can improve. It was argued that by only introducing ICT in classroom does not mean the process of teaching and learning will improve, but that the relationship between ICT and pedagogy can make a difference. Constructivism emphasises a student-centred approach, which can help to overcome some of the educational issues related to quality and inequity that would otherwise prevent some students from attaining their HCT and CA related goals in life. In conclusion, we learnt from the literature in this section that a change in education and its relevant policies is fundamentally necessary in order to address these educational issues, as discussed in the first section. Therefore, the next section will discuss this change specifically in ICT policy and education.

### **3.2 ICT policy and change in education**

In the 21<sup>st</sup> century, international consideration regarding the vital role of ICT in economy, society and educational change is evident from a significant number of multinational policy document promises (Kozma, 2008). The author cites several multinational organisations in developed countries who realise the importance of ICT in education and economic expansion such as the G8 Heads of State (2000) and The Organization for Economic Cooperation and Development (2001, 2006). Kozma states that the realisation of ICT significance has not only been limited to developed countries but also to developing countries, and refers to examples from the World Bank (2003), the African Union (2004) and the United Nations (2005).

According to Kozma (2008), in order to make change in different endeavours to develop the goals of education, strategic ICT policy needs to include its rationale, goals and vision in terms of how ICT could contribute to change for the schools and their stakeholders, parents, and the whole community. One may argue that dealing with ICT is practical and policy might not always be important. However, even in assuming all teachers and students are familiar with using ICT, there is no guarantee they will do so in the process of teaching and learning. Therefore, according to Kozma (2008), while ICT can occur in schools in the absence of educational ICT policy, without being guided by an effective policy its sustainability in the process of teaching and learning is doubtful.

There is no doubt regarding the importance of ICT policy for ICT integration in schools, however, the gap between policies and the actual ICT practice in schools needs to be addressed. Thus, reform in education is necessary but its implementation could face many factors that need to be dealt with to ensure effective integration of ICT. This is supported by Fullan (2001), who argues that although general change in education could be helpful, it needs to be followed by relevant initiatives together with extensive consideration of the influencing factors in schools settings. Therefore, research such as Baylor and Ritchie (2002), which found a disparity between schools in terms of ICT integration due to differences between the affecting factors in schools, is not surprising.

For ICT integration to take place effectively, strategic plans are needed as one of the significant factors discussed throughout the thesis, due to their influence on successful ICT

integration (Tearle, 2004). Tearle (2004) claims that for the integration of ICT to effectively be implemented, there is a need for an integrated plan of different phases from the institutional body to the level of schools to work on these phases: formulate, implement and evaluate.

Over the past three decades, educational change and innovation have been widely considered in publications, policies, plans and projects made by government officials and related organisations because of their interest in the significance of technology in the process of teaching and learning in the field of education (Hannan & Silver, 2000) which in turn reflect in their future in labour. However, in some cases, the demand of government concerning the use of ICT has caused pressure in educational systems (Preedy et al., 1997). Such pressure may insist on the use of ICT rather than concerning how ICT can make change to the pedagogical practices for an effective learning environment. For example, in Saudi Arabia, despite the massive funds to invest in ICT in public education for the development of education, evidence revealed unfortunate results from different ICT initiatives introduced. One main reason towards this failure is the absence of ICT relevant policies and their relevant strategies.

Another reason for such failure is that teachers' professional development is a required factor for the effective integration of ICT pedagogy practices (Kharade & Thakkar, 2012). The role of teachers in the process of both innovation and intended change in education has been suggested as a vital and crucial role that needs to be carefully considered (UNESCO, 2005). Voogt et al. (2013) support this and indicate that literature generally agrees on the necessary role of teachers in ICT implementation in schools. As emphasised earlier, there is no doubt that without teachers, ICT solely will not make the desired change for effective learning, but teachers can be the facilitators of ICT in the pedagogy. The effective use of ICT depends on how effective the users of ICT are (Chittleborough et al., 2008). Therefore, the development of teachers is required if the use of ICT is to create an effective learning environment. It is argued that the integration of ICT in the learning and teaching process needs only to occur after teacher training takes place in order to ensure the successful use of ICT in classrooms (Blackmore et al., 2003). The issue of teachers and their development will be discussed in more details in section 3.3.

For a better understanding of the relationship between ICT policy and change in education, this section will first give an overview of the ICT policy, giving some examples of ICT initiatives in education before moving on to ICT integration in education, educational change and innovation, and finally the theory of change and examples of different ICT approaches in education.

### **3.2.1 ICT policy in education**

The educational process is complex and requires concrete consideration and intervention from stakeholders. Therefore, the complexity of ICT in education requires well-planned strategies derived from a strong ICT policy in order to develop the implementation of ICT in education. The lack of clarity in ICT policy is likely to affect teachers' acceptance to changes involving ICT integration that are intended to improve the educational process. This is because, according to Blamire & Balanskat (2002) who criticise ICT policy in education in the United Kingdom, by simply setting up aims without explaining how these aims can be dealt with, e.g. guidance of how or why to use them, these aims may not be translated in real practice or be achievable.

Vallance et al. (2009) agreed that the absence of a clear ICT policy would result in negative and failed implementation of ICT in the classroom. Also, it will not help teachers in the facilitation of ICT in their classrooms (Wozney et al., 2006). A clear policy requires at least clear and straightforward messages, objectives and implementation of process guidelines. Twining (2007) emphasised that the implementation of ICT policy could be easier if school stakeholders are recognised and guided in the policy itself, but only if the policy is clear and understandable for stakeholders. Stakeholders such as teachers may not be familiar with ICT policies, due to not being informed or familiarised with those policies. Therefore, teachers and other stakeholders in school are required to be familiar and aware of these. Along with making ICT policies explicit, education departments need to ensure that stakeholders really know and understand the expected implications through, for example, workshops or any other similar event. For example, teachers are required to fully understand that ICT policy aims to make an impact on actual practice (Kennewel et al., 2000). Other issues that need to be considered in ICT policy are the necessity of adequate resources and assignment of qualified staff and the provision of teacher training (Tawalbeh, 2001).

In addition, the ICC Commission on the Digital Economy (2017) recommends a number of considerations to be taken into account in ICT policies. One of the more obvious recommendations is that ICT skills are required in order for people to use ICT in an effective way. Another consideration is the necessity of access to and availability of ICT to ensure a well-designed ICT infrastructure.

Examples of ICT policies and projects that are relevant to the present thesis, such as in Finland and Australia, concern the development of ICT use as vital to creating an effective educational environment. These will be overviewed below, and some other relevant examples will be shown in the theory of change section.

In Finland, one of the objectives of the National Information Society Policy for 2007–2011 is *"to carry out a pilot project on educational use of information and communications technology (ICT) and to use it as a basis to estimate the opportunities to increase the use of computers and information networks in teaching"* (p. 2). In 2008, the ICT in Everyday School Life project was launched in 20 schools aiming to establish the use of ICT in education, and to draw up a national plan in order to determine how to develop the integration of ICT for effective learning through a number of proposals and actions. The results of this project revealed in 2010 showed that while technological infrastructure and pedagogical practices were good, other schools were lacking in these aspects as well as in pedagogical and technical support (Ubiquitous Information Society, 2010, p. 13).

As a result of this project and its barriers and issues, the National Plan for Educational Use of Information and Communications Technology was assigned for implementation of its rigid strategic policies and actions aiming to develop the use of ICT in education and the environment of learning. Some of those formulated actions are future skills of learners, approaches and practices of pedagogy, e-learning resources, support and infrastructure in schools, training for teachers, and school management cooperation with business and networks. The plan's purpose is to inspire and motivate the school society to benefit from the advantages that ICT provides for education and to ensure the students' acquisition of the future needed knowledge and skills. The drawing of this plan involves the contribution of those involved in the 2008 project, including government bodies, business representatives, experts and units for research, school head teachers, teachers and school projects and planning officers and teacher trainers (Ubiquitous Information Society, 2010).

The Finnish ICT initiative is a very helpful example for education systems to learn from, including the Saudi's, because the initiative was based on a national policy, which is, as Kozma (2008) stresses, significant and necessary in guiding such ICT initiatives. In addition, piloting a project is an effective opportunity to find out the effect of ICT in classrooms, so the Finnish pilot project helped to determine the obstacles to ICT integration that schools face when expanding their ICT initiatives. Another lesson which can be learned here is that based on the results of the Finnish pilot projects, the aim of the project was achieved by developing concrete ICT initiatives based on a national plan of ICT which overcame issues in order to develop the integration of ICT in the educational environment. This example is also significant as it involves stakeholders (including those in schools where the pilot project took place) in drawing up the ICT national plan, which is one of the crucial conditions in drawing educational policies.

In Australia, *Making change happen framework* is an ICT initiative provided for the development of ICT in Australian schools. The development of the framework was contributed by different national bodies, including MCEETYA ICT taskforce, the independent and Catholic sectors and ACER, and by international bodies such as BECTA and MOE in New Zealand. The introduction of this framework was as an attempt to achieve the national vision that requires “*all schools confidently using ICT in their everyday practices to improve learning, teaching and administration*” (p. 4). The framework focuses on ten elements of quality of education that ICT can contribute. The ten areas and their descriptions are shown in the table shown below. The description of those elements is as guidance for an independent review and evaluation by the schools themselves, including the management, staff, and the whole school community, in order to know where they are at the present and where they desire to be later, in addition to monitoring their progress (Learning in an online world, 2008).

The Australian example is also another lesson that other countries can learn from. The framework was based on a national vision, which signifies its value for other countries when they are considering creating ICT initiatives on a similar path, i.e. from national plans. The involvement of different voices nationally and internationally in developing the framework is also significant in terms of drawing ICT policies instead of relying on a single voice, such as in educational and ICT initiatives in Saudi Arabia, where the developer is always the MOE with no involvement of other bodies. The Australian example is also important in its

development of guidance for the elements of the framework instead of simply listing these ten components without guiding and explaining their purposes to stakeholders. Although stakeholders in schools were excluded from the development of the Australian framework, the value of their self-evaluation is another lesson about involving school teachers in ICT and educational initiatives.

The two examples explored above from Finland and Australia can be of interest in any ICT integration initiative, including the context of the present study. This is because they are based on a national plan. As Kozma (2008) emphasises, even if programmes or initiatives are sponsored and handled by non-government organisations or are applied in practice, they are likely to fail with the absence of national ICT policies that guide stakeholders and provide the required resources.

In addition, the important feature of the Finnish project and the Australian framework is their process nature, which considers different key aspects that are usually not all covered in Saudi Arabia. Their processes are especially significant for this current research when considering the key factors that influence ICT integration in the classroom for the process of teaching and learning, including professional training, management, support, access and evaluation.

### **3.2.2 ICT Integration in education**

All requirements and needs for successful ICT integration must be addressed so that teacher's capabilities can be improved, which can result in improvement in students' capabilities and their skills. This in turn leads to the improvement of their human capital and capabilities as they are viewed from the perspective of the two purposes of education discussed in this thesis, HCT and CA.

According to the absence of ICT policy, strategy of planning is one factor affecting the failure of teachers ICT integration in the process of teaching and learning Wozney et al. (2006).

According to the findings on their Finnish study based on 20 observations and interviews with teachers and head teachers, Niemi et al. (2013, p. 1) identify six categories of successful ICT integration in the process of teaching and learning. These are as follows: "(1) ICT

*included in strategic planning, as part of school culture, (2) teaching and learning methods facilitating participation and leading to empowerment, (3) flexible curriculums, (4) high investments in communication, (5) optimum leadership and management, and (6) teaching staff's strong capacity and commitment."*

In this context, Gager & Lokman (1999) define four main functions for the use of ICT in education. First, ICT as a goal: in this function, learners learn about ICT skills in a specific ICT subject. Education of this type is to provide training to those learners in how to use ICT in their education, as well as prepare them for their future career and social life. Secondly, ICT as an assistant tool: this is the use of ICT as an assistant tool to the teaching and learning process. Thirdly, ICT regarded as a tool for the organisation and administration of the educational institution. Fourthly, ICT is regarded as a mediator or method for the teaching and learning process. In this function, ICT is employed as a facilitator for the teaching and learning process.

While the first function is clearly supported by the view of HCT, the second and third types could also contribute to the development of students based on HCT and CA. In the second type, students' learning may be better when studying with ICT, and in the third, students could remain updated for any monitoring and assessment which may influence their learning. However, in the second and third functions, knowledge and skills are not guaranteed, as student engagement in the educational process and access to ICT may be restricted. In regard to the forth type, ICT can be a real contributor to the improvement of students' learning and thus towards achieving the goals of HCT and CA. Students here can be more involved and engaged in the process of teaching and learning, as discussed in the pedagogy section earlier.

Comparing the availability and access to ICT in classrooms with the integration of ICT, the former comes first, but integration comes after for the use of available ICTs in the teaching and learning process. This thesis focuses on the fourth function since it is the most relevant one within the scope of this study.

Similar to those types, Downes et al. (2002) categorised ICT integration to four categories: introducing ICT to acquire its skills, ICT use for enhancing students' learning, ICT as an essential part of the reform in the learning and teaching process, and the use of ICT as a necessary component for school reform. However, the combination of all these types of ICT

integration in schools is required. It is assumed that having all of these types would create an innovative environment in schools. However, it should be noted these types cannot happen at once but through a gradual implementation of categories. This is confirmed by the phases of ICT implementation identified by Zwaneveld & Bastiaens (2010) who suggest ICT integration is initially about automating the already existing process; followed by using ICT in this process in teaching and learning, then moving to creating new innovative pedagogies. This is much clearer in The Apple Classroom of Tomorrow, (ACOT) which is an ICT integration model developed by Apple based on four years' study (1985 to 1989) on teachers' ICT integration in American schools. Teachers gradually went through five sequential stages: entry, adoption, adaptation, appropriation and invention in order to effectively integrate ICT in classroom (Ashburn & Floden (2006). This model explains teachers at the first stage have little or are lacking knowledge of ICT, while in the following stage they start using ICT at a basic level; in the third stage teachers move from basic to more advanced use of ICT in their teaching; while in the fourth and fifth stages teachers have more innovative and creative ICT for the process of teaching and learning.

ICT integration in schools can be through two different sources: in the first source ICT is provided by the educational institution to their schools and teachers, while the second source teachers introducing ICT into their school. However, it is important to accept that some issues may occur in schools during the process (Zwanevel & Bastiaens, 2010). Through their literature review, Al-Zahrani (2017) categorises three groups of issues relating the integration of ICT in education: policies and support issues, ICT use for pedagogical practice issues, and practitioner issues. For example, Unal & HakkiOzturk (2012) state that a number of challenges affect this integration in classrooms, such as lack of teacher training, traditional teaching method impact, lack of ICT resources and equipment, teachers' acceptance towards ICT, and inadequate time for teachers. These issues and others will be discussed in more detail later in section 3. The significance in this is that ICT is effectively used for a good learning and teaching process regardless of where ICT is introduced. Although combining the two sources should lead to positive impact, educational institutions need to be patient towards teachers and their schools when using ICT, especially for those who lack ICT training provision, instead of putting teachers under pressure to use ICT. This is because this pressure may result in teachers not accepting ICT integration into their classrooms (Kanuka & Rourke, 2008).

As discussed before, a good relationship between ICT and pedagogy may lead to positive outcomes in education (Underwood & Dillon, 2011). The common issue that many education systems confront in relation to ICT is when the focus is on ICT more than best learning, due to wanting ICT to be quickly used to keep up with other education systems and in particular those in developed countries. This is supported by (Ertmer & Ottenbreit-Leftwich, 2013), who argue that a high level of learning should be identified first, followed by how ICT can facilitate that learning. In their Europe-wide e-learning programme study, Granić et al. (2009) found support from administration bodies, professional development, and availability of resources as requirements for the effective integration of ICT in order to improve the process of teaching and learning.

The integration of ICT in education does not mean merely the physical presence of ICT tools or equipment within the school premises, but instead the implementation of ICTs and their influences on the teaching and learning processes and activities, plus post-implementation (continuation) activities such as evaluation and assessment (Alenezi, 2015 and Lee et al., 2014). This requires key conditions of integration such as the development of professionals and the availability of maintenance support (Puma et al., 2000). These should include classroom activities and students' participation and engagement, teaching strategies, methods and curriculum; and in administration and management, ICTs assist in communication and processing tasks (Hinostroza et al., 2011; UNESCO Institute for Statistics, 2014). Therefore, successful ICT integration in the teaching and learning environment is primarily related to the teachers' role.

At this point, the relationship between the integration of ICT in classroom and pedagogy must be considered if ICT integration is to be effective in the process of teaching and learning. This is particularly relevant from the perspective of teachers, as they need to be aware of the objectives of learning and the potential of ICT in order to choose the appropriate ICT tools to utilise in their teaching methods (Mishra & Koehler, 2006; Okojie et al, 2006). According to Jones (2004) teachers who take ICT training courses only without a pedagogical consideration in training are expected to fail in terms of teachers' ability to integrate ICT for the process of both teaching and learning.

### 3.2.3 Educational change and Innovation

The concept of educational change has been used as a link for development in education. In education, (Carlopio, 1998, p. 2) defines change as: *“the adoption of an innovation, where the ultimate goal is to improve outcomes through an alteration of practices.”* In UNESCO’s comparative overview of innovations and initiatives in teacher education in Asia and the Pacific region, educational change refers to *“any noticeable move from established practice; it may be large or small, lengthy or brief”* (UNESCO, 1990, p. 1). For the purpose of this study, it is necessary to find out how change can improve the use of ICT in classrooms, and what needs to change in order for effective ICT integration in the teaching and learning process.

Innovation in education can refer to new methods, products and knowledge introduction (OECD, 2014). In this study, innovation is mainly referring to ICT or educational technology innovation and its practices and activities related to learning and teaching processes, such as adoption of the constructivist classroom. However, according to UNESCO (2002), although ICT can be a supportive means in the teaching and learning process, its presence alone without motivating interventions cannot bring about change. Hence, significant initiatives such as professional development and appropriate support which can result in an effective pedagogy are needed for the desired change in education.

There are a number of principles to take into account in order for the change to happen in education. For example, Hargreaves and Shirley (2009) emphasises on the importance of some principles, such as responsibility and accountability, teachers’ development and students’ voices, if education change is to occur.

Other examples are the recognition of teachers’ value by community and educational organisations and salary increases. Hanushek & Rivkin (2007) suggest that there is little evidence that salary affects the quality of teachers and that the value of research may affect methodological issues. Additionally, they suggest salary alone is not a guarantee of the quality of teaching for better learning, but linking salary and professional development with the ability of teachers is a good combination regarding teacher quality.

In regards to students' voice, Hargreaves & Shirley (2009) assert that students need to share and make their own decisions. This may not always be possible in the traditional classroom as students are likely to be receivers of the contents delivered by their teachers. Therefore, adopting new methods of teaching and learning could enable students' voices to be heard and allow them to be involved in the whole or part of the process.

There are several signs considered in research as factors affecting the success or failure of educational change, taking into account the intended innovation and the role of teachers in this change. According to Brummelhuis, (1995), when the required support (from the influencing factors of educational change) is clearly and effectively available, the result should be effective change.

Concerning the supporting factors, they consist of two sets: the first relates to the phase before implementation, while the second relates to the implementation stage and includes the continuing phase. Fullan (2000) refers to external school factors affecting the educational change. These factors are those at government and public levels. In terms of government level, decision making in the educational field is always influenced by government officials, who are in turn influenced by the demand of businesses and corporations who aim for highly skilled people and therefore require highly educated students who will benefit the future economy. Official factors can be influenced by the media as this reveals information relating to education and the public's view; and can be influenced by professional organisations that work with education towards a successful change. Other affecting factors can come from teachers and parents. So, parents can demand good and equal education for their children and cooperate with their teachers in improving their children's learning. Teachers can benefit from national association information and call for changes in education.

According to Fullan (1991a) there are a number of factors relating to the first phase of innovation which can lead to it being effective, such as *relevance*, which refers to the beliefs of teachers towards the potential advantages of the intended innovation; and *readiness* which refers to the ability and capability of the school and its people to accept and implement the planned innovation. This will require changes to many aspects of the school, including teaching and learning strategies and practices, and new resources, and will take into account the availability of required skills in their staff for such innovations. The final factor is *resources* availability, which includes equipment and its associated and required resources,

time and funds. However, it is necessary to note again that the availability of resources in classrooms does not mean that effective learning will be achieved (Bers, 2008), but the importance here is how ICT in the classroom can be used for effective learning (Bingimlas, 2010). This will require achieving many goals such as ICT policy reform and professional development in order to ensure effective ICT use for a positive teaching and learning process.

Further factors have been considered by Louis & Miles (1990) and Fullan (1991a cited in Brummelhuis, 1995, p. 14) but these factors are in regard to the implementation phase. Their suggested factors are listed as follows:

*“The clarity of school policy with respect to the goals, means and ends of the innovation; the organization of staff development activities; the setting up of procedures for monitoring and evaluation; the supply of (technical) support to teachers in need of practical help; and the support (from above) of the principal, government and other agencies.”*

Hannan (2001) found, with his research colleagues in 1997/98 and 1998/99, similar factors to these, and added: motivating and supporting inventors who believe in and need change; recognition from responsible people within the working environment in terms of distributing the innovation outcomes; the development and support for education and learning.

However, there are factors that hinder successful educational change through innovation. These factors can be external or internal. External factors can be, for example as revealed by Hannan & Silver (2000), from the government and/or the Ministry of Education and its related organisations and bodies putting excessive pressure on schools to implement an innovation in too limited a time, which can result in a negative attitude of school practitioners towards this innovation.

A research study in two phases conducted by Hannan et al. in 1997/98 and 1998/99 revealed some factors that may obstruct the process of educational change and innovation. Their research was undertaken to examine the process of educational change and innovation in higher education using an interview survey. They interviewed 221 innovators within 15 UK old and new universities in the first phase with an emphasis on the innovative practitioners' experiences. In the second phase they returned four times to the previous 15 universities,

plus one more university, for the purpose of doing case studies for examining the change process, by interviewing 116 participants plus conducting six meetings of a focus group. The obstacles they found included disrespect for teaching and learning; carelessness and lack of appreciation from people (either people they work with or from responsible bodies); and the pressure and inflexible instruction of policies that prevent inventors from being fully creative, including the extreme difficulty they experience in the procedures for obtaining support and resources.

### **3.2.4 Theory of Change (TOC)**

The previous sections have considered change in education, including the teacher's role; the relationship between these significant areas and constructivist theory in the teaching and learning process, and the factors affecting the failure or success of the process of educational change and innovation. This leads to the need to find out how and why this process can take place in a particular environment. For the purpose of this study, the area of focus is ICT integration in the classroom and its related teaching and learning processes. A valuable approach to understand this sort of educational change is known as the *Theory of Change*, which will aid in understanding of both other interventions of ICT and those in Saudi Arabia, especially when taking into account the documented failure of Saudi ICT in education projects.

Every policy, strategy, programme or project should have a theory behind how change will happen. This implies that these initiatives want to produce a desired change; however, this will require some actions to be taken. For change to happen in this context, they need to have a final goal, and to ask how they understand that this change will happen in order to decide on the most appropriate interventions to achieve the desired goal (Vogel, 2011; Kazimirski & Pritchard, 2014).

According to Vogel (2014), Theory of Change (TOC) is the currently favoured approach for designing, planning and evaluating programmes. TOC is not just a planning methodology; it is more about the experience of having an energising group conversation that makes stakeholders think in depth about what is of importance in the given situation.

Harries et al. (2014) define TOC as an assistance tool describing the intended needs, the change (outcomes) desired, and the activities required to achieve this. This theory can be used in any organisation regardless of type or size. A dedicated online resource to TOC, namely *Centre for Theory of Change* similarly defines TOC as a combination of revealing how and why an intended change is expected to take place in a determined context by focusing on demonstrating the “missing middle” - between what the interventions of change process do and how these interventions lead to intended goals.

According to Vogel & Stephenson (2010, p.2) each theory of change should be different to other theories of change “*depending on the views of those involved in its development, the context and nature of the intervention, and the purpose for which the theory of change has been developed.*” In addition, for the purpose of theory of change, Harries et al. (2014) stress that assumption is a significant component involved in TOC since it helps towards understanding why particular activities can lead to the desired goal of the change process.

Theory of change requires a combination of both approaches. “*The mapping of the logical sequence is strengthened by critical thinking about the contextual conditions that influence the programme, the motivations and contributions of stakeholders and other actors, and the different interpretations (assumptions) about how and why that sequence of change might come about*” (Vogel, 2012, p. 3).

It has been already mentioned that theory of change can be used in any organisation and work area, but using TOC for a policy, strategy, plan or programme in these environments can be extremely helpful for improving it, since TOC is regarded as an agreed process that creates a positive feeling in people due to them being involved and aware of the desired goal. TOC can lead to projects with better effectiveness as it can help in identifying and finding the information needed and the activities most appropriate in order for desired goals to be achieved (Harries et al., 2014).

The view of TOC is that change will not happen simply because new resources are deployed, but its process needs other actions (related to people, information, support and activities) to be accomplished. Therefore, TOC helps in understanding that the distinction between the above mentioned initiatives (policy, strategy, programme or project) is not only different in

terms of goals but also in the underlying assumptions about how to produce the desired change.

#### 3.2.4.1 Steps for developing a theory of change

It has been suggested that developing a theory of change has a general agreement on the main components that should build it up (Vogel, 2011). Vogel has listed the following elements, which represent the same meaning but with different terms for the components stated by Kazimirski & Pritchard (2014): The first step is to define your final goals clearly, including identifying the beneficiaries of those goals. The second step is to map your intermediate outcomes since they are steps towards your desired and ultimate goal. In the third step, you will need to find out and identify the appropriate activities that lead to your intended outcomes, and all stakeholders should take into account the question of how they achieve their intended change. Finally, the last step is to identify what other conditions should be in place for the intervention to work, normally by identifying the possible barriers preventing the intervention from working and which factors would accelerate the change.

#### 3.2.4.2 ICT approaches in education in light of the theory of change approach

In light of the theory of change discussed above, a range of significant ICT programmes from different contexts will be reviewed and discussed below, i.e. Tables 3.1, 3.2 and 3.3, to illustrate the theories underpinning them in order to inform this study.

#### 3.2.4.3 Hole-in-the-Wall review

An ICT approach based on an experiment called ‘Hole-in-the-Wall’, launched by Mitra & Dangwal (2010) in India.

Target	Goal	To achieve this goal for change	Assumption	Enablers
Their targeted group was students.	Their main goal was to enhance students’ self-organised learning.	The approach aims to achieve this goal by giving students access to computers and their	The project assumes that students do not have enough opportunities to develop	To enable the project to take place, resources were distributed (enablers). The main resources were computers with an internet connection built into

		educational materials with or without mediators but not with particular subject teachers.	self-organised learning because of their lack of access to computer devices.	holes in walls at various locations in an Indian village. Students could work collaboratively and were assigned mediators who were not related to the subject being installed in these resources in the second phase of the study.
<b>Activities</b>				
<p>For the project to commence, activities had taken place in the Indian village, and a sample of students had been allowed to use these distributed resources without mediators for 75 days in the first phase. Then in the second phase, that also lasted 75 days, students had a mediator, who did not possess knowledge regarding the subject to be tested.</p> <p>Other samples were chosen in addition to the main sample from the Indian village; one consisted of students with lower performance at local state schools taught by an unqualified teacher, and the other consisted of students with a higher performance studying in a private school taught by a qualified teacher.</p> <p>The performance of these samples was compared with the performance from the experimental sample. The tests used in this project comprised two parts: pre-test and post-test. The experimental sample was tested in both phases of the project, whilst other groups of students were tested only by the second phase test.</p>				

The findings of these tests showed that the experimental sample in the first 75 days considerably exceeded the sample from the local school and was close to the sample from the private school. After another 75 days, surprisingly, the experimental sample reached the same level of performance as the sample from the private school.

Therefore, it was concluded that although the sample from the local school was being taught by teachers, its performance was lower than that of the experimental sample without a teacher, which is an indication that local teachers needed to improve their teaching performance. (Horton, 1990).

In terms of the experimental sample, the project's intermediate outcome was that the exposure and enthusiasm of the students to these resources was clear, and also that collaboration between students took place.

Furthermore, alternative methods to regular schools should be examined and evaluated thoroughly, since they might offer, as shown in the example of the experimental group, significant benefits to students. In contrast to the sample from the local school, participating

students from the private school achieved a high level of performance whilst following the same curriculum as the students at the local school. This underlines the importance of adequate teaching performance for achieving better learning outcomes. Finally, the results of the experimental group with only a poor command of English, no previous knowledge of a given subject and the help of a mediator in the later stage of the project highlights the potential of self-organised learning, particularly in difficult socio-economic conditions in many countries with poorly performing education systems.

#### 3.2.4.4 Pedagogy before technology review

The second ICT approach for educational change is entitled '*pedagogy before technology: re-thinking the relationship between ICT and teaching*', launched by (Watson, 2001). From a different perspective, Watson (2001) focused mainly on the UK initiatives over 20 years (1980 to 1990 and from IT age to ICT era) in the use of technology in education that have not always fulfilled their potential and have not delivered upon their promises. While admitting the importance of technology for our world, at the same time he revealed the clear issues around technology in education compared to other areas around whole societies. He highlights the stark contrast between the success of technology in other sectors of society and industry, and the extent to which education systems have benefited from the implementation of technology, notwithstanding a considerable number of funding schemes and projects. The same observation was made Muir-Herzig (2004) who admitted that technology was ubiquitous but questioned the reality of whether technology had a place in the classroom.

Watson's approach is different to other approaches to ICT that focus on areas such as provision of resources or on students and learning, rather than on change in education. However, in this approach, pedagogy and the teacher's role are given more importance for both the pedagogic approach and ICT together to make a change in education. He identifies teachers and their performance as key factors responsible for the success or failure of using technology in education.

The idea that because resources are provided in a school, learning and teaching will improve is one of the largest of the issues around ICT and education. Those who think in this way

should ask why and how that can happen, as in every UK initiative research reveals the reluctant attitude of teachers towards change.

From his review of some UK initiatives with ICT, Watson (2001) highlights some issues regarding the use of technology and the concern with pedagogy. One issue is the notable lack of clarity with respect to educational policies and their objectives. Consequently, the lack of clarity of the policy objectives results in issues around the implementation of ICT designed by the same policy.

Another issue from Watson's review is about the available resources and the practice of ICT where it does not match the policy of the school in regards to ICT use.

Watson believed that technology is not only a fundamental factor for change but also has a significant role in changing approaches to the teaching and learning process and knowledge of how to achieve this. Therefore, Watson suggests that if the issues around using information technologies are understood, more focus on essential educational issues will be needed. He indicates that most studies imply a link between inadequate use of ICT in education and negative attitudes of teachers towards using technology in education, whereby some teachers can be seen as technophobic, insisting on following the traditional methods of teaching whilst not accepting any change in this regard. Therefore, he suggests that these policies need to clarify clearly the nature of both learning and teaching to achieve the required knowledge that leads to the desired change.

In order to identify ways of implementing technology in education that lead to more dramatic positive changes, it is crucial to evaluate relevant existing policies. This renders Watson's study particularly beneficial as it offers an insight, in the form of a case study, into education practices related to the use of ICT in education that were adhered to in the UK over the course of 20 years between 1980 and 2000.

<b>Target</b>	<b>Goal</b>	<b>To achieve this goal for change</b>	<b>Assumption</b>	<b>Enablers</b>
Their targeted group was teachers and	The main goal was to develop and improve	This approach aims to achieve this	This approach assumes that ICT cannot	To enable the change to take place, the

their role in ICT and educational change.	the pedagogic approach first, in order to improve the learning and teaching process where the use of ICT in classrooms is to be deployed as a supportive tool to achieve educational change.	goal by giving more attention to the importance of pedagogy and the teacher's role in effective learning and teaching.	make change in education compared to other successful areas in society because the pedagogical approach is the basic factor in the effectiveness of educational experiences in school. In addition, the same is true for the clarity of policy objectives and school policy as, if they are on the negative side, the desired change cannot happen.	following factors are key: Teachers' acceptance of ICT; enthusiasm and motivation of teachers; Ministry of Education policy makers; school management.
<b>Activities</b>				
<p>The need to evaluate relevant existing policies.</p> <p>The need for clarity with respect to the educational policies and their objectives.</p> <p>The nature of both learning and teaching needs to be clear and clarified in policies in order to achieve the required knowledge that leads to the desired change.</p> <p>Policy needs to make teachers aware of the difference between learning ICT use and its skills, and how to use these for education.</p> <p>The need for teacher training on ICT use for classroom subjects.</p> <p>Students should be trained for the use and skills of ICT and apply them practically in the classroom.</p>				

These issues around the use of ICT and the development of pedagogical approaches are also problems of change (Rhodes & Cox, 1990; Willis, 1993, cited in Watson, 2001). It is suggested that change cannot happen if one of these fails in the process of educational change.

When these policies (as highlighted in the review) and their unclear objectives are considered for reform and modification, the required change and the relationship between teachers and technologies to achieve the desired change will appear. Therefore, Watson (2001) suggests

that policies should not consider that change will happen simply because technology can change knowledge, but rather they need to show how such knowledge can be achieved. Hence, they need to clarify the nature of both learning and teaching.

According to (Fullan, 1989, cited in Watson, 2001, p. 259) the teacher is placed “*at the heart of the success or failure of educational change; but he also asserts that if change is to happen it requires teachers to understand themselves and to be understood by others.*”

Teachers who are developed professionally in pedagogy can then adapt to the need to use ICT for their subject in the classroom. This is supported by an international study conducted in certain developed countries by Watson and Tinsley (1995, cited in Watson, 2001) who revealed that few of the teachers who actually used computers during their lessons linked their pedagogical strategy for their subject with the use of technology.

#### 3.2.4.5 One Laptop Per Child (OLPC) initiative review

OLPC project is an initiative founded by a non-profit organization for learning improvement by the use of ICT. The review has been taken from the following sources: Warschauer et al. (2012), Buchele and Owusu-Aning (2007), Näslund-Hadley et al. (2009), and One laptop per child (OLPC) official website.

Target	Goal	To achieve this goal for change	Assumption	Enablers
Their main targeted group was students.	To enable students from developing countries, especially those from poor countries, to be able to learn and engage in their own learning, to construct their own	The approach aims to achieve this goal by providing students with laptops to use anytime and anywhere and which have many interesting educational resources to	The project assumes that the development of students' learning cannot improve significantly because their education would remain undertaken in the same poor	To enable the project to work, OLPC and its related resources are distributed (enablers) to school children age.

	knowledge and improve their learning.	use, regardless of geographic and financial issues.	area where there is a lack of teachers, poor education quality and poor education delivery.	
<b>Activities</b>				
Students use their laptops to learn anywhere and anytime by accessing worldwide resources online and by communicating with people around the world. They can also use many applications installed to enhance their learning. Teachers are also provided with these laptops so they can benefit from these resources.				

This approach is different from the majority of previous ICT initiatives since the clear advantage of this approach is that students are not restricted when and where to use their laptops as students carry their laptops all the time. In this approach students can teach and learn at the same time as their friends, family and people around the world when network connection is available so they can share information and build knowledge from different sources.

According to Näslund-Hadley et al. (2009), in this project the project designers think about how to achieve their desired change by understanding what the project requires in order to achieve its goal. Therefore, they provide laptops as means for learning and, most significantly, providing essential content resources and applications which support their learning. The project founder reveals that this project is not just a ‘laptop project’ but it is an education project because, if those students were provided only with laptops without the necessary resources, then the students would be unable to learn from them.

According to Buchele & Owusu-Aning (2007), when the project commenced, the organisation was restricted to cheap laptops for which the government only had to pay \$100. This cheapness has helped technology access to be widespread around the world such as OLPC (Norris & Soloway, 2008).

Criticism was made of governments’ spending on OLPC from their small budget for education, which would be taken from the fund for paying teachers, funding schools and buying learning materials. Another criticism of this project is related to the poor internet connections these laptops experience. It may be better and cheaper to exchange the laptops

for simpler technology, such as mobile phones with internet connection (Buchele & Owusu-Aning, 2007).

According to Warschauer et al. (2012), based on research evidence from a study conducted in Peru on OLPC by Santiago et al. (2010), some of the issues revealed in the study concerned the desired implementation of these laptops, especially in poor rural societies. One problem was the issue of power outage; connectivity was another issue. A further significant issue was that only 10% of teachers had technical support, and only 7% had support related to their profession. Another issue related to the use of these devices was the extent to which they were used by teachers. They did not seem to rely on them for their teaching; as 40% revealed that they only used them 3 or 4 times a week. As for the students, 43% of them did not bring their laptops, with the most common reason being that they were afraid of getting into trouble with their parents and teachers in case something happened to the laptop.

#### 3.2.4.6 Summary of the above three experiences:

Based on the three TOC examples, it is evident that these ICT initiatives are situated at different angles in regards to what this study represents.

In terms of the *Hole in the Wall project* and *One Laptop Per Child (OLPC)*, the message was clear that every child has the right to access education and learn using ICT, which supports both the UNESCO's EFA initiative and Sen's capabilities approach. Another key message of the two initiatives is aligned with the constructivism theory and particularly with the independent learning approach, as these projects prove that ICT can help students to learn by constructing their own knowledge independently whoever and wherever they are as long as resources are available and more significantly, the access to them is available too. However, the role of teachers and their pedagogies in these projects is limited. This is not to say the projects neglect the role of teachers but, based on their goals and assumptions, this could be because learning of students by themselves was the target. This is a very important feature, especially in poor contexts where the quality of education is poor as it allows students to learn by themselves. However, the role of teachers in ICT integration is vital for students' learning improvement as discussed earlier in this thesis. Therefore, the two

examples could be developed by also considering teachers and the role played by ICT in their education.

While the abovementioned projects centre on students' learning and their ability to use ICT even without teachers, on the other hand, Watson's *pedagogy before technology* mainly considers the relationship between ICT and teachers' role and their pedagogy. Watson is primarily concerned with the importance of the pedagogical aspect to be addressed before ICT is being used in the classroom. In order for teachers to choose which method they will employ when deciding whether or not they want to use ICT in their teaching, it is especially important those teachers are familiar with a range of teaching pedagogies. This technique can help teachers in choosing the pedagogical approach that is most appropriate for the ICT and their subject, which is what this present study will highlight later in the TPACK framework in section 3 in relation to the required knowledge types that teachers require when integrating ICT in their classroom. Like in many studies, Watson argues that the failure of ICT integration in education relates to the process of teaching and learning and stresses a number of factors such as the lack of policy clarity, which does not clarify what the purposes of using ICT in classroom are, and the absence of teachers' policy involvement, which affects their understanding and ICT integration in the teaching and learning process.

These ICT initiatives are considered to be very significant for the case of this study in terms of several aspects relating to ICT integration in the classroom. This includes the importance of ICT policy and its clarity in showing how and why ICT is used in the classroom, teachers' professional development in ICT and pedagogy, provision of ICT resources, and students' access to ICT and their involvement in their learning.

### **3.2.5 Summary**

To conclude this section, research argues the potential benefits of using ICT might be prevented by incomplete integration of ICT in education (Livingstone, 2012). Therefore, the discussion emphasised that relevant policies and educational change are necessary steps towards the effective integration of ICT in education. The theory of change was fundamentally important as learning how ICT integration must move on through a process of change towards better learning environment is an approach that policy makers should carefully consider. No matter if the aims of the reform are those promoted by HCT or CA,

for ICT policy to produce a change in education it will necessarily to take into account the mechanisms that will lead to the actual integration and use of ICT in the educational process.

There are some key issues which could adversely affect the possible advantages of employing ICT in classrooms (Barolli & Sevrani, 2009). This includes different aspects of ICT usage in education, for example ICT policy, educational system, teachers' role and professional development, ICT related support, school management, and stakeholders' accountability. Therefore, these factors will be discussed in the following chapter.

### **3.3 ICT and teachers in practice**

It has been suggested that there has been a major focus in research on ICT in education that considers students and their learning but with less emphasis on teachers (Semenov, 2005 and Shelly et al., 2006). This of course could be because learning is perceived as the primary goal in education; however, we must focus on the role of teachers who teach those students in order to achieve this goal. According to UNESCO (2002) the role of ICT is not only its ability to change students' learning, but also it is vital in changing the role of teachers and their teaching approach in the classroom.

Therefore, having considered, in the previous sections, a number of issues in regard to ICT and learning, the aim of this section is to review the literature in terms of teachers' ICT use in classrooms, as well as their professional development. The section will begin with presenting the patterns of ICT in practice to understand teachers' ICT use in the classroom. This will be followed by discussing the teachers' development. The final section will consider a range of factors that could affect teachers' ICT use in the classroom.

#### **3.3.1 The patterns of ICT practice in education**

Since this section is mainly about ICT use by teachers in the classroom, a briefer view regarding the availability of ICT in schools will be presented as one of the key platforms towards effective ICT use in the provision of ICT in classrooms (Tondeur et al., 2012). As suggested by Eickelmann (2011), the availability of ICT resources is one essential way of encouraging teachers to use them in their classrooms. However, it should be noted that the type of ICT available in schools is not the central focus of this research; rather, as stated

above, this is an introduction to the following section which considers teachers' ICT use in the classroom as central to this research.

In this study, computers, the internet and educational resources as connected resources to computers are mainly considered. One of the essential and preferable ICT resources that is most commonly used is a computer, as with computer software many other ICTs can be included (Gülbahar, 2007). In a Turkish study conducted by Gülbahar (2007), questionnaires were distributed to 105 teachers and 25 administrators and 376 students. The study shows that there were 75 computers for students, which meant there was one computer for each 13 students, while 71 computers were used by teachers and the school's staff, which indicates the focus was on administrative work more than the learning process. The study also indicates there were two computer labs with 25 computers, an overhead projector and sets of TV/video in addition to a total of 31 overhead projectors and 10 sets of TV/video throughout the school. Students and their teachers, including management staff, were allowed access to a number of resources for students, teachers and staff, each for different purposes. Most of the studies mentioned above have confirmed the lack of ICT use and the necessity of providing more technical and professional support.

In a study involving Jordan, a country similar to the context of the presented thesis, a survey was conducted by their Ministry of Information and Communications Technology (MOICT, 2012) on all schools of the kingdom of Jordan for quantity purposes of the available ICT in schools. The findings show 99% of schools had at least either one PC or laptop for use for either teaching or administrative functions, 86% of schools connected to internet, 62% of schools used additional educational software rather than the EduWave software, and almost half of teachers produced their own software for the subjects they teach. However, not all schools have a computer lab, and while 85% of schools have at least one lab, only 14% of schools have their own websites. In addition, statistically there was one computer per 14 students throughout the country.

Al-saif (2006) conducted a large-scale survey in the capital city of the Kingdom of Saudi Arabia where 600 teachers were randomly chosen for questionnaires and 18 teachers were interviewed to evaluate their practices with the use of ICT in their teaching. The study found a large gap in the ratio of students per computer, a lack of ICT resources available in classrooms and outdated software.

When comparing such findings to the situation in more developed countries, there will be a noticeably large gap concerning the provision of ICT and in particular, computers. In addition, the clear difference will likely be confirmed in the data once it is obtained.

For example, in United Kingdom, Watson (2001) report there was one computer in all schools in 1980, when 16 were provided in each school only two years later; eight students per one computer was the number in 1998. Another example comes from the findings of the PISA study in 2003 in Australia. This revealed the average ratio in regard to the number of students per computer is 3.3, while 93% of students responded as having a home computer where 83% of them also had access to internet, with 67% having access to resources related to education. However, the internet connection is not good everywhere (Gerald, 2008).

Although the provision of ICT resources is pervasive, its availability varies from country to country. An example of large-scale level of research is the survey conducted by the European Commission in partnership with European Schoolnet and the University of Liège in 2012 in 27 European countries, with responses from more than 190,000 participants, which were teachers, students and head teachers. Its results were compared with the findings of a related research in 2006. The survey found a clear increase in the provision of ICT equipment unlike its status in 2006 as the provision was doubled (European Commission, 2013). The findings reveal that almost all schools have internet connection, and laptops, notebooks and tablets are ubiquitous in most countries but there is less provision of interactive whiteboards. Teachers and head teachers in some countries claim the failure to provide such resources is a hindering factor affecting the ICT use in classrooms. However, despite the changes since 2006, ICT availability varies between schools and countries. It also varies in terms of the grade of student as the ratio of student per computer is between 3 and 7 students per one computer, while the ratio of older students is lower than the ratio of their peers in earlier grades.

As mentioned before, the main focus in this research is not about the types and quantity of ICTs available in schools, but rather the use of ICT by teachers, which is considered in the following sections.

### 3.3.2 ICT use in classrooms

After reviewing some evidence on the quantity of available ICT in schools, this section is about how ICT is used in schools by teachers. Similarly, to many others, Kozma (2003a) expects a remarkable amount of ICT use in education since ICTs are increasingly expanded and used globally. Yet, the majority of literature researched so far regarding the use of ICT in education has shown that the reality of ICT practice has not reflected this optimism. For example, in Saudi Arabia, Al Mulhim (2013) argues that despite the intensive attention regarding the integration of ICT in schools by introducing many initiatives, a significant number of studies in KSA have revealed there is still a lack of ICT use by teachers in classrooms. In another Saudi ICT study conducted by Oyaid (2009), the overall findings revealed an increase in the use of ICT by teachers in schools than in the past, but the use of ICT by participants was still very low. Watson (2001) concerns about the global failure of ICT use in education fields compared to many other successful areas in regard to the use of ICT. This is of particular concern when teachers are aware of ICT advantages in education.

Some research links unsatisfactory ICT integration to equity in relation to gender. This could be of special interest in the context of this study, where gender segregation in the educational system is unique compared to most other contexts. For example, according to the findings revealed in Alsulaimani's (2010) study, the availability of ICT and ICT integration by male teachers was higher than in their female counterparts. However, a recent study conducted by Wiseman et al. (2018) revealed that female teachers use and integrate ICT in their classrooms more than their male peers. It should be noted that the interpretation of this study refers this to a cultural reason, and argues that this could be because female teachers are restricted from getting information from outside sources, which is in contrast to males who can freely do so. This means female teachers have to use ICT as an approach to get their intended information. This was supported by Alghamdi (2016) who showed that the number of Saudi women enrolled in computer science in 2014 was 59% compared to only 14% in United States and 16% in United Kingdom. However, Alghamdi also attributes this to the culture of Saudis, which encourages girls to stay with their families until marriage, because of the gender segregation in all sectors of the country, and so the expansion of the subject of computer science in all universities across the kingdom has been to meet this culture. Alghamdi (2016) and Amoudi & Sulaymani (2014) conclude that despite the segregation of men and women, they both help in building the nation, however, women are expected to contribute more in

productivity with the use of computers than males. So, to achieve the goal of both HCT and CA, gender issues need to be addressed. This is especially when taking into account that excluding women from equal ICT to men, and vice versa, can influence parents understanding about ICT and its importance in education for a better future (Gras-Velazquez et al., 2009), and consequently this could affect their children's awareness towards the significance of ICT in developing their future.

The majority of research shares the fact that although ICT is increasingly over time being introduced into schools, and teachers are becoming more familiar with its potential advantages and willing to apply it, their integration of ICT in the educational process in classrooms in different part of the world is still at a low level. This is of course variable from country to country and context to context such as those countries in Europe as specified by the OECD (2015) and some other publications. Some examples of these facts are presented in this section.

In a study conducted by (Korte & Husing, 2006) on 10000 head teachers and 20000 teachers by the European Commission in 27 countries (25 countries of members of European Union, Iceland and Norway) which investigated ICT use in their schools, almost three-quarters of teachers were using computers for visually presenting their subjects by using electronic text and presentation tools, although there was a difference in use from country to another. Specifically, they referred to computers and the internet, which were broadly used in most schools. The ratio of computers per student was one computer for each nine students.

Another example is the Chilean *Enlaces* initiative as mentioned above; in this situation, despite the efforts to introduce ICT in schools as well as training teachers in this regard, research such as Hinostroza et al. (2011) and Sanchez and Salinas (2008) has demonstrated that there is still a lack of ICT integration for teachers in their pedagogical activities.

Recent research conducted by Wasson & Hansen (2014) that was based on a study of five developed countries which aims to compare the Norwegian situation to the other four European countries (UK, Germany, Austria and Denmark), found that the intensity of teachers' use of ICT in their profession was variable between the European developed countries. The UK and Norway were in top place for major ICT use by teachers, while

teachers in Denmark use ICT less than UK but with effective use. However, Germany and Austria are at the bottom in their teachers' use of ICT with very low levels of use.

Studies such as those presented throughout this thesis demonstrate evidence of teachers using ICT but they often lack effective ICT integration. In other words, teachers have been observed using computers and overhead projectors or IWB and more likely using ICT in their lesson preparation, but they are not using ICT for students' learning as they are not facilitating student engagement. Alternatively, there is resistance to teaching through other methods which are more student-centred. For example, Ertmer & Ottenbreit-Leftwich (2010) and Harris et al., (2009) support this idea and justify that there are even uses of ICT by teachers but such uses are mainly for transmitting the information to learners rather than facilitating their construction of knowledge. Thus, merely using ICT in the teaching process does not mean it is integrated and teachers still need to integrate ICT more effectively.

It is important to note that research sometimes refers to the use of ICT by teachers in classrooms without clarifying how it is actually used. In other words, they sometimes do not specify whether ICT was used as a tool only or as a method in their teaching, as it is referred to in this thesis. The difference between these uses will be presented and clarified below.

### 3.3.2.1 Types of ICT in schools

In order to understand teachers' use of ICT, it is important to understand how it has been perceived in the literature. As stated previously, studies in this regard have categorised the use of ICT in schools into four different forms. The first one is ICT as a subject within the school curriculum. The second form is ICT as an assistance tool to teaching (i.e. not an integral part of the teaching and learning process). However, the third form is ICT as a method to enhance the teaching and learning process, where the fourth use of ICT is as a means that can be used for the work related to the school's administration and management (Wasson and Hansen, 2014). The role of ICT in school was as a subject being taught to students; however, the role of ICT is expanded to be one of the significant means utilised and practiced daily by the school management staff (Anderson & Dexter, 2005). In terms of ICT as a subject of school curriculum, it came after the prior introduction of the *information technology* subject, which was part of all levels of schools curriculum in most countries (Plomp et al., 1996). However, the current study specifically focuses on the second and third

forms, as they are related more to teaching and learning processes. It is important to know how such areas of ICT are perceived among teachers' views in contemporary Saudi Arabia.

Teachers vary in terms of approaching ICT in their classroom, where one group perceives ICT use for things such as teaching preparation and their administrative tasks (ICT as a tool). Another group represents teachers who use ICT for their teaching advantages, not only for them, but also for their students' learning by integrating ICT resources into the teaching and learning process (ICT as a method). The third group regards teachers who are characterised as users representing both groups. The decisions of all groups are determined by their level of knowledge regarding effective ICT integration, i.e. their TPACK level, which will be presented in 3.3.5 section in this chapter.

Supporters who view ICT as a tool believe ICT can help them by preparing their lessons before they attend the class, while continuing instruction of their lesson more traditionally too (Cuckle & Clarke, 2003). They rely on ICT in the classroom, but students are engaged in limited ways when they use software such as PowerPoint to present their prepared work during the session. Thus, they use it more for their personal work than for learning purposes, as was confirmed in the American survey, where teachers confirmed they used ICT for more personal uses such as lesson planning. They tended not to use it for the process of teaching and learning in the classroom (Holden et al., 2008). They usually prepared their next session through PowerPoint or Word for displaying it via projection or on the interactive white board to ease their job when it came to the class. They also brought photos or videos they thought could contribute to their lessons.

Subscribers to this group of thought regard ICT in education as a supplementary tool. Some previous studies, such as Greiffenhagen (2000) argue that educational technologies are, in fact, used as supplementary tools to the school curriculum rather than used as an approach for the process of teaching and learning in classrooms; this points to a lack of teachers' conviction about the importance of technologies in educational processes, which explains their lack of ICT use. Referring to literature about ICT use by teachers in education, Mundy et al. (2012) indicate that despite more teachers being provided with computers and other ICTs at schools, those teachers use more ICT in administration-related tasks. Therefore, it is not surprising that some teachers still do not integrate ICT into their teaching even though many of them may have been provided with ICT resources and are familiar with them. For

example, from the European Commission's survey in 2013, although ICT provision has been increased in all 27 countries, the findings revealed that teachers who have been working since 2006 use ICT for their teaching but have not changed their pedagogical methods in classrooms (European Commission, 2013).

In contrast to the view that believes ICT is a tool, the second group view ICT differently, as they regard ICT as a method that can be used to facilitate both teaching and learning processes (Downes et al., 2001). That is why Watson (2001) combines both views as being important for ICT use in education, and suggests the need to obtain the skills of ICT use through learning about its tools, and emphasises the necessity of using ICT as a method of teaching and learning in classrooms. This is also confirmed by Braak et al. (2004) who stress that teachers need to not use ICT as a method solely to facilitate their work, but more importantly to enhance education in general which will facilitate the process of both teaching and learning.

Therefore, teachers who support this view usually use a variety of ICT resources in order to deliver lessons to their classes through these resources. They allow their students to use internet to enable them to think more widely and become creative learners who are able to communicate with a number of sources that help them to build their knowledge independently and collaboratively.

In this type, ICT is used not only as a tool but is also as an integral method in learning and teaching processes that result in users with effective knowledge and skills. Cox et al. (2003) emphasises the significance of regarding ICT as the "engine of classroom achievement" when teachers have ICT skills and actively connect these skills to pedagogy in the actual practice.

In a study on Finland about ICT, conducted by Hakkarainen et al., (2000), questionnaires were distributed to 515 students attending secondary schools to reveal how these students assess their learning when ICT is used in classroom; the findings reveal that students believe their learning is more effective and significant when ICT is integrated in the classroom.

The survey research conducted on more than 4000 teachers in the USA by Becker (2001) to investigate teachers' ICT use in their teaching found that the majority of teachers are

representing ICT as a tool to support their teaching rather using it as an integral element in the teaching and learning process. Kozma (2003b) also supports this, as the findings reveal a high percentage of ICT for teachers' activities, whereas only 13% of teachers refer to resources that are particularly designed for education. In a very different context but interestingly similar to the findings above, a recent study conducted in 24 secondary schools, located in diverse environments from more urban to semi-urban to rural in Ghana (Buabeng et al., 2015), researchers interviewed 60 teachers, who were divided into 10 focus groups, and examined how teachers use ICT. They found the majority of teachers are using ICT for other administrative purposes that are not related to their teaching instruction.

In their study, Wasson and Hansen (2014) explain the finding of semi-structured interviews with six teachers of high and primary schools from Norway who participated in a baseline study conducted by (Ceirniak et al., 2011) on five European countries, namely: UK, Germany, Norway, Austria and Denmark. Thirty-four teachers were interviewed to understand how those teachers are using ICT in their professional practice; then, the result from teachers in Norway was compared to the study findings from other teachers interviewed in the other four countries. They concluded their study by indicating that all teachers who participated in the interviews were actively engaged in the use of ICT in terms of their professional practice, although there was a contrast. The findings regarding the four main areas of ICT use showed that all teachers use ICT for planning their teaching lessons, but in Norway, they also plan for the activities and learning process. More interestingly, student representatives are included in the planning process. In terms of ICT use while teaching, their use varies from country to country; all countries excluding Denmark use some subject-related sources and software, video, YouTube, with very little access to the interactive white board in Germany. However, teachers in England and Norway have great access to these resources in addition to many other resources they use during their teaching in classroom. Denmark, in this regard, has little findings. However, we cannot generalise such findings in those countries from such a small sample.

In a Tanzanian study conducted by Mwalongo (2011), 74 teachers participated via an online survey, and the blog postings made belonged to the researcher as an attempt to investigate teachers' view in terms of their ICT use in their teaching. This includes administrative use, professional development and personal use. The findings revealed high percentages of ICT: 71% of teachers search for resources related to education via the internet. In terms of

software access, the highly usable one was word processing; 80% of teachers used it for different purposes (mainly administrative), while half of participants worked on electronic documents for functions related to administration. The study revealed the computer was the top ICT tool used by teachers with high usage, where word processing was the highest of the ICT tools that 80% of teachers used on a weekly basis (Mwalongo, 2011). This could indicate that those ICT tools are dominant because their availability is higher than others or because teachers feel they are more beneficial in comparison.

When comparing these studies to the context of Saudi Arabia, based on evidence, the use of ICT as a method appears not to be the case in Saudi Arabia. However, the other studies that revealed ICT being used as a tool are similar to the case in Saudi Arabia as it is the dominant type used by teachers in classrooms. For example, research (Al-assem, 2001; Al-ashrafi, 2004; Al-jlad, 2007) all concludes that teachers still use the available ICT in their schools as a tool (i.e. not for pedagogical use). Saudi research shows the clear lack of ICT use by teachers in the classroom. For example, Alghamdi's (2008) study used an interpretive paradigm to understand the use of ICT by teachers within 28 schools located in five provinces, and revealed a lack of ICT use in classrooms, also referring to inadequate professional development training. Alotaibi (2011) conducted a study to explore how often teachers use ICT in their classrooms in a city in the northern region of the kingdom. The results of the study show that the use of ICT has reached a low level of use by teachers and teachers remain central in their teaching approach. The fact that Saudi teachers remain traditional in their teaching is linked to male more than female teachers as is confirmed in some recent research (Wiseman et al., 2018; Amoudi & Sulaymani, 2014).

### **3.3.3 Summary**

In summary, this section has focused on the teachers' ICT use in classrooms and provided some international examples in this regard. Literature has categorised the use of ICT into four different forms, and for the purpose of this research, the focus was not on ICT for administration and management types nor ICT as a subject type, but rather on the other two forms: ICT as a tool and ICT as a method. This is because the study aims to understand how ICT is integrated by Saudi teachers in classrooms. It was notable from the literature that ICT as a method for pedagogical purposes has failed to show an optimal improvement over time despite the positive prior expectation, but the introduction of ICT in schools and teachers'

views regarding ICT are increasingly becoming better over time. However, evidence shows this is different from country to country. Therefore, this research intends to explore what is behind this issue through discussing teachers' professional development in the next section, followed by another section presenting the factors affecting teachers' ICT use in classrooms.

### **3.3.4 Teachers' Professional Development**

Having discussed in the previous sections ICT and its role in learning, ICT policy and change in education, and teachers' ICT practices in classroom, it is necessary to focus, in the following section, on teachers and their development as the key factor for effective ICT integration in classroom. This is because, as argued previously, ICT in itself will do nothing and requires the intervention of teachers as the key operators for ICT integration in the teaching and learning process (Celik & Yesilyurt, 2013; Tezci, 2009; Cennamo et al. 2010).

John & Sutherland (2005) set a number of conditions for teachers in order for the pedagogical change to occur. They require teachers to be aware of and understand the importance of linking together the content of teaching, the learning aspect, and the ICT that will be employed. Furthermore, Preston, et al. (2000) highlight other conditions that teachers need to meet in order for ICT to be used appropriately. The first one relates to the importance of teachers having a positive belief toward the effective achievement of the learning objectives when using ICT. For teachers to use ICT for both teaching and learning purposes, the second requirement is related to the necessity of teachers' ability and skills of ICT use, and of accessibility to ICT resources. However, all of these conditions require the necessary intervention from policy makers and any related educational bodies for capable and successful teachers in the teaching and learning process. In their *ICTs in schools* chapter in *The Global Information Technology Report 2015* Behar & Mishra (2015, p. 73) conclude that *"Our best hope of improving the educational outcomes our children achieve—wherever in the world they may live—lies in improving the capacity of their teachers. The priority for policymakers, therefore, should be to look for solutions that will develop higher capacity teachers. This is true for both those who are just starting out in the profession and those who are already teaching."*

According to Roblyer (2016) the use of ICT can be significant in facilitating pedagogy, not only facilitating the teaching process but also in the learning process, including students'

achievement if ICT is integrated into the curriculum. According to research such as (Fitzallen, 2004; Preston, 2004) as students' learning and achievement should be always placed as the highest goals in education, teachers' development in terms of their subject understanding, skills, and knowledge of pedagogy must be met in this regard. Based on the above-mentioned and what was discussed earlier in this thesis in relation to teachers' effective ICT integration, research in this field such as Fitzallen (2004) and Angeli & Valanides (2009) stresses the need for more professional development in how teachers effectively integrate ICT into the whole process of teaching and learning. In professional development programmes in this area, it is essential that teachers acquire appropriate kinds of knowledge that help them learn how to integrate ICT in order to facilitate learning in a meaningful way (Ertmer & Ottenbreit-Leftwich, 2010). For example, their knowledge in ICT, pedagogy and content must improve in order for them to be aware of how to integrate the best resources they will need to teach their subjects. Cennamo et al. (2010) emphasise that teachers are required to have appropriate knowledge concerning teaching the right ICT for the specific content they teach, involving students in the integration process by using ICT for learning processes, and employing particular ICT through the use of effective teaching strategies that facilitate students' learning. This issue is presented in more detail in the TPACK framework, 3.3.5, following the present section.

Teachers need to have the skills of deep thinking and deciding what ICT they will use, why and how (Wang, 2008). Wang illustrates this through providing examples such as deciding which tools would be the most appropriate for the objectives of learning, making any required changes and modification on the available resources. The author further suggests that the learning environment enables the engagement of particular learners in the classroom session and/or the existence of teaching and learning methods such as the learner-centred approach. This means that the availability of ICT resources and related resources cannot lead to correct ICT use if teachers lack the ability of the aforementioned requirements.

As argued earlier, a report by UNESCO (2009) claims that the expectation of ICT use was its facilitation for learning to be more productive; however, research prior to this report did not show positive results to this expectation. Teachers were found in the Tanzanian study conducted by Mwalongo (2011) to be widely using ICT in their teaching, and their approach of teaching still remained central. However, the use of ICT could make teachers less central (UNESCO, 2002), as students can have the opportunity to work more collaboratively and

independently through the use of ICT. Watson's (2001) concern about the most important aspect in education is learning, arguing that the lack of use of ICT in pedagogical aspects is significantly affecting the learning side. The issue here is not about a teacher's knowledge and use of ICT, but rather their knowledge regarding pedagogy. In other words, even if they have strong ICT skills but lack knowledge in their teaching methods, effective integration of ICT cannot happen. This is particularly the case when recognising that most students in the present are fairly ICT knowledgeable as they can access worldwide information and construct their own knowledge. The following section will clarify this in more detail.

Hasselbring et al. (2000) argue that the professional development of teachers is more necessary than the availability of ICT resources. For example, regarding the *Enlaces* education ICT programme which is similar to relevant examples throughout the thesis, although extensive efforts have been made in order to enable teachers to use ICT effectively in their classroom, research reveals ICT for teaching and learning has still been disappointing (Hinostroza et al., 2011; Sanchez & Salinas, 2008). Another example is from Saudi Arabia, where the project of King Abdullah for education development was expected to create a huge change in education, including ICT integration in the process of teaching and learning. However, despite the massive budget and the laptops per student and laptops per teacher, research has revealed the failure of initiatives related to ICT. Some related programmes have been cancelled such as the one laptop per student policy as devices were returned to the Ministry. Researchers such as Tezci (2009) and Albirini (2006) justify this by arguing that the physical provision of ICT in classrooms without teachers' intervention will add no value to the teaching and learning process. As argued throughout this thesis, being equipped does not mean one will be able to use ICT effectively in the process of teaching and learning.

Literature such as the studies of Dogan (2010) and Blackmore et al. (2003) shows that for the success of ICT in education, teachers need to undertake training in ICT to assure their appropriate use for the teaching and learning process. In the Saudi context, Al-Asmari (2008) and AlMulhim (2014) argue that although teachers are required to integrate ICT into their teaching and learning, and despite different reforms in the education system in this regard, teacher training is poor. Most Saudi teachers require professional training in pedagogy and skills both prior to and in-service (Mansour et al., 2011, cited in Al-Madani & Allafiajiy, 2014).

However, teachers' training courses must not only focus on ICT skills, as it is taught in most universities, but also on how to effectively use ICT in the educational process (Almosa, 2002). According to Ragsdale (1991, cited in Watson, 2001, p. 255) "*knowledge of ICT skills do not mean these skills are always applied. Indeed, acquiring ICT tool skills may be relatively easy but gaining wisdom to use them effectively is not.*" This can be illustrated by Figg & Kamini (2011), who reveal that ICT basic skills are not enough to benefit from when using ICT in pedagogical practice, which means teachers are required to have the ICT skills that relate to pedagogy as well. Teachers also need to understand what, why, and how ICT can be used in their classroom for their teaching and learning processes (Morrison, 2011).

In addition, research emphasises the need for ICT training programmes during teacher education courses to make them well-prepared to integrate ICT in practice in the future. For example, Koehler & Mishra (2009) and Jaiya (2015) stress on the significance of such courses if students teachers to effectively employ ICT in their future classrooms; and ICT training may include not only knowledge about ICT but also knowledge about the content of the subject they will teach the methods they will employ in their teaching. Training during teacher education, whether in the university before they graduate or in the special programmes before they are appointed as teachers, is a very significant start for them using ICT in their teaching. They can start their careers with confidence and skills to practice the new, effective, and innovative methods of teaching and learning through benefiting from the advantages that ICT can offer them (Kay & Mellar, 1994).

Regarding any type of training and professional development for teachers' ICT integration, the review of literature about teachers and ICT in education conducted by Cox et al. (2003) seems very useful especially in relation to the TPACK framework, which will be presented following this section. The review revealed there is evidence of the necessity of teachers' professional development in order for them to effectively integrate ICT into the process of teaching and learning and consequently improve the attainment of their students. Most teachers, even those who are regarded as more innovative, need to have extensive knowledge, confidence, and awareness of the effectiveness of ICT in education. Therefore, based on their review, they list a number techniques needed in teachers' training in order for teachers to effectively integrate ICT in the process of teaching and learning. They include teachers' need to: be able to refer to their expertise in the subject they teach and choose the relevant ICT resources; be familiar with the advantages of ICT for learning, have confidence

through using different ICT resources; be aware of the different ways of teaching and learning when ICT is used; have knowledge of how ICT will help students' deep thinking and understanding when preparing their lesson; and have knowledge of which appropriate pedagogy they will use. These aspects are very crucial as they embody the kinds of knowledge (technology, pedagogy and content) that are presented in the TPACK framework in the following section.

In their review of literature on ICT professional development, Daly et al. (2009) extracted a number of contributing factors for teachers' effective ICT use: supporting teachers' pedagogical needs differently, as the way they learn and their learning needs are different; allowing teachers to learn and interact with others as well as to access learning resources; supporting teachers whose needs are large through offering monitoring and feedback; supporting teachers in their subject needs and pedagogy; and monitoring what they do in the classroom, which can be helpful in creating more confident and skilful teachers.

Both reviews of Cox et al. (2003) and Daly et al. (2009) set a number of conditions that need consideration in teachers' professional development training in order to help them effectively integrate ICT in the educational process. However, the study by Cox et al. (2003) concerns the types of knowledge teachers have to acquire; while Daly et al. (2009) considers offering extra support to teachers with greater needs in terms of the types of knowledge they need for ICT to make an effective change in the process of teaching and learning. Therefore, policy makers need to take all of this into careful consideration in order to make sure that all teachers and their needs are equally treated, which in turn can reflect on teachers' effective integration of ICT in their classrooms, in turn improving the quality of education.

This section has presented how ICT is used in schools using two main categories. The study has referred to ICT as a tool, referring to those teachers who use ICT for their teaching preparation, presentation or administrative tasks rather than an integral part of their teaching and learning; and ICT as a method, which refers to ICT integration as we mean in this thesis. If, however, teachers decide to use ICT as a method, teachers will need an understanding of the way towards effective ICT integration in their teaching and learning process. Therefore, the following section will present the TPACK framework with the intention of helping teachers to integrate ICT in their teaching and learning more effectively.

### 3.3.5 TPACK framework

Throughout the earlier sections of this chapter, it has been emphasised that the role of teachers is central to effective ICT integration in the classroom. However, merely being ICT skilled does not mean effective integration of ICT will take place, rather, if ICT is to enhance and improve learning, integration of ICT requires a close link to pedagogical and content related aspects that teachers must have knowledge about alongside their ICT knowledge. To illustrate this, the TPACK framework will be presented below as a useful ICT model for teachers, because if teachers have this knowledge, ICT can be integrated into the process of teaching and learning and potentially improve students' learning.

Thus, if ICT is to make effective change in the classroom for both teaching and learning, teachers are required to acquire appropriate knowledge as one of the central requirements for effective ICT integration (Mishra & Koehler, 2006; Koehler et al., 2011). The following model will present a framework for teachers, which shows the required knowledge to effectively integrate ICT in the educational process.

#### 3.3.5.1 Background:

The roots of the TPACK framework go back to Shulman's framework of pedagogical content knowledge (PCK) in 1986 and 1987, which considers the necessity of combining two categories of knowledge for teachers in their teaching practice: what teachers know about their subject (content knowledge); and how they teach the content of their subjects, including methods and strategies of teaching (pedagogical knowledge). As they are blended together this forms an integrated knowledge (pedagogical content knowledge) which teachers can use to actively engage students and relate the subject matters to the way they teach (Koehler & Mishra, 2005; Shulman, 1987). In 2005, Koehler & Mishra built their framework on the PCK framework and extended this by including technology knowledge to form the TPCK framework, as it was previously called. This was a way of understanding the teachers' knowledge regarding effective teaching with the use of technology (Koehler & Mishra, 2005, 2009). The TPACK abbreviation was initially named TPCK but then renamed to TPACK because it is believed to be simpler to remember and, more significantly, it is thought that the three domains of knowledge (technology, pedagogy and content) should not

be isolated and instead should form a more ‘integrated whole’. This encourages teachers to benefit from the advantages of technology to develop learning (Thompson & Mishra, 2007).

### 3.3.5.2 Definition and assumption:

The TPACK framework refers to the intersection of multiple kinds of knowledge that teachers need to have for their teaching practices when using technology (Mishra & Koehler, 2006). As mentioned in previously discussed literature, this framework is based on the idea that simply providing technology in classrooms is not enough, as teaching is a complex activity and requires different kinds of knowledge for effective ICT integration in teaching and learning (Mishra & Koehler, 2006). The assumption of the TPACK framework is that effective ICT use for the educational process is associated with teachers’ high level of TPACK. This is not to say there are no other factors influencing their teaching practices with the use of ICT, but this interrelated factor is fundamental when ICT is used in teaching. Nevertheless, the TPACK framework acknowledges the multiple contextual factors affecting teachers’ ICT use. This study will present a detailed explanation of the factors affecting this in the classroom.

### 3.3.5.3 TPACK’s kind of knowledge:

According to Mishra and Koehler (2006; 2009), there are three main kinds of knowledge in the TPACK framework that more effective teachers use. 1. Content knowledge (CK): what teachers know; 2. Pedagogical knowledge (PK): how teachers teach; and Technological knowledge (TK): how technologies are used. These will be briefly presented as follows:

#### ***1. Content knowledge (CK):***

This refers to teachers’ knowledge regarding the subject they teach.

If the teacher fails to have the CK, they must gain that knowledge by understanding their overall subject content related aspects in order for teaching and learning to be effective.

#### ***2. Pedagogical Knowledge (PK):***

This refers to teachers’ extensive knowledge about their teaching experiences, i.e. their teaching processes and approaches or strategies.

Teachers with deep pedagogical knowledge can understand how learners think and learn and construct their knowledge, know the appropriate way of teaching so that learners learn optimally, and choose the appropriate strategies for learning evaluation.

### ***3. Technological knowledge (TK):***

This is the knowledge that teachers need to have to know how to use technology in the classroom and to decide which technology is appropriate for learning.

According to Mishra & Koehler (2006), the above three kinds of knowledge are key requirements for effective teaching. However, what is essential here is the need for teachers' understanding of how these three kinds of knowledge are integrated for effective teaching with ICT. So, based on the TPACK framework, when these three types of knowledge mentioned above are combined or intersected, they will form three further integrated kinds of knowledge:

#### ***A. Pedagogical Content Knowledge (PCK):***

This kind of knowledge refers to the knowledge of how to teach the content of a particular subject.

#### ***B. Technological Pedagogical Knowledge (TPK):***

It refers to how to employ technology in the teaching and learning process.

#### ***C. Technological Content Knowledge (TCK):***

This refers to the knowledge of how to use technology to explore the content of the subject.

When all three components of knowledge intersect, this will form the basis of the Technological Pedagogical and Content Knowledge Framework (TPACK): This refers to knowledge teachers need to have to teach a specific content while employing appropriate approaches of pedagogies and technologies. Here, teachers should be able to choose the appropriate ICT and teaching strategies that suit the taught content.

The framework assumes that teachers acquiring TPACK related knowledge can integrate ICT more effectively than those who fail to develop these types of knowledge. The TPACK

framework also guides the use of appropriate programmes for teachers' professional development to help them effectively integrate ICT (Schmidt et al. 2009). According to Koehler et al. (2011) and González-Sanmamed et al. (2017), the TPACK model is commonly recognised in professional development-ICT-related programmes, in teacher education programmes, and universities courses. However, to the best of my knowledge and experience in actual practice, this is not the case for such programmes in the context of this research.

It should be mentioned that focusing on a particular kind of knowledge and excluding another leads to professional development programmes with one dominant knowledge. This encouraged Shulman to propose his PCK framework as different kinds of knowledge are integrated altogether (Mishra & Koehler, 2006). Therefore, as TPACK is built on the PCK framework, while the focus in professional development for teachers in terms of ICT must be on the development of these forms of knowledge, they must not be limited to technology knowledge (Mishra & Koehler, 2006). According to Mishra & Koehler, teachers are no longer required to simply learn how to use technologies but rather need to develop their technology knowledge and skills alongside relating that to appropriate knowledge in pedagogy and their subject.

Having discussed the knowledge required by teachers in relation to the central focus in this thesis, and having explored why their knowledge is vital regarding effective ICT integration in the classroom, the present study will highlight this issue in the factors section later in this chapter, informing an understanding of the relationship between this knowledge and ICT use in teaching.

Supporting and encouraging teachers towards effective ICT integration does not imply teachers are required to know what the TPACK framework is, but rather refers to teachers understanding how to shape their teaching in a way which integrates the three main kinds of knowledge (Voogt & McKenney, 2017).

It is worth noting that the present study aims to understand how teachers use ICT in the classroom for educational practice and what factors influence them, and thus this study does not intend to examine the framework. However, this model is considered as a model of ICT for teachers that both teachers and policy makers need to take into account.

It should be noted that the framework has been criticised in a number of aspects. For example, referring to several studies examining the model, Graham (2011) argues that the TPACK framework is theoretically unclear. However, Koehler et al. (2011) claim that there has been a misconception in research about the framework in describing modern technologies that focus only on TPACK, and that technologies in TPACK actually imply both digital and old technology, while the goal of TPACK is not only related to technology, but also includes content and pedagogy.

Another criticism by Graham (2011) is that the TPACK framework fails to separate categories and this makes it difficult to study them. For Mishra and Koehler (2006), dealing with the TPACK's categories of knowledge could result in centrality of one category over another.

Graham (2011) also argues that the framework lacks clarity in defining its concepts. However, based on different research, the definitions are almost similar, for example, Tozkoparan & Kılıç (2015) summarise the TPACK's concepts from a number of studies and found similarities between them.

To conclude, this framework is an important consideration because, as discussed before, the current study argues that simply providing ICT resources or acquiring ICT skills does not mean ICT will be integrated into the process of teaching and learning. Since ICT integration requires teachers to employ ICT to enhance the process of teaching and learning, this requires knowledge of how to use it effectively. As mentioned before, this knowledge in TPACK consists of different types of knowledge, which are integrated as guidance for teachers and their professional development programmes. This intersection of knowledge types here is crucial for the MOE to consider in their educational and ICT strategic planning, which should reflect on the nature and implementation of teachers' professional development training programmes to help Saudi teachers to integrate ICT effectively. This is especially important when considering students today who are likely to engage with ICT more readily than the content of the subject of study or with the current pedagogy that their teachers follow, but when ICT is integrated into that content and pedagogy, students' learning should be enhanced. It is also important to mention that, as discussed before, teachers need to be ready for different pedagogies. This means employing the only pedagogy that is thought to improve students learning. It is the same case with the use of ICT - it should

not be used if it will not make learning better. Therefore, in TPACK, teachers will have the opportunities to understand and decide if that pedagogy or particular ICT is worth employing in the classroom.

Thus, when teachers acquire and employ this integrated knowledge, the learning and quality of education can be improved which means achieving the broad purposes of education too. However, in order to make teachers' professional development programmes effective and successful, and to acquire TPACK, it is essential to determine and overcome any obstacles hindering actual ICT use in the classroom for educational processes (Ertmer et al., 2012). This issue is central to the present research and so specific factors affecting teachers' ICT use in classroom will be discussed in detail in the following section.

### **3.3.6 Factors affecting teachers' ICT use in practice**

#### **3.3.6.1 Motivating factors**

Teachers seem to believe in the potential benefits for the educational process, but they still face challenges in the integration of ICT in their teaching in classrooms (Balanskat et al., 2006). For instance, despite the many initiatives considering the importance of ICT in the teaching and learning process, schools in Saudi Arabia still fail to integrate ICT into the educational process. Bingimlas (2009) interprets this failure as overweighting barriers compared to advantages. Therefore, there is a significant need to identify and determine ICT obstruction in schools as this is the first step towards change in ICT use in education. This thesis considers this aspect and seeks to understand the issues affecting teachers' use of ICT in their classrooms. However, before addressing the factors that affect the use of ICT by teachers in education, and having discussed the purposes of education and ICT earlier in this thesis, it is important to highlight some reasons why teachers use ICT in their teaching. Therefore, these reasons will be briefly presented below.

According to Altınay-Gazi & Altınay-Aksal (2017), the advantages that ICT offers for teachers in education include freedom and flexibility regarding what, how, where, and when to practice it in their teaching, and this is a motivating factor towards ICT use. In addition, teachers are motivated to use ICT in their classroom for the more interesting facilitation that ICT can offer during lesson instruction, resulting in more effective learning, such as making

use of easy storage, speed, and fast movement among various resources (Roblyer & Edwards, 2000, and Beauchamp, 2012).

In their study of teachers' ICT use in education, Wasserman & Millgram (2005) state a number of reasons causing teachers to use ICT, such as the students' motivation, independent learning, strengthening low achieving students, and teachers' ability to apply different methods of teaching, thus expanding knowledge.

Baek et al. (2008) indicate a number of reasons for teachers to use ICT in their teaching, such as the social request for the necessity of teaching students with ICT; the benefits that ICT can offer teaching and learning process; and the comfort and ease ICT can offer teachers in terms of lesson preparation. Another significant motivating factor is related to both teachers' and students' access to massive online resources and thus the ability of sharing views and knowledge with other people, even communicating with them directly (Bhattacharya and Sharma, 2007).

#### 3.3.6.2 Hindering factors

Literature has stressed that teachers' related hindering factors, especially personal ones, depend on the external factors or even the internal support factors (as classified in this thesis). For example, according to Becta (2004) as soon as teachers are supported with appropriate ICT resource provision, effective professional development training and adequate time, their personal factors can improve. However, Becta (2004) found that both categories are interrelated when affecting teachers' ICT use.

Research shows a number of hindering factors in this regard. According to Ertmer (1999), these factors can fit within two central categories. The first group is related to *internal factors*, while the second category is linked to *external factors*. Factors related to the first category can be barriers related internally in school, such as attitudes of teachers and management, support of management and school related resources, teachers' time, and workload. External factors are those associated with barriers outside of the school as any support (technical, resources, strategies and policies, maintenance, training, continuing professional development programmes) coming from the educational authorities including the Ministry, and associated educational authorities.

- *Internal factors*

One of the personal factors that affect teachers' use of ICT is related to teachers' culture. Culture can be related to language, belief, religion, etc. For example, concerning the huge differences between the use of educational electronic resources between Arab countries and the US and UK, Ahmad et al., ( 2007) provide a number of facts which make this distinction. They indicate that only 0.5% of people using the internet around the world are users living in Arab countries; and in terms of owning PCs there are only 20 of them for each 1000 people in Arab countries, whereas there are 200 PCs for each thousand people living in more-developed countries. They refer a number of reasons for this, such as the high cost of internet use imposed by governments in Arab countries, and in terms of personal reasons; culture is a factor because the use of internet is sometimes restricted to avoid aggression towards the country's values and traditions.

This is also confirmed in the Saudi study conducted by Alreem (2008) on female teachers where culture was one of the factors affecting teachers' ICT use. This study conducted on female teachers in the Eastern region of the Kingdom explored the challenges faced in regard to ICT usage, in particular, teachers lacked awareness of the significance of ICT in the educational process. For cultural and religious reasons, they avoided internet use completely so that they could guarantee never being mistakenly navigated to bad websites.

Another factor is related to lack of confidence, experience, motivation, and attitude. Hennessey et al. (2005, p.9), based on their review of various research, state a number of personal related factors that can be barriers to teachers' ICT use, such as lack of confidence, experience, motivation, and attitude. In contexts such as Arab states where ICT usage rates are lower, confidence and experience are likely to be low. According to the study conducted by Cox et al. (2003), reveals that teachers who have been motivated to use ICT were successfully able to accept this change and teach with the use of ICT, since they were confident of its educational benefits.

Teachers' positive attitudes toward the use of ICT is required if it is to be used in the teaching and learning process. According to Mumtaz (2000), when teachers' views toward ICT use in education are positive, they are more likely to apply ICT in their teaching, and even more learn to have ICT skills if they are not skilled yet. According to Ertmer (2005), a small

number of teachers are not welcoming the use of ICT in their teaching although the available resources, including their related support, are increasingly provided. Therefore, he asserts that teachers themselves have the choice for deciding whether or not to use ICT in actual practice.

Ng & Gunstone (2003) explored teachers' attitudes toward the use of ICT in their teaching in a city in Australia. 79 questionnaires were returned to researchers and 22 teachers were interviewed. Although they found a large portion of the teachers had a positive attitude, they rarely used ICT in their teaching practice. This indicates that even if their perception in terms of the use of ICT is positive, there might be other factors to address that might affect their use of ICT.

Given the importance of attitudes, teachers' awareness of ICT in the teaching and learning process must be raised and nurtured during their training programmes. Attitudes of people towards any action can be affected by different factors such as their previous experiences, beliefs, values and their abilities and skills for practicing that action. This relationship is confirmed in the study by Usta & Korkmaz (2010). It is also supported in the study on 129 teachers in Finland and Serbia, where teachers' interest can be positive when their attitudes are also positive, which requires experience in terms of the use of technology (Haapasalo & Kadijevich, 2008).

In 2008, Holden et al. conducted a survey in USA to examine teachers' attitudes and use of ICT. It was found that teachers preferred to use the technology for lesson preparation rather than its explicit use in lessons. This could indicate a lack of confidence in using technology their students may be better acquainted with. Although it does show that teachers see the benefit of ICT for lesson planning. Moreover, before that in 2001, Sheunmaker et al. found that poor training opportunities accounted towards teachers' negative attitudes towards ICT use in education. A lack of support for ICT resources was found to contribute to the lack of ICT acceptance by secondary schools' teachers in Greece (Demetriadis & Barbas, 2003)

In a Saudi study conducted by Alshowaye (2002), participating teachers revealed that one of the issues affecting their ICT in classrooms is the load of the managerial job, which is not part of their work. Indeed, they revealed that, as a result of this, they do not have enough time to learn about ICT. In a more recent study, Alsulaimani (2012) aimed to find out what

prevents teachers from using ICT in Saudi schools by using questionnaires sent to 309 teachers; 90% of teachers revealed the lack of time as a crucial factor, especially when committed to family affairs (Amoudi & Sulaymani, 2014).

Another issue is associated with the intensity of subject content as teachers are responsible for prioritising finishing and completing all the units of the subjects they teach. This, together with lack of time, creates difficulties in using ICT in the face of competing pressures. Teachers report that such factors prevent them from the use of ICT (Waite, 2004). Some studies (Becta, 2009; Jones, 2004; Ertmer et al., 1999; and Rogers, 2000) have found that teachers need more time in order to prepare lessons that apply ICT in the education process.

Teachers are also affected by the workload and other tasks that they are not responsible for; these tasks in school are related to the responsibility of school management. For example, allocation of extra classes impedes a teachers professional development (Mumtaz, 2000; Pelgrum, 2001). Solutions have included suggestions of giving teachers more time for training, and supplying teaching assistants, as well as professional incentives (Becta, 2009).

Lawless & Pellegrino (2007) indicates that many perceive unsuccessful ICT use in education as due to the lack of teachers' time. This is also supported in the findings of the Jordan report in 2012 where teachers were not happy being offered an ICT training programme after their working hours without being rewarded for attendance (Ministry of Information and Communication Technology in Jordan, 2012). This is also supported by the American survey that was conducted on 47 teachers in one city in America, which explored those teachers' current usage of ICT. The teachers indicated time to be one of the major factors affecting their ICT usage in education (Holden et al., 2008).

Another barrier is related to students' access to ICT. The number of students benefiting from the advantages of ICT could be minimised if their schools' management restrict access to ICT resources within the school. As learning is the most important aspect in education where ICT can facilitate and support, the school management should assure that access to ICT is available for all students to benefit from. One of the reasons causing students learning to be at a low level is their non-use of ICT, as their head teachers do not allow it; and another reason over-crowded classrooms (Yesilyurt, 2006, cited in Yesilyurt and Celik, 2013).

- *External factors*

The other category of hindering factors affecting teachers' ICT use in the process of teaching and learning is external factors.

In their Australian study, Dakich et al. (2008) aimed to reveal the barriers and facilitators of effective ICT use in primary schools via questionnaires distributed to 350 teachers in these schools. The finding of this study shows a number of barriers relating to support, such as the lack of appropriate ICT resource infrastructure, where ICT should be used, and lack of technical support.

One significant factor affecting teachers in relation to their use of ICT in education is educational and ICT policies. For example, an extensive analysis conducted by Kozma (2008) demonstrates how supportive ICT policy has positively affected ICT use by teachers in a number of countries.

One of the issues related to ICT policies in education is the lack of clarity when making statements. One common example of this is ICT policy including its aims and objectives but lacking the provision of details assisting and guiding the targeted people in how to use ICT. This is confirmed by (Blamire & Balanskat, 2005), who criticise ICT policy in UK education, as the policy regards computers as a tool which can be used for learning, however, the policy misses how this tool can be used. Another study before this by Watson (2001), related the failure of ICT in education compared to the success of ICT use in other sections of business around the world to particular issues; the main issue was related to the clarity of ICT policy made by governments, with the UK's ICT policy used as an example of this.

Since ICT Initiatives are a significant approach towards the development of ICT integration in the educational process, departments of education must pay attention to their policies development to avoid any problems may hinder the effective ICT integration in classrooms. Examples of that include the ICT national framework of the education department in Australia, which aims to change the teaching and learning process effectively and prepare learners to be familiar with an ICT world environment in their future (Alhawiti, 2013). In particular, the framework takes into account a number of goals such as encouraging independent learning in and outside schools, enhancing students' achievement, keeping ICT

capabilities developed and monitored, and ensuring technical and maintenance support for the process of learning and teaching.

ICT provision support is another external barrier affecting teachers' ICT integration. A lack of funding and a lack of ICT resources have been found to be inadequate in Saudi schools, hindering their successful integration (Alshowaye, 2002; Addandani, 2011; Shabat & Baneamah, 2009). Based on the findings published by Alshowaye (2002), it is reasonable to conclude that the degree to which ICTs resources are effective in classroom teaching is adversely affected by limited availability. In the following year, the comparative study conducted by Almohaisen (2003), which collected data from secondary schools in several countries (KSA, USA, Japan, and UK), arrived at the same conclusion. Furthermore, the author reported that it constitutes a key obstacle that many teachers have difficulties in overcoming, and concluded that limited resources availability is a comparatively severe concern in the KSA when considered in relation to the problem in other countries. In addition, since the Internet is a fundamental educational resource (Al-Obaid, 2002), an especially critical issue in Saudi schools is that of Internet access (Almosa, 2002). At the same time, the availability of relevant software is imperative when selecting ICT resources for educational environments, not least because of the motivational benefits they offer to both educators and learners (Wasserman & Millgram, 2005; Alsaif, 2006). As such, without software, teachers are hindered significantly in achieving their aims. This is to say, the literature is clear in demonstrating that even when computers are available in educational settings, a lack of relevant educational software and other ICT resources, including the Internet, detrimentally impacts the value computers can bring to the learning experience.

Since most teachers in Saudi are not bilingual, and since their first language is Arabic, their ability to utilise software, which is primarily operable only if one speaks English to a high level of proficiency, is negatively affected (Al-Obaid, 2002; Alsaif, 2006). In this way, limited language skills have an adverse impact on the ability these teachers have to utilise software, even in the event that specialised educational software is available in the school. Consequently, the degree to which options are available for these teachers to employ computers without Arabic-language software is severely hindered.

Insufficient support provided to teachers is an additional obstacle hindering using of ICT in education. Topp et al. (1995) and Finger et al. (1999) demonstrated that an absence of

ongoing technical and maintenance support of ICT in practice has a severely negative impact on the degree to which teachers are successful in their utilisation of technology with respect to student learning outcomes. Failure to provide ICT support in classrooms was also identified as a major hindrance in Saudi schools in relevant studies such as (Al-Rashed (2002), Al-Alwani (2005).

Another piece of research from KSA conducted by Almosa (2002) revealed lack of technical support for ICT resources, the implication being that it is crucial to ensure that targeted forms of support are available. ICT resources always need to be technically supported, checked up and maintained. Teachers refer the lack of such support to be one of the factors affecting their use of ICT in classroom (Waite, 2004).

As already noted, one of the major issues that hinders teachers' use of ICT is related to the lack of training provided for teachers, which is an external factor leading to an internal problem. The Saudi study conducted by Alsahli (2012) on teachers in secondary schools in the Saudi Arabian city of Jeddah aims to explore the training features that secondary school teachers need. The study found that teachers lack both knowledge about ICT and how to use ICT, which reflects on the lack of training they have undertaken. Effective learning with ICT is likely to fail if students' teachers are not skilled enough in ICT and ICT pedagogy. Thus, as revealed by Blackmore et al. (2003), the first prerequisite for underpinning the successful ICT into education is teachers with high quality training. In particular, as highlighted by Ortega (2000) and Almosa (2002), training opportunities must be offered pre-service and in-service. Otherwise, as highlighted before, the lack of effective training might result in the rejection of ICT in education. In addition, because of the fast development of technology, teachers' awareness of new ICTs and their uses in education is significantly important. In this sense, the literature underlines the fact that the absence of ICT training for teachers contributes to the emergence of a knowledge gap (Guha, 2011). Therefore, as noted by Holden et al. (2008), the available studies emphasise the criticality of ongoing training not only for teachers but also for students. Alkanani (2012) investigates the issues and actual use of ICT in intermediate schools' teachers in a city of the southern region of the Kingdom of Saudi Arabia. The finding indicates that teachers rarely use ICT in their classrooms. He concludes that this failure of teachers' use of ICT is because of the inefficient training they receive.

### **3.3.7 Summary**

To conclude this section, all of the discussed factors are interrelated, or may even be affected by each other (Becta, 2004). For example, Celik & Yesilyurt (2013) argue that teachers' attitudes towards ICT use in classrooms could be influenced by other barriers. Becta (2004) clarifies this, stating that as soon as teachers are supported with external factors, or organisational factors as referred to in this thesis, (such as appropriate ICT resources provision, effective professional development training and adequate time), their personal factors can improve afterwards.

So, if ICT integration is to be successful, any affecting factors need to be determined and dealt with. Policy makers must recognise these barriers and address them in strategy so that the results of overcoming such issues are reflected in education reform, policies, and teachers' professional programmes (Celik and Yesilyurt, 2013).

## **3.4 The relationship between literature review and the research questions**

The review of literature has covered three international debates on teachers' use of ICT in education that correspond with the three overarching research questions of the study. Firstly, ICT policy reforms in education can be classified between those mainly oriented towards the instrumental and economic aims of education and those oriented to wider aims of education that are not restricted to instrumental and economic ones. The two theories of education and development that better represent these two contrasting orientations are HCT and CA. Policy reforms informed by HCT will understand the adoption of ICT in education as a strategy to develop a set of ICT-related skills among students that will prepare them better to function in technology-intensive work environments. On the other hand, policy reforms informed by CA will promote the use of ICT in education to develop the agency freedom of the students and their capacity to make informed judgments about their motivations for learning, areas of interest and life plans. By interrogating the views of policy makers in relation to ICT in education in Saudi Arabia, the research will be able to identify the main aims behind the policy reforms and programmes that they are promoting.

Secondly, the literature on teachers and change in education shows how the role of this educational actor is absent on many theories of change of ICT reforms. Understanding the important role of teachers in any process of educational change is crucial for the success of these initiatives. Policy approaches that focus only on the transformative capacity of the interaction between the student and the use of technology will fail if they do not incorporate the mediating role of the teacher. Any significant innovation in the learning process of the student will need to be accompanied by adequate pedagogical support from the teacher. By interrogating the patterns of ICT practice in education in Saudi Arabia, the research will be able to elucidate to what extent teachers are actively incorporating ICT in the teaching and learning process.

Thirdly and finally, the literature on teachers and ICT use identifies several factors at individual and institutional level that may explain different levels and types of integration of ICT into the teaching and learning process. These different patterns are not only influenced by teachers' individual characteristics but by the interaction between these characteristics and other contextual and institutional factors. The institutional factors can be of material (e.g. technical support, equipment) or a cultural nature (e.g. pedagogical approaches) and may be configured at school or policy levels. By interrogating the factors that affect Saudi teachers' use of ICT in the classroom, the research will be able to identify which of these individual and contextual/institutional factors are influencing the integration of ICT in their practice.

### **3.5 Conclusion**

This chapter has presented relevant literature to the use of ICT in classroom, starting with a presentation of the broad purposes of education based on two dominant theories in education, (human capital theory, HCT, and capabilities approach, CA) in order to understand the importance of ICT in education. A conclusion of both theories demonstrated that a number of educational issues (i.e. pedagogy, quality, equity and ICT) are required to be addressed if the purposes of education are to be achieved. The discussion on these issues was helpful to understand the main issue of this study, which is about teachers' ICT use in the classroom for teaching and learning processes (or integration, as these two terms have the same meaning in this thesis). Most research revealed that despite the global movement towards the importance of ICT and the massive investment in ICT and related education systems,

initiatives and programmes, ICT is still at a disappointing level, opposing the global expectation of its role in advancing education and its role. The conclusion made was that simply introducing ICT in classroom is not enough for ICT integration, but rather how ICT is integrated is the important consideration. The literature suggested some conditions for ICT integration to be effective in the process of teaching and learning. Theory of change is a very useful tool for underpinning interventions affecting ICT integration. The planned change should include a clear ICT policy that guides all stakeholders including the teachers as the main implementers of ICT integration in practice. Another important condition was the provision of necessary ICT resources because the study argues its quantity is not the issue, but the equal availability for teachers to uptake. In addition, literature emphasised that teachers' professional development is a significant condition for effective ICT integration, thus, TPACK framework as a useful framework was presented that discusses the importance of an integrated form of the most important kinds of knowledge (technology, pedagogy and content) that teachers need to effectively integrate ICT. This is because teachers with ICT skills knowledge can do nothing to enhance content they teach nor the particular pedagogy they use if they fail to have knowledge of specific content and pedagogy. The TPACK framework is a very useful framework because it can guide MOE policies and any ICT initiatives, and professional development programmes on what teachers need to help them effectively integrate ICT in their classroom.

In addition to those issues, the chapter concluded with a presentation of additional factors affecting teachers' ICT use in the classroom based on the categories of internal and external factors. It is assumed that in order for teachers to effectively integrate ICT in the process of teaching and learning, overcoming the hindering factors discussed is necessarily required. The following chapter will present the current study's methodology.

To conclude, there is no doubt that ICT is an essential means that rapidly becomes a necessary requirement for the development of countries and their societies in terms of economic growth, as from the HCT view. However, from the CA view people also have the right to develop their capabilities through equal access to and use of ICT to choose the life they have reason to value. This includes the use of ICT in education, where both theories emphasise that through ICT use in the educational process, acquiring skills and knowledge to develop individuals' human capital reflects on the development of the economy for both themselves and their nation, and/or develops peoples' capability to fulfil their personal and

social lives. This is because as mentioned above, ICT becomes part of people's lives, and contributes to the development of not only individuals but also their societies. For example, students with high knowledge of ICT are expected to contribute to economic development of themselves and countries; contribute to social activities and services, and contribute to their personal and educational fulfilment. This echoes the necessary development of ICT in education because it is not optional knowledge and skills anymore but an essential requirement.

However, deprivation of capabilities in this regard not only affects fulfilment of teachers and their students in using ICT effectively in the educational process, but also the quality of their human capital, which affects their economic wellbeing in the future. This deprivation is inherently a fundamental issue in education that affects successful ICT integration, specifically quality, pedagogy and equity are affected by a number of hindering personal and organisational factors.

This chapter justifies that if we want to understand the importance of ICT, it is necessary to understand the purpose of education and all of the educational issues and hindering factors must be addressed if ICT is to develop people's capabilities and human capital. If the hindering factors discussed in section three of this chapter are addressed, then equal ICT access and use of ICT can be expected; and effective ICT pedagogy can then improve the quality of education. In consequence, people's capabilities and human capital will improve.

It is worth stating that this study is different to other studies in this field for the following reasons:

1. In the context of Saudi Arabia, there is a lack of research on the actual use of ICT use in practice.
2. Understanding the broad purposes of education is based on HCT and CA to understand the importance of ICT in education.
3. The relationship between the broad purposes and the importance of ICT in education lead to the emergence of fundamental issues in education that need addressing, including quality, pedagogy and equity.

## Chapter Four: Research methodology

Research on ICT for the use in the teaching and learning process is negligible in Saudi Arabia. The majority of what exists lacks consideration of the views of the various actors, such as the policy makers from the Ministry of Education (MOE): the very people who have the power over decisions relating to the education system and related initiatives, including ICT integration. In addition, there is a lack of literature that specifically and intensively observes teachers' actual ICT use in practice and then examines that through a deeper perspective. Also, there is a lack of research about ICT use that involves students' perspectives in the study, and, if they are asked to participate, they are commonly asked to fill in close-ended questionnaires.

This study is built on the literature discussed earlier in this study and aims first to understand the current state of ICT in schools from the views and perspectives of policy makers in Saudi Arabia; then to explore and understand the actual teachers' use and practice of ICT in the classroom; and finally to reveal the factors that might affect Saudi teachers' use of ICT in schools.

Therefore, this research provides a significant contribution to knowledge as it employs a qualitative methodology within the interpretive paradigm with a consideration of teachers' actual ICT use in real practice, set in a context of their views, students' voices and policy makers' perspectives about the current state of ICT within schools. The study findings contribute to producing understanding regarding the use of ICT by teachers in schools and should be useful for different stakeholders, including teachers, whether they are already using these technologies or not, researchers who are interested in the teachers' use of ICT in schools, and policy makers who can review the findings in order to consider and bring about educational change in terms of developing the ICT use and related practices in schools and with people who are involved in and dealing with it.

It is important to indicate that, in regard to answering the first research question, which considers the policy makers' views to understand the current state of ICT in education, it would be helpful if it had been possible to gain access to ICT policies to gain a broader understanding for the purposes of this research. It was attempted to gain wide access to ICT

and education government documents – which should be clearly stated and operated as what we call policies in Saudi Arabia – through different ways including literature, the MOE and its related sectors and organisations’ websites and publications, and face-to-face meetings with policy makers and other people in the Ministry. However, despite all these attempts, it was not possible to access or gain information on any policy required for this study. In particular, during the fieldwork phase for the collection of the data for this study, policy makers themselves were interviewed. They refused (or were unable) to share any policy or even strategies as they admitted that the Ministry lacks a clear and standard policy specifically for ICT.

There is some Saudi research where ‘ICT policy’ is discussed; however, when reviewing the available documents related to ICT in Saudi public education as well as from the responses of policy makers that participated in this study, the reality is that most relevant research seems to consider different plans or projects and their aims and objectives as ICT education policy documents, and so researchers call them ‘policies’. This is misleading - unlike in the case of the present study where initiatives, projects and programmes are correctly labelled for what they are. It is possible that the reason why previous researchers used the word ‘policy’ could be related to a translation error from Arabic to English. It seems likely this is the case as no Arabic source referring to ‘policy’ was found in this present study, however, the word ‘projects’ is widely used. This is not the same as policy.

No single article on the general educational policy articles in Saudi Arabia focuses on ICTs, but other plans, programmes and projects may set up a number of objectives. However, these initiatives cannot reflect the policy we mean in this study, as a number of ICT interventions in the Saudi context have been cancelled or postponed or have even failed. The findings of the study will show more details about this crucial issue.

Therefore, it was decided instead to interview ICT policy makers from departments related to the MOE to understand the current state of ICT in education from their perspective. The observable use of ICT by teachers and their views will also be explored. In addition, this research will benefit from the relevant literature, which should be very useful in the discussion chapter in this thesis. In this research, ‘Policy Makers’ is used as a term to refer to those who work in higher positions in related divisions in the Ministry, and are the highest-level representatives of the Ministry’s decisions regarding ICT initiatives’

The above mentioned aims of the study have resulted in the generation of the following research questions:

1. What are the policy makers' views about the current state of ICT in education in Saudi Arabia?
2. What are the patterns of ICT practice in education in Saudi Arabian boys' secondary schools for the teaching and learning process?
3. What are the factors that affect Saudi teachers' use of ICT in classrooms for the teaching and learning process from a personal perspective, and in terms of the Ministry's policies, and its support and management?

This chapter describes the methodology used in the present study. The chapter is structured as follows. Firstly, the research approach and paradigm will be discussed. This is followed by a description of the adopted methodology. Thirdly, the data collection instruments in the form of classroom observation, student focus group and interview will be explained. Then, the research's sampling and selection will be described. Next, the data analysis is highlighted. Finally, the ethical consideration are explained.

This research takes into account the voice of policy makers, head teachers, teachers and students, through semi-structured interviews and in the case of students, focus groups. In order to triangulate these views, classrooms were observed.

#### **4.1 Research paradigm and approach**

Since this current study aims to understand the current state of ICT in classrooms in Saudi Arabia's schools and its use by teachers through the meanings and interpretation of participants, therefore, based on the aims and questions of this research, the most appropriate methodological approach is a qualitative methodology. According to Maykut & Morehouse (1994, p. 17) *"to understand the world under investigation, people's words and actions are used by qualitative researchers."*

This study's qualitative methodology is situated within the interpretive paradigm through different instruments, or in other words: triangulation. In this section, the paradigm will be

discussed first, followed by a discussion on different methodological approaches and the data collection methods used in this research.

The assumption of this paradigm is based on the philosophy of hermeneutics and phenomenology (Boland, 1985), as the participants can express their views and perspectives, which can result in understanding and interpretation.

It was Kuhn who first used the ‘paradigm’ as a concept: knowledge is regarded as occurring within specific paradigms (Kuhn, 1970). Determining a paradigm for a study is a starting point of not only choosing its method but also in its ontological and epistemological assumptions (Guba & Lincoln 1994). Each methodological approach will make assumptions about ontology, epistemology and methodology. Blaikie (1993) defines ontology as, “*the study of being*” and “*what is there that can be known about it*” (Guba & Lincoln, 1994, p.108). Crotty (2003, p.10) also defines it as being, “*concerned with what is, with the nature of existence, with the structure of reality as such..*” About epistemology, (Crotty, 2003, p.3) defines this as the, “way of understanding and explaining how we know what we know.” It is about, “what is the nature of the relationship between the knower or would-be knower and what can be known?” (Guba & Lincoln, 1994, p.108).

To step back from this choice, in the case of education, research is usually classified into two main contrasting paradigms: Positivist and Interpretivist (Cohen et al., 2007). The Positivist adopts a model of science to understand the practical situation in education; conversely with the Interpretivist, research concentrates on participants’ subjective meaning, as they cannot be placed as science objects (Pring, 2000). The ontological assumption of positivism is ‘*Realism*’, as an “*apprehensible reality is assumed to exist, driven by immutable natural laws and mechanisms*” (Guba & Lincoln, 1994, p. 109). Its assumption of epistemology is ‘*Objectivist*’, as the researcher is independent from that being investigated, i.e. the ‘*objects*’ (Guba & Lincoln, 1994, p. 109). The methodological assumption of this paradigm is “*experimental and manipulative.*” “*Questions and/or hypotheses are stated in propositional form and subjected to empirical test to verify them*” (Guba & Lincoln, 1994, p. 109).

Hence, one of the crucial criticisms of positivism is that it assumes the nature of social reality is singular (one truth) as it is detached from researcher and participants (Gall et al., 2003).

The findings in this paradigm are excluded from individuals' perceptions, views and practices as it views that the social reality cannot be examined by considering those aspects (Morrison, 2002). So Hustler et al. (2005), argue that conducting research on social phenomena without including participants' perspectives is impractical (Hustler et al., 2005). However, in terms of generalising the findings of research that is based on this paradigm, it is believed this can possibly happen and so this is a major advantage (Bryman, 2008).

In contrast, in social studies including research in the field of education, the interpretive paradigm, that does not aim for findings generalizability, is intensively used because of its purpose to understand and explore as well as explain the factors that might affect a particular situation (Bryman, 2001; Ridenour & Newman, 2008). Weaver & Olson (2006) point out that the interpretive paradigm enables an understanding of the attributes of individuals regarding their action and their actions towards others as well. This type of paradigm is perceived to be valuable between the researcher and participants in terms of a 'mutual recognition' (Dzurec, 1989; Horsfall, 1995, cited in Weaver & Olson, 2006). In the present study, teachers' use of ICT in classrooms for teaching and learning processes through different sources and methods are explored to answer the research questions.

The researcher in this paradigm depends on the responses of the study participants, who are expressing their views on the phenomena of the research (Creswell, 2003). Methodology adopting the interpretive approach aims to understand a particular phenomenon through the interpretations of participants (Creswell, 2009). This present study aims to understand the situation of ICT use by teachers through the meanings and interpretations of participants through interpretive methods within a qualitative study.

As we saw in the literature review, the guidance of policy and teachers' attitudes to ICT are major factors in its success or failure in education. To understand the current state of ICT, its use by teachers in real classrooms, and the barriers to this, it was important to do so through the meaning and interpretation of participants through triangulating different methods with different participants, including taking into account the process of researcher interpretation to address the research questions. Therefore, the appropriate paradigm in the present qualitative research was considered to be interpretivist.

After highlighting the research paradigm, the following discussion concerns the research methodology approach, which is followed by details of the data collection methods chosen in the current study.

According to Crotty (2003, p. 7), methodology can be defined as “*the research design that shapes our choice and use of particular methods and links them to the desired outcomes.*” The methodology is to help understanding of researchers about the research process (Cohen & Manion, 1994).

This study is conducting research into education and comes under the umbrella of social sciences. Cohen (2000) discussed a number of methodologies that can be followed in educational research. Qualitative research methodology is one of the broad methodologies listed by Cohen, and is followed in this research, which takes place within the interpretive paradigm.

While stating earlier that the present thesis followed the qualitative approach, it is worth noting some differences between this approach and the quantitative approach. There is a contention between the supporters of a qualitative approach and those of quantitative approach on whether the latter is appropriate for social sciences research (Robson, 2011; Thomas, 2009). Regarding the quantitative method, it mainly operates with numbers that enable researchers to compare their research figures and find what numbers are similar or different, as well as note remarkable values (Creswell, 2003). It is important to state that this method has several advantages, such as its simple analysis through different statistical processes because of its numerical nature. With respect to the data collection process, quantitative and qualitative research are marked by clear differences. In the case of quantitative approach, structured methods are typical (e.g., close-ended interview questions and questionnaire surveys), primarily because such methods lead to the collection of straightforwardly quantifiable data. However, although the quantitative method has a number of advantages, it has a range of weaknesses, including the ineffectiveness with which it offers in-depth data relating to the perceptions and perspectives of the sample group (Neuman, 2000; Greene, 2002). Hence, if a study aims to gain in-depth information that can only be gathered by open-ended questions, the quantitative method is not appropriate.

In contrast, qualitative research is broadly adopted in the social sciences because its primary aim is the exploration and understanding of the behavioural aspects of a certain individual or a collective (whether the latter is a community, a country, or an entire society) (Nkwi et al., 2001). Hence, qualitative approach is mainly concerned with gaining comprehensive insight into the subjectivities of individuals, including their attitudes, experiences, and behaviours (Pope & Mays, 2000). That is why in the event that a quantitative research would fail to address the complexity and nuance associated with such data, qualitative research should be adopted (Pelto & Pelto, 1997). In the case of the present study, as mentioned noted earlier, this research aims to explore and understand teachers' current ICT practice in schools by considering three main areas: the state of ICT use from the views of the MOE representatives or 'policy makers'; the pattern of ICT practice in classrooms; and the factors that may affect teachers' usage on ICT, which are likely to be partly about the subjectivities of the people involved and their views of the facilitators and barriers that they face. Therefore, the qualitative approach is adopted in this study, especially because it allowed the research to better capture the views from the different actors and to understand their motivations and logics of action.. This is important when acknowledging that every research question is answered via different methods and sources. The discussion on the methods and procedural sections provides more details of that.

It has been mentioned above that one of the main advantages of the quantitative method is its external validity (generalisability). However, this is because quantitative researchers deal with a large number of participants or settings, whilst qualitative researchers often deal with a small number of participants or sites (Maxwell, 1998). Guba & Lincoln (1989, p.95, cited in Maxwell, 1998) replace the word 'generalisability' by 'transferability', as generalisability of qualitative research "*is usually based on the development of a theory that can be extended to other cases.*" It is the intention of this study not to generalise in the statistical sense but to bring together a rich assortment of data in the context of wider evidence and theory in order to illuminate and inform.

The necessity in this study is to produce a deep understanding and interpretation about a particular issue that is being researched for people who are involved or interested in the field of the study, including policy makers and teachers; and also for researchers who may transfer the findings. Thus, it is very important that the study's findings show comprehensive interpretations that can contribute to knowledge, which should then lead to informing

stakeholders who may benefit from the findings and some may extend the particular or even the whole interpretations to different research.

Piloting all methods was taken before conducting the real data collection in practice. The piloting of questions for interviews and focus groups was conducted by the following process. Interviews were first conducted with two Saudi university teachers. The second step in the process was to pilot the methods with people working or studying where the research would take place. This was as follows: the policy makers interviews were piloted with one head of a division in the IT department in the MOE; and the deputy director of one of the participating schools took part in the head teachers interview pilot study; interviewing a teacher worked in another participating school for piloting teacher interviews; and discussing with students in a different school (also participating in the research) piloted the focus group. Any recommendations from those involved in the piloting were considered and minor changes were made based on their suggestions. In terms of observation, the same two Saudi university teachers, mentioned above, were asked to review the observations schedule. As part of ensuring the reliability of the research, transcripts were carefully and repeatedly read in order to ensure the data was accurate and understood, before starting the coding process.

#### **4.1.1 Data collection methods**

The choice of data collection method branches from the chosen paradigm in the study, along with its methodology and the particular area of research study.

One type of triangulation suggested by Denzin (1994) is that of when two or more methods are used in a research. This is because relying only on one method of research is difficult to extract holistic information through one single research. According to Potter (1996), researchers using triangulation methods are more likely to have convincing findings than others who use a single method. This is true in my research because its goal is to obtain rich interpretation in different issues within the research area, which is more significant and important than only finishing with outcomes that do not lead to extended investigation.

Therefore, as this research attempts to discover and understand the current state of teachers' use of ICT in terms of policy makers' perspectives towards the current state of ICT through interviews with policy makers to answer the first research question, and by observing

teachers' real practice in the classroom and conducting student focus groups and teacher interviews to answer the second research question as well as interviewing teachers and head teachers concerning the factors that might affect teachers' ICT usage to answer the third research question, the interpretive paradigm was chosen for this research, which employs the qualitative methodology. The most suitable methods to utilise are observation, focus group and interview (Hancock et al., 2007). Therefore, triangulation of methods as well as participants was planned.

In terms of the design of the research's methods, the design of all the interview and focus group questions, see appendices 11, 12, 13 and 14, are semi-structured and open ended in order to explore in-depth information which means more deep understanding is achieved, which was considered appropriate for the aims of this research (Cohen et al. 2007; Kvale & Brinkmann, 2009). A semi-structured observation was also followed in the present research because it intends to explore the situation in a real practice (see appendix 10). So, the preparation of these questions was based on extensive reading of the relevant literature and from personal experience in Saudi secondary schools as a teacher, and interaction with stakeholders in the situation of ICT in those schools (Merriam, 2001). However, these questions were only a first pass and some amendments occurred based on several procedures that were followed before the final formulation of the methods questions: including discussion with a supervisor, comments from the ethics committee and piloting. The aims of this research were to explore ICT use in classrooms, therefore using this design is appropriate as ICT use would be different from teacher to teacher, as well as their methods of teaching. Also, ICT itself is rapidly and continuously changing everywhere, including in the field of education. Sticking to a fixed and structured question scheme would prevent the freedom to explore the participants' contribution and would miss a deep understanding and interpretation by not allowing questions to emerge, which would add more depth of information. This design also helped confirm thoughts and information from previous personal experience (Newton, 2010).

#### 4.1.1.1 Classroom observation

According to Berra (1964, cited in Berra & Garagiola, 1998), the interview is a significant method for learning about people's perspectives; however, it cannot discover what they really do in practice. In this study, in order to answer the second research question which

considers how teachers use ICT in classrooms, classroom observation method was chosen to see the actual practice of those teachers. This is very important when taking into account the lack of relevant research in this regard, i.e. observing the actual practice instead of talking to teachers without seeing what and how they are doing when in their classrooms.

There are different types of observation: direct observation and indirect observation (Cohen et al., 2000) and participant and non-participant observation. Atawi (2007) defines direct observation as when the observer actually connects directly to the intended participants by attending the location to be observed and watching, observing participants' behaviour or acts. In contrast, indirect observation is defined as when the researcher connects indirectly to the participants by referring to particular research carried out by others previously about those participants (Atawi, 2007). Direct observation is significant for the observer to see what is actually happening in practice and write notes about different themes that they will have prepared beforehand. Cohen et al. (2007) stresses that this method of observation can lead to a deep extraction of meaning from that which is being observed. In regard to participant and non-participant observation types, the former is when the observer participates in classroom activities, for example: while, in non-participant observation, the observer is not participating in any activities.

In the present study I was a direct and non-participant observer because I attended, watched and took notes based on different themes and questions I had prepared previously. This type of observation helped me to focus on the observations and care was taken to not miss any actions during the observation, which is likely to happen in cases where observers are participating. In addition, from personal experience of the region, researcher participation in the environment where the research was conducted is not the right place to participate for the purpose of a study. So, since the aim in the classroom observations was to understand and discover the use of ICT by teachers and the different practices and actions employed that occurred in the classrooms, there was no point in participating or sharing understanding and knowledge in the classroom. However, the researcher's role was to maximise recording every action in the classrooms and signpost important and relevant incidents to be discovered and clarified more during the teachers' interview and students focus group.

However, there are some limitations to the observation, such as when teachers are aware that they will be observed they might act in the way they think the researcher wants them to

(Berra, 1964, cited in Berra & Garagiola, 1998). In addition, in observation, although the observer can listen and watch, they may not be able to remember or collect every detail about some features. In addition, according to Hargreaves (1967) the head teacher's failure in informing and explaining to teachers whose classrooms should be observed about the researcher is one of the reasons of reducing the credibility of the observer. To avoid this issue, I did not enter any classroom until all head teachers, teachers and students had confirmed they were happy to take part in the research (please see the role of researcher section at the end of this chapter). However, although the ethical issues were taken into account, one of the issues occurred during the conducted observations was that some of teachers seemed to be uncomfortable, and that was because some of them thought that I was an educational supervisor and working for their schools' local education authorities and there to evaluate their performance in the classrooms. Therefore, to put teachers at further ease, in addition to what stated in the role of researcher section at the end of the present chapter, I introduced myself to the whole class, which also proved useful as preparation for a good relationship in the following students focus group and teachers' interviews especially as they were now aware of the research process, and had met me before the actual data collection.

As stated earlier, semi-structured observation was chosen as a method for this study as it intends to explore the situation in a real practice. It has been chosen as an attempt to answer the second research question, which is about the actual patterns of ICT practice that teachers use and follow in their classrooms. Although the second question is about the patterns of ICT practice, it is also intended to discover, through observation, the process of how these are being used by teachers (Johnson, 1975). It was decided to interview the same sample in order to expand on the classroom observation by filling in any missing gaps or clarifying any occurring incident. It also helped to build a good relationship between myself and the participants, which helped them relax and helped reduce possible confounding factors.

A diverse group of teachers was considered to make the final selection, using different aspects such as their subjects, teaching experience and ICT literacy level to ensure a true reflection of the reality of ICT use in classrooms of cross curricula instead of focusing on ICT subject teachers only. As mentioned before, this thesis does not focus on ICT as a subject; rather it considers the use of ICT for the process of teaching and learning.

Before the start of each observation, participants were asked about their objectives for the lessons, their expectation of the lesson at the end of the session, and the source of the ICT resources used in the lesson and students' year of study. This preparation helped me to focus on the observation guide categories. The classrooms were all of a similar layout and I was able to sit in the corner at the back of each of the classrooms. This ensured constancy and gave good visibility of the whole classroom. Other locations in the classroom would have had restricted views.

Four main aspects of classroom observation are categorised in the observation guide (see Appendix 10). First, to see what ICT equipment is used in the classroom and the students' engagement with these types. Second is to observe the frequency of ICT use during the lesson, i.e. how often are these tools used during the lesson? The third category mainly concerns the methods used to observe the learning and teaching in the classroom. Finally, the fourth section was for stating any information that I thought was important to add, and to record any critical incidents that happened in the observation which merited further discussion later with participants.

Table 4.1 below shows the number classrooms and every school and the time spent, as well as their total. The decision on the total number was based on a pre-discussion and then an agreement between myself and the research supervisors.

**Table 4.1: Duration of classroom observations**

<b>Number of schools</b>	<b>Number of classes</b>	<b>Time for each lesson</b>	<b>Total hours from all schools</b>
5 secondary schools	5 for each school (25 classes in total)	45 minutes (3hours and 45minutes)	1125 minutes (18hours and 45minutes)

Classroom observations helped in comparing between what was actually seen in the classrooms and what participants said in the interviews and focus groups, as well as asking them about any clarification or additional information (Merriam, 2001; Cohen et al., 2007).

#### 4.1.1.2 Focus group

The focus group is described as a research method to gather information from a group of participants through their interaction on themes created by the researcher (Morgan, 1996). The focus group method is mostly used in marketing, but it has been considered and recommended in a number of other areas, including the field of education (Wellington, 2000; Robson, 2011). It is suggested that evaluation can not only be considered and dealt with by evaluation teams, but also that students' evaluation of the practice in which they are involved is valuable and significant (Clark & Redmond, 1982). Students could be the best informers about their experiences of the teaching of ICT in the classroom, as they attend, listen, watch and may interact with teachers more than any other people may. For example, according to a report conducted by the UK National Union of Students (2010), which used different methods such as survey and focus group to investigate the perspective and demands of students regarding ICT in higher education, one of the main findings showed that almost 43% of students were concerned about their teachers' lack of ICT use in their teaching. In this report, students also highlighted that most of their teachers had a low level of ICT skills. Discussing with students attending the observed classroom sessions was helpful in complementing other methods used to answer the second research question. As shown by qualitative studies in the area of teachers' use of ICT in education, it is important to combine the view of the students and classroom observation with traditional interviews with teachers.

It was previously mentioned in the discussion of the possible limitations of the observation method in this study that teachers might do what they feel the observer might want to see but not what they normally do. In this case, a focus group with students was one way to minimise this issue, as students were able to explain what actually and usually happens when teachers use ICT in their teaching in addition to what was observed in the classroom observations where those students attended. Therefore, as this study is focusing on teachers' use of ICT in their teaching, and uses classroom observation, it was important to hear students' views, experiences and feedback in more detail by using focus groups with students, which added richness to the other data gathered through other methods from different sources.

Data collected from a focus group might not be gained by questionnaires or open-ended interviews. This is because, in a focus group, each participant may express a different view,

which could develop the discussion and might identify important issues discussed in other research (Fontana and Frey, 2005). Such interaction allows the researcher to include this important information in their study, even if the researcher has not considered such issues before in the topics they have prepared for the inquiry. One of the contributions of this study is its including students' voice by verbal discussion with those who took part in the observed classrooms, which is not the case in other Saudi relevant studies, as when students are included in research, they usually only take part in questionnaires.

However, the focus group method has some limitations; one could be that students might not be confident in the confidentiality issue (Darbyshire et al., 2005). This is especially true if they feel a third party other than the researcher will access their responses. Therefore, in addition to the relevant procedure discussed, it was ensured that students were assured of confidentiality of their participation at the beginning of each focus group and reminded that if they wished not to participate, then they were at liberty to leave at any time.

Another issue, stated by Yin (1994), could be that participants may give irrelevant information, which might affect the time limit of the discussion. However, this issue was minimised by restricting the number of each focus group to four students in conversation with the same researcher they were familiar with from the classroom observations, and that their teachers were also interviewed. In addition, some members of the group might not interact and participate in the discussion for any reason. What was found most challenging was talking to all members of the group whom it was hoped would interact in the discussion. Thus, to minimise these limitations and encourage them to interact, participants were assured that their responses will be replaced by codes, and the findings will be presented in an anonymous form.

The focus group with students in this study was one of the methods chosen to answer the second research question, which concerns the pattern of ICT practice in the classroom (see Appendix 12). The participants in this method were students who attended the observed classrooms. From each classroom, four students formed one focus group for the discussion. This size was supposed appropriate as suggested by (Tang & Davis, 1995) because larger number of students would be difficult to focus and concentrate on everything during the discussion.

A suitable time for the discussion with students that did not affect their study was agreed with the head teacher and teachers of each school. The selection of students was based on a diverse group of students with different levels of achievements and performance to ensure an equal selection of participants and to listen to different perspectives. As Evans et al. (2001) suggested that such selection could help in obtaining a mix of views and thoughts, which might not be possible with a group sharing similar perspectives.

During the initial meeting with schools' head teachers, we had a discussion over the selection of potential students to participate in focus groups. However, head teachers advised that teachers were best placed to choose those students and advised that they would inform teachers to choose students as they were the best people to know about the students who attended the classroom observations, which is a significant requirement for the research: to meet students who physically attended the observable lesson. Only students who agreed to take part in the research were involved. Focus group discussions were recorded with the participants' agreement.

The reason for choosing a semi-structured technique for the focus group is, first, the possible difficulty of identifying every issue that may emerge during the discussion; and, second, such possible issues that may arise are significant with this method (Ritchie & Lewis, 2003).

Because this research aims to discover and understand teachers' ICT use in the classroom following a triangulation of methods, it was important to conduct a focus group with students who had attended the observed classroom in order to hear and discuss their experiences and feedback in more detail.

#### 4.1.1.3 Interview

Semi-structured interviews are preferred by researchers who want to examine study participants in terms of their perceptions, views and opinions in depth and detail (Lichtman, 2006; Thomas, 2009; Wellington & Szczerbinski, 2007). Kvale & Brinkmann (2009) gives one of the advantages that a semi-structured interview offers, which is enabling participants to be flexible to add more information that might help in answering the study's research questions. Another advantage is that an interview could minimise responses that are incomplete and do not have enough information from the other data collection methods used

in the study by allowing participants to answer and clarify their meaning more deeply; therefore, it can cover such limitations in those other data collection methods (Cohen et al., 2000; Patton, 2002). The triangulation of methods in this study should complement each other in answering the research questions, as each research question is considered with a particular method that should eventually help in answering all the research questions to meet the aims of the study.

It is important to take into consideration the possible issues regarding interviewing powerful people such as the policy makers in this study. According to the literature reviewed by Darbi & Hall (2014) to gain access to elite or powerful people is one of the crucial issues researchers could face, as those people usually prefer to make distance between them and others. It is recommended the researchers can use their effort in searching the best way to gain access to elite people. Another issue with such people is a concern with their locations where they work, which is the case in this study as some of policy makers who were interviewed were working at the same Ministry in the capital city, Riyadh. In addition, the general relationship between elite people and researchers also has a crucial effect in the case of this kind of interview since a good relationship can result in welcoming researchers for the interview. In this study, as policy makers are not usually involved in research in the country, the relationship between policy makers and researchers is weak. However, to overcome this issue, an attempt was made to build trust and a positive relationship to get quality data from policy makers by meeting them and arranging the time of interviews at a time they preferred. They were aware that I was not based in Riyadh; this reassured them that participation was valuable and important for me.

The interview has been chosen as a method of data collection as an attempt to answer the first research question with policy makers to understand their views in regard to ICT in Saudi education in schools because they are the most relevant people who have the experience and information about the research area at the national level (see Appendix 13). The second question targets teachers to support the data collection gathered from the observation method to understand more about what has been covered in the classroom observation. The third question is to be addressed by the same teachers to explore and understand any factors that might affect their ICT use in classrooms (see Appendix 11); finally, the third question was also to be discussed with head teachers to reveal and understand the factors affecting the use of ICT in their schools (see Appendix 14).

This study seeks to explore deep details from participants; for this reason, the interview has been chosen as an appropriate choice. According to Maxwell (1992), interviews not only fill in the information missing from observations but also can ensure the accuracy of the conducted observation. Thus, interviews can be supported with other methods since the researchers, by employing other sources of data, are more likely to see different angles from the participants' responses, rather than researchers who only rely on interview methods (Denscombe, 1983). In this research, interview data from all the participants who were interviewed added information that might have been missed in other methods. Hence, the triangulation of the qualitative methods was an appropriate decision for this research.

In regard to the design of this method, a semi-structured interview with open-ended questions was used to collect the intended data through different themes based on the issues considered in the research questions. This type of interview was chosen because in it the researcher is allowed to ask not only prepared and specific questions but also additional questions that emerge during the interview (Williamson, 2002). This advantage is beneficial in interviews with all the interviewees, but in particular it is very interesting to use this technique with policy makers, as their answers are expected to produce extra questions to enable more understanding of the research topic.

#### **4.1.2 Procedure of data collection**

This section explains briefly the overall procedure of the data collection, and further details and clarification are also presented throughout this chapter, including, in particular, the role of the researcher. As mentioned earlier, the current research has employed different methods and sources of data collection. During data collection, there were two different settings where data was collected: the first setting was at the MOE premises where policy makers were interviewed; while the other settings were at the participating five schools where classroom observations, student focus groups, teacher and head teacher interviews were conducted.

In terms of interviews with policy makers, firstly the MOE was visited to identify the ICT-related departments and then identify the relevant policy makers for this research. It was then possible to meet them and make an appointment for the interview after explaining the

nature, aims and reasons for the research and the value of their contribution. Policy makers were interviewed in their offices at the MOE.

In terms of the data collected in schools, the sequence of data collections was very similar in all of the five schools participating in this research. The sequence was as follows: classroom observations, student focus group, teacher interviews, and finally head teacher interviews. After every classroom observation, four students who had attended the same classroom also participated in the focus groups; the teachers of those classrooms were later interviewed. In terms of school management, only head teachers of the participating five schools were interviewed.

In terms of classroom observation, before the start of each observation, participating teachers were asked about their objectives for the lessons, their expectation of the lesson at the end of the session, and the source of the ICT resources used in the lesson and students' year of study. This preparation helped me to focus on the observation guide categories which in turn were very important for the following up data collection methods. The classrooms were all of a similar layout and I was able to sit in the corner at the back of each of the classrooms. This location within the classroom gave me good visibility of the whole space and limited my interference in the normal functioning of the session.

In regard to focus group with students, students participating in all the focus groups were also those attending classroom observations. A suitable time for the discussion with students that did not affect their study was agreed with the head teachers and teachers of each school. More details are also presented in the focus group section. In terms of interviews, the head teacher from each school was also met to arrange a suitable time for their interview, and also to arrange an appropriate time to interview the teachers whose classrooms had been observed.

Only voluntary participants were involved in the data collection. The interviews took place at the Ministry of Education-related departments, and at the selected schools with teachers and head teachers as face-to-face interviews and were recorded with permission for transcription purposes. Before any interviews commenced, all participants returned their signed consent forms to confirm their voluntary participation. Interviews with participants

never lasted more than an hour and were digitally recorded. The sampling section below will give more details of participants.

The locations of the interviews were based on the participants' preference as head teachers were interviewed in their management offices, while interviews with teachers took place in non-classroom rooms, including meeting rooms and teachers' rooms. As mentioned before, teachers who participated were the same participants during the classroom observations which proved useful as it was possible to ask them about some of incidents that occurred in the classrooms observed and request clarification on their practices.

During the face-to-face interviews, they were asked versions of the questions on the semi-structured interview schedule and given the freedom to explore and add any information that they felt important, or related to the question being asked (Hinchey, 2008). This is important, as it allowed a deeper understanding and clearer interpretation. Probing questions were asked when it was felt that more clarification or detail was needed, or for the dissection of important incidents. There was some intentional and unintentional digression from the interview topics and this was either curtailed or brought back on topic by myself. Interviewees were reminded of their rights in the research and that they could contact me at any time when needed.

Having highlighted the procedural process of the data collection, it is critical to also show the relationship between the integration of those methods and sources involved in that procedure and the research question of this present study. The following table shows this relationship and more details are presented underneath it.

**Table 4.2: Integration of methods and sources and their relationship to research questions**

Question	Objectives	Method	Source
Research question one: What are the policy makers' views about the current state of ICT in education in Saudi Arabia?	To understand the current state of ICT in schools from the views and perspectives of policy	<ul style="list-style-type: none"> <li>• Interview</li> </ul>	<ul style="list-style-type: none"> <li>• Policy makers</li> </ul>

	makers in Saudi Arabia		
Research question two: What are the patterns of ICT practice in education in Saudi Arabian boys' secondary schools for the teaching and learning process?	To explore and understand the actual teachers' use and practice of ICT in the classroom	<ul style="list-style-type: none"> <li>• Classroom observation</li> <li>• Students Focus groups</li> <li>• Interview (teachers)</li> </ul>	<ul style="list-style-type: none"> <li>• Teachers</li> <li>• Students</li> </ul>
Research question three: What are the factors that affect Saudi teachers' use of ICT in classrooms for the teaching and learning process from a personal perspective, and in terms of the Ministry's policies, and its support and management?	To reveal the factors that might affect Saudi teachers' use of ICT in schools.	<ul style="list-style-type: none"> <li>• Interview</li> </ul>	<ul style="list-style-type: none"> <li>• Teachers</li> <li>• Head teachers</li> </ul>

To answer the first research question, policy makers were interviewed. This was significant because looking for the current state of using ICT in classrooms requires getting views and perspectives from the highest levels, i.e. at policy level. Interview was the best method to gain the data hoped for the purpose of this particular question. As mentioned in this thesis, policy documents review was sought as an additional method for the first research question, but obtaining such documents was not possible and that is why no other methods were used with the policy makers. However, the broad levels investigated in this study have all informed and supported each other in answering the research questions. For example, a number of issues have been revealed by policy makers but also were supported during what was observed in the classrooms and what teachers, head teachers and students have said, for example about teachers' training and knowledge of how to use ICT in the educational process.

In terms of answering the second research question, two different methods were used to support each other, namely classroom observation and student focus groups which were based on two different sources as well: teachers teaching in those classrooms and students attending the same classroom observations. It was intended to meet the same group of students at focus group discussion and teachers at interviews following up every specific classroom observation, as this integration of different methods and sources supported each other in an attempt to understand the actual educational practices of ICT in a real classroom.

In regard to the third question, main sources were head teachers and teachers through interviews. This kind of integration was vital because different levels of responsibility within the school were involved in the responses to this third question.

The triangulation of sources in this study is a key contribution to the literature as it shows the potential for researching complex educational phenomena that involve several actors with very different roles and responsibility. The initial section in the findings chapter gives more details on this.

## **4.2 The sampling**

According to Maxwell (1998) and Holloway (1997), qualitative research is usually conducted in a single setting or on a small sample of participants or places. The present study is one example of this fact for the reasons and justifications discussed earlier behind the use of a qualitative study.

There are different types of sampling and the one used in this interpretive research is purposive sampling (Cohen et al., 2000). In order to meet the purpose of the research and the questions to be answered, and to enable the diversity of participants, a sample needs to be selected for a purpose that fits within the purposive sampling (Patton, 1990; Bryman, 2008). According to Johnson & Christensen (2004), purposive sampling aims to obtain in-depth data for a study aiming for interpretation meaning. Therefore, this research used purposive sampling to ensure the conducted data met the objectives and answered the study questions.

Five secondary schools in the city of Al-Rass were chosen to participate, and the head teachers indicated their permission for the study to be conducted in their schools by signing and returning the letter requesting permission to the Ministry. The reason behind the selection of this city and these schools is that this researcher grew up, was educated and worked as a teacher in the city, and knows the schools well. However, in terms of selecting the secondary schools in the city, this was based on the recommendation of the head of IT department in the city's LEA who suggested five of ten secondary schools where ICT resources were available more than other schools in the city and where ICTs might be applied. Putting his position into account, he was deemed to be the most appropriate person to suggest the schools' selection. So, head teachers of those schools were selected based on the selection of the five schools.

However, the reason for selecting this particular city is because, in my personal experience of schools in Saudi Arabia, there is not much difference between state schools all around the country. I also spent two years in secondary education in the capital city of the northern region of the country and worked as a teacher in the Kingdom's capital city Riyadh, and realised that there is no difference between schools in other cities, as all schools and their staff are under the umbrella of the MOE, which controls the overall resources including staff. Thus, it was decided to conduct the research in schools in a city with which I was personally familiar in order to meet the study purpose. Then, I met school head teachers to arrange the time and plan each classroom observation, student focus group, and interview with them and the teachers. All head teachers of the five selected schools participated in the data collection process. The recruitment of the teachers was carried out through a meeting with the head teacher of each school to select the teachers based on consideration of a diverse group of teachers using different aspects such as their subjects, teaching experience and ICT literacy level. Then, it was necessary to check the time when the observed teachers could be interviewed and the students could participate in the focus group. Only volunteer participants, who agreed to take part in the research, were involved (see appendices 1, 2, 3, 4, 5 and 6). The meeting with staff management was through three different meetings. The first meeting was to arrange classroom observations; the second one was to arrange the student focus group; and the final one was to arrange the head teacher and teachers' interview.

Observations were made of teachers and students in 25 classrooms in five secondary schools (five classes in each school). Then, from each school, five teachers and the head teacher were interviewed and four students were included in a focus group. The selection of the students was based on a diverse group of students with different levels of achievements and performance to ensure the equal selection of participants and to listen to different perspectives. This selection was based on their teachers' recommendation and confirmation. A consent form was provided for parents of participants under 18 years old of age as one of the ethical requirements of this study. Only volunteer students who were willing to take part were included. These schools are boys' schools only; so all student participants are male. The age of secondary school students is between 16 to 18 years old.

In regard to the selection of policy makers for the interview participation, the Ministry of Education was visited to meet people working in information technology departments in the Ministry. The education authority in Al-Rass city was visited (where the research is located) to discuss interviewing a number of policy makers who were the appropriate people to talk to about the state of ICT use in schools as they were appointed in positions from where the ICT initiatives come. It was possible to identify and meet five managers of ICT-related departments. After explaining the aims of the study and reason for their voluntary participation, and providing them with supporting documents, they all agreed to participate: five policy makers were interviewed.

Tables 4.3 to 4.8 show the identifying codes used for each of the participants that took part in the study. Every school of five participating schools was given a letter code (S, A, G, M or T) representing the name of schools, and also numbered from 1 to 5. In terms of head teachers, each of those schools has one head teacher identified as H, numbered from 1 to 5. Teachers were identified as T and numbered from 1 to 25, with five teachers from each of the five schools. Student were identified as FG and numbered from 1 to 25, as there were five focus groups of students, who attended classroom observed, in each of the five schools stated earlier. In regard to policy makers, they were identified as PM followed by number from 1 to 5 as five policy makers participated in the study. Their numbers were based on the divisions of the MOE where they work as PM1, 2 and 3 were those who worked at the same MOE building, whereas PM4 and PM5 were those working in a Local Education Authority (LEA) as a division of the MOE. Below, each school is presented in a separate table from

Table 4.3 to Table 4.7. Following those tables, the MOE sample table is presented in Table 4.8.

**Table 4.3: Sample table of the first school**

Code: School	Code: Head teachers	Code: Teachers	Code: Students
S1	H1	T1	FG1
		T2	FG2
		T3	FG3
		T4	FG4
		T5	FG5

**Table 4.4: Sample table of the second school**

Code: School	Code: Head teachers	Code: Teachers	Code: Students
A2	H2	T6	FG6
		T7	FG7
		T8	FG8
		T9	FG9
		T10	FG10

**Table 4.5: Sample table of the third school**

Code: School	Code: Head teachers	Code: Teachers	Code: Students
G3	H3	T11	FG11
		T12	FG12
		T13	FG13
		T14	FG14
		T15	FG15

**Table 4.6: Sample table of the fourth school**

Code: School	Code: Head teachers	Code: Teachers	Code: Students
M4	H4	T16	FG16
		T17	FG17
		T18	FG18
		T19	FG19
		T20	FG20

**Table 4.7: Sample table of the fifth school**

Code: School	Code: Head teachers	Code: Teachers	Code: Students
T5	H5	T21	FG21
		T22	FG22
		T23	FG23
		T24	FG24
		T25	FG25

**Table 4.8: Sample table of policy makers**

Code: Policy makers	Authority
PM1	MOE
PM2	MOE
PM3	MOE
PM4	LEA
PM5	LEA

### 4.3 Data analysis

A feature analysis of data in qualitative research is that there is no one specific strategy to analyse the collected data, and so if researchers choose not to follow a definite strategy, they need to explain the steps they followed in their data analysis process when presenting their report (Creswell, 2014).

However, there are some strategies such as those suggested by Maxwell (2009, P.236) as: *“categorizing strategies (such as coding and thematic analysis), connecting strategies (such as narrative analysis and individual case studies), and memos and displays..”* Also, Creswell (2008) suggests that the researcher in a qualitative study can analyse the conducted data in the form of themes. The analysis of this study’s data was carried out by thematic analysis based on the triangulation of different methods and sources of data. Braun & Clark (2006) define this type of data analysis as an approach that researchers can use to identify, analyse and report themes with the gathered data.

Creswell (2014) suggested that researchers could start the analysis as early as they collect their data. The analysis of this study’s data was started at the same time as the data was collected: it was recorded and then transcribed soon after while it was fresh in my mind. This was the first step of the process. Initial analysis was conducted during transcription, listening

to the recorded interviews (and focus groups) and reading the observation notes. Potential themes, relevant to the aims of the study, were derived from these transcripts at the time. At the start a deductive approach was used, drawing on literature and the researcher's personal experience as a teacher and student in the study context. This stage of the process was invaluable in familiarising the researcher with the data to a deeper level and ensured a higher quality of later interpretation and the extraction of meaningful conclusions.

Before presenting the official process used in analysing the research data, it is important to highlight some aspects related to this process for better understanding of the process that was followed. Because an inductive and deductive approach was employed (see Step 3 below), it was possible to return after every emerging theme back to the data that generated that theme. This helped to identify where the data belonged. It is also important to state that there are two levels that can be followed when identifying themes in a thematic analysis: explicit level and latent level (Boyatzis, 1998, cited by Braun & Clarke, 2006). In the explicit level, researchers in the analysis process look for meaning explicitly exposed, while the latent level, they surpass that explicit meaning to more interpretive way to develop each theme (Braun & Clarke, 2006).

Although this research is situated in an interpretive paradigm and so centrally looking from interpretation of the gathered data, both levels were followed. This is because, some questions were designed with expectation of explicit responses that do not need more interpretation and so explicit level was used in such cases. On the other hand, most of questions asked during the data collection required interpretation, so the latent level was used as for these most of the time.

After highlighting the abovementioned, the following will present the official process of my data analysis. This was based on the steps of data analysis suggested by Braun & Clark (2006) and Creswell (2014). Both suggestions are similar with slight difference in the number of steps. For example, two steps in Creswell (2014), i.e. 1 and 2, can be found in Braun & Clark as one step, i.e. 1. So, I have, therefore, based on these similar strategies, the following strategy was developed:

1. *Organise and prepare the data for analysis*

The analysis process started by listening to audio records and transcribing the data from all the methods used for data collection and then sorting them into different folders to make them ready for the next step.

## *2. Familiarise yourself with your data by reading or looking at the data*

The transcripts were read several times to get a general and an initial idea before starting the coding process. This was based on thorough review of the whole gathered data from triangulation methods used, which helped in making sense of the data that facilitated the next step, especially when bearing in mind the large quantity of collected data (Cohen et al., 2007). This is because at this stage, there were only general thoughts and ideas about the data, and translating that into potential themes and categories was aided by using some external notes, as well as on the margins of transcripts.

## *3. Start coding all of the data*

The identified themes or categories can reflect or present important data help in answering the research questions. However, themes here can be either identified prior to the process which is called ‘deductive’ and refers to the research of relevant literature and research questions; or emerged during the analysis process of data which known as ‘inductive’. To ensure answering the research questions, a deductive approach was followed from the beginning. Consideration of the literature and the research questions allowed me to identify three main categories of code in the beginning of the data analysis concerning three levels: policy, practice and factors, and an evaluation of those codes for fit was made during the data analysis process. However, interesting and relevant themes emerged during the process of coding and were included as sub-themes that relate to the main themes already identified as they were believed to be useful in answering the research questions. So, the inductive approach was also followed to make sure the pre-determined themes fit to answer the research questions, and to identify the sub-themes. However, it was also possible to deductively check the data, but this time from the emerging themes, which helped to support all the themes (Creswell, 2014). The later approach helped make sure that the data and emerging themes were still relevant with the pre-determined themes. So, having followed both approaches, the study followed the ‘abduction’ approach, which means the combination of both theme-generation approaches. Since transcripts contained a lot of data, it is important in analysis is to interpret their meaning rather than interpret what is accurately said

(Huberman and Miles, 2002). So, this was useful in the coding process during the analysis process given the large quantity of data gathered in the study. The deductive approach was used in the beginning to identify the main themes, but also to check if the themes were still relevant during through the following stages of the coding process to inductively identify the sub-themes related to the main themes.

### *3.1 Generating initial codes*

A table was created containing a column identifying the participant and a column for their settings alongside a column for the question and a column for the extracted data (which are highlighted in the transcripts based on chunks of paragraphs, a words, phrase or sentence) and a column for the potential codes, a blank column to be filled with the theme from the next steps.

### *3.2 Searching for themes:*

Then different initial codes were grouped together based on their relation to each other in order to generate initial themes. In this step, codes form themes and subthemes, or some themes, were disregarded.

### *3.3 Reviewing themes*

Themes were then refined: some themes became joined to become one theme or even a sub theme. To ensure this, a maximum of two levels were followed: first, the extracted ‘coded’ data was read again and compared against the themes to make sure they made sense. Then, the themes were reviewed against the whole data to check if the relationship between them as meaningful.

## *4. Defining and naming themes and presenting the results of the analysis:*

The importance of every theme and sub-theme was identified, and which data belonged to those themes was decided. This is in order to help the narrative presentation, which is important in understanding the contribution of each theme. So, it was important to provide as much detail as possible in the findings chapter for every theme. The relationship between every theme and their reflecting data, and the research questions was checked in order to ensure the possibility of answering the research questions. The importance and the

relationship between themes and sub-themes were identified by making sure that every sub-theme was related to its main theme. It is also by making sure the themes and sub-themes were systemically ordered and that the most important and relevant sub-themes come first in order to allow the narrative flow to reflect the study underpinnings and answer the research questions. For example, it was necessary to start the analysis with the theme about policy level because understanding the situation of ICT use in classroom from policy level facilitates greater understanding of what is going on in practice. The ‘factors’ themes come last because when moving from the high level to what is actually happening in classrooms, they allowed unpacking of initial ideas raised in the first and second theme. For example, it was difficult to identify the training factor as a significant issue hindering teachers’ use of ICT before knowing what and how teachers were doing in their classrooms. More examples are also given in an initial section of the findings chapter.

#### *5. Interpretation in qualitative research*

Through the confirmation of themes’ development according to the data from the triangulation methods and sources conducted on the sample, it was possible to produce insights into the research that helped in answering the research questions and fulfil the aims of this study. This was through discussing and interpreting the findings in relation to literature review.

### **4.4 Trustworthiness**

To ensure the research quality, trustworthiness has to be considered (Lincoln & Guba, 1985). A number of procedures were followed to ensure the quality of the research. To ensure the credibility in the research, a discussion was started with the research supervisors on the initial stages of the questions of all methods used in the research before submitting and revising these questions to the supervisors. After obtaining the approval from the supervisors, a submission of all of these questions with the ethics application to the University’s Ethics Committee who approved the application after some amendments were made based on their suggestions. So, this amendment process assisted the credibility in the research. Another way to ensure research credibility and avoid bias, conformability, is the triangulation of methods (Cohen et al., 2011; Patton, 2002) because it does not rely on only one method, but on the contrary, it relies on different sources which all support the development of each other (Maxwell, 2004; Creswell, 2009) this is the case of this study.

Member checks were employed: during the interviews participants were shown summaries of their responses in order to check the accuracy, afterwards participants were also asked to review the transcripts for accuracy. No issues were found. (Lincoln & Guba, 1985; Cohen et al., 2007).

According to Shenton (2004) to ensure trustworthiness, researchers may pre-visit the participating settings before any data collections are begun to understand the organisation where the research will take place and enhance trust between them and the participants. So I made pre-visits to all schools, which helped in understanding the settings and meet some of the participants.

Also, to ensure the trustworthiness and reliability in my research in terms of analysing the research methods thematically, the recordings were carefully listened to in terms of interviews and focus groups, notes were checked in all observation by having interviews, focus groups and interviews, this was really helpful in filling any gaps found in each of methods which helped understanding and increasing the accuracy of the research question. A careful transcript and then a coding process followed this; and then, transcripts were read carefully and repeatedly. The whole process above was also checked and reviewed by two university teachers by checking a single sample of each method, as well as checking a sample of each transcript together with their themes (Rallis & Rossman, 2009). Similarly, my data analysis was discussed with my research supervisors.

In terms of transferability, although this study does not aim for generalising its findings, it can still be transferrable to other similar contexts. To ensure this, triangulation method enabled the research with heavy information. This was by explaining its context and participants, providing justification of the different selection in the research process (Creswell, 2007). However, transferability of this study data is left to the potential future researchers own decision whether or not they wish to do so.

I used a notebook to record my reflections during the analysis process as it helps to “make transparent the subjective processes” (Cho & Trent, 2006, p. 327).

## 4.5 Ethical considerations

According to Maxwell (2009), it is important that any ethical and/or practical issues that relate to the potential research, particularly social research, must be addressed prior to commencement. It is particularly important that ethical considerations, including the protection and preservation of participants' privacy and interests, are both guaranteed and maintained. In accordance with Denscombe (2010), the study's participants were assured that strict confidentiality would be maintained for all information provided, including that of a personal and sensitive nature. Furthermore, such information would be used solely for the purposes of this study. Moreover, as Burton & Bartlett (2009) propose, each participant were asked to give their express approval to taking part in the practical aspect of this research. Furthermore, prior to commencement of the study, each participant was provided with full information about the research project's aims and objectives, including the proposed utilisation of the results. Finally, the respondents were informed of their right to decline to take part in the research at any time during the process. Furthermore, following the study's completion, all relevant stakeholders would be eligible to receive information about the research outcomes, upon request.

Therefore, permission was requested from the relevant supervisors as the first stage of the proposed procedure before any further steps were started. Then, before data was collected, a review form was submitted to the ethics committee, signed by the relevant supervisor, with supporting documents, including the participant information sheet. The ethics committee then approved this (see Appendix 9). The participant information sheet letter was to be given to all the participants; it included an invitation to voluntarily participate in the study, the nature and aims of the research, the reason for their selection and their right to withdraw at any time without giving any reason for doing so. In addition, the supervisor provided a letter of authorisation to conduct this study that was sent to the cultural bureau in the Royal Embassy of Saudi Arabia in London. They contacted the MOE who then approved the fieldwork. The MOE then contacted the LEA to provide written permission and asked them to contact the schools by sending them a letter that explained the nature of the study, its aims and purposes.

All participants were given the participant information sheet and the consent forms, including the one for students' parents for them to decide whether or not to accept the

invitation and participate in the study's data collection. The participants were assured their identities would be replaced by codes. For comfort, safety and privacy reasons, an arrangement was made (with head teachers for data collection in schools, and with policy makers for their interviews) for data collection to take place in suitable places.

#### **4.5.1 The role of researcher**

Since this study is an educational research situated within the social studies, the role a researcher was very important, or as Creswell (2014) describes it, the main instrument, in the research process. As previously mentioned, having that this qualitative study is situated within the interpretive paradigm, that views reality as multiple and constructed, the data was gathered, interpreted, reported and written by the same researcher.

All participants were informed and handed the participant information sheet before any data collection was taken. In terms of policymakers, they were visited a week before interviews were conducted when they were handed the participant information sheet and the process of the research was explained to them. They were told to feel free to contact me at any time, by referring to the contact provided in the participant information sheet, if they had any questions or needed any more clarification.

In terms of schools, head teachers were visited a week before the data collection took place (who had already been informed by the LEA) and informed of the research and its nature and purpose. During the visit, participant information sheets and consent forms for all targeted participants in the schools were handed out, including those specialised for students. This was done in compliance with the university rules, and this was explained to them, in order to give them and other participants a considerable time to read and understand everything before deciding whether or not they should accept taking part in the research. During these visits, myself and the schools' head teachers had discussed, arranged and agreed on some actions and process (this is explained in the selection of schools). Head teachers had considerable time to explain all this to their teachers and students who participated in the observation, teachers' interview and focus group. Thereafter, all schools were visited again for two days in order to clarify any questions or concerns and to see if they were willing to participate. These visits were not only useful for this regard but also gave the opportunity to meet the management staff and some teachers as well as occasionally

the LEA supervisors. This facilitated the sharing of information and knowledge on the use of ICT in the classroom and related issues; such as methods of teaching, professional development programmes, and the role of stakeholders including the MOE and LEA. For ethical reasons, these discussions were not recorded but notes of important facts and topics were made afterwards. These proved useful during the analysis of the data and it gave a deeper understanding and interpretation of the collected data.

However, although all participants were happy to take part in the research, consent forms were only taken at the time of the observation to give them more time to decide their participation.

In the classroom observations, I was a direct observer noting the practices during each lesson, which was useful for interviewing teachers and discussing with students in focus groups later. This helped to clarify practices and incidents that happened in the classroom observations. Despite the prior visit arrangements and participants' agreement of participating in the research, a few teachers were not very comfortable. In order to put them at ease and make them feel comfortable, further reassurance was needed. It was explained that participation was only to help achieve the research aims and answer the research question, and that their participation is voluntary and their right to withdraw was absolutely possible at any time and that the research had no relation with the LEA or the MOE for supervising or evaluating teachers. This had a positive effect.

All interviews took place in a comfortable environment. However, choosing a particular location was not under my control, but it was explained to the responsible body in every setting that an appropriate environment is preferable for interviews and focus groups to take place. In terms of policy makers, this explanation was directly to the participants themselves and that was also true with the head teachers who all preferred to hold the interviews in their offices. However, in terms of teachers' interviews and students' focus group, the head teachers determined the interview location. However, all teachers and focus group were requested to oppose if the arranged locations were not appropriate so other arrangement might be sought. In terms of observation, all head teachers confirmed, it is not possible to arrange another classroom but all classroom observations would take place where the classroom is originally based unless teachers had previously booked other rooms or had their own classrooms.

During the data collection, all questions were predetermined but also some questions emerged based on the responses of the participants in the interviews and focus groups, and practices in the classroom observations. However, interrupting the participants' responses and then asking probing questions during their responses was avoided in case it confused or made them feel uncomfortable. However, emerging questions were asked when they paused for moments or finished their responses.

## Chapter Five: Findings

Based on the thematic analysis of the research data that followed both inductive and deductive approaches, the presentation of the findings is categorised into three main themes comprising several subthemes. Each of the three main themes presents findings that respond to the three research questions and aims of the study. They draw on the analysis of data from the interviews with policy makers, teachers, head teachers and students, and the notes from classroom observation (see Table 5.1). The triangulation of methods and informants allows the research to better achieve its original aims.

**Table 5.1: Overview of the current study**

No	Research question	Main theme	Aims	Main Participants
1	What are the policy makers' views towards the current state of ICT in education in Saudi Arabia?	The current state of ICT from the policy makers' viewpoints.	To understand the current state of ICT in schools from the policy makers' views.	Policy makers (PM1,2,3,4 and 5)
2	What are the patterns of ICT practice in education in Saudi Arabian boys' secondary schools for the teaching and learning process?	ICT patterns of practice in the classroom.	To explore and understand the actual teachers' use of ICT in the classroom.	Teachers & Students (T1 to T25) and (FG1 to FG25)
3	What are the factors that affect Saudi teachers' use of ICT in classrooms for the teaching and learning process from a personal perspective, and in terms of the Ministry's policies, and its support and management?	The factors affecting ICT use in the classroom.	To reveal the factors affecting teachers' use of ICT in schools.	Teachers and Head-teachers H1, 2, 3, 4 and 5)

This study has three high-order levels of inquiry, namely 'policy level', 'practice level' and 'factors' level, which all are related to the research's issue of the use of ICT in classrooms for the processes of teaching and learning. These are also the central focus in the literature

review and the three research questions of the current thesis. Therefore, to help reading this chapter and answering the research questions, the three main themes in this section were consistent with those three levels to allow a better relationship between the findings. The triangulation of methods and sources in this study was very helpful in understanding a number of educational issues concerning particular situations of ICT in classrooms. This is significant when taking into account the complexity of the issues being researched in such as social settings, for example, policy and pedagogical issues (Creswell, 2003).

The analysis of the data has allowed the emergence of a number of sub-themes for each of the three main themes. As described in the previous chapter, during the analysis of data, sub-themes emerged based on their relationship to the main themes after extracting initial codes, grouping relevant codes and identifying final sub-themes related to the main themes. For example, policy makers talked about the present status of ICT by referring to the educational policy and national plans, e.g. ‘national plans’, ‘education policy’ and ‘build the whole society’. Those words and phrases assisted in the development of sub-themes that are related to the issue of policy and national plan which in turn represents the main theme of the current state of ICT in education.

Another example comes from the pedagogy level. Since the pedagogy level was linked to the second research question, this issue was based on two different methods and sources: classroom observation with students and teachers, and interviews with teachers and focus group discussions with students from same classrooms observed. Applying the same process of analysis mentioned above, classroom observation notes and transcripts of interviews with teachers and focus groups with students were analysed separately at an initial stage. The use of triangulation in this thesis helped the integration of those methods and sources at later stages all together to identify the sub-themes for the main themes that represents the second level of inquiry in this study. For example, in the classroom observation notes, teachers’ methods of teaching were noted and that was labelled as ‘*teaching methods*’. The same category was identified after reading the transcripts of teachers’ interviews, e.g. ‘*use internet in my teaching*’, ‘*teaching methods*’ and ‘*ICT for teaching*’. Meanwhile in focus groups, this category was generated based on phrases like such as, ‘*ICT for better learning*’, ‘*teachers should integrate computers in the classroom*’ and ‘*we like technology in classroom*’. Ultimately, all those categories emerged from different methods and sources were integrated

together to form a sub-theme relating to teachers using ICT, which is linked to the second research question and the second level in the literature review.

The employment of triangulation in the present research allowed the above-mentioned process of analysis to be applied for the third broad level in this thesis, which is also linked to the third question, namely the factors affecting teachers in regard to their use of ICT in classrooms. Here, data from different levels of respondents were integrated together which resulted in two broad categories of factors: organisational factors and personal factors. The presentation order of the main themes in this chapter was based on the sequence of the three high levels focused on in this thesis presented in the literature review and research questions that informed the findings. However, it was thought that discussing the current state of ICT from the perspective of the policy level, it is necessary to move from the highest level, who are the first responsibility level, to the school level where the implementation of ICT actually takes place. So, having understood both the wider views about the present status of ICT from those most responsible and the actual use of ICT in real practice in schools, the presentation of what factors could affect the use of ICT in classrooms was placed in the final part. This order was thought to assist the reading of the analysis of this research data.

In terms of sub-themes, the order of presentation was based on the most important and relevant issues to the research, and aimed for better understanding in order to answer the research questions. For example, the first four sub-themes of the first main theme preceded ‘failure of development projects for general education stages’ because discussing the former sub-themes was key for understanding why the later sub-theme was important. In other words, revealing the issues presented in sub-themes (Sections 5.1.1 to 5.1.4, see below) was thought to make sense of the disappointing findings in the final sub-theme.

In the following sections, the findings of each theme will be presented. This will be followed by the discussion of the findings of this chapter in the discussion chapter. The main findings of this chapter will be presented in the discussion chapter as well as in the conclusion chapter.

## 5.1 Theme One: The current state of ICT from the policy makers' viewpoints

**Table 5.2: Theme one**

Theme	Subtheme	Main participants
The current state of ICT from the policy makers' viewpoints	The Current State of ICT in the Educational Policy and Plans	5 Policy makers
	The Role and Responsibilities of Stakeholders	
	No relation between ICT departments in the Ministry of education	
	Support issues	
	Failure of Development Projects for General Education Stages	

In this subtheme, the policy makers from both the Ministry of Education and the local education authority in Al-Rass city revealed a number of issues. These areas are the subthemes that emerged under the main theme in this section, which is the current ICT situation in education. Each of these areas is presented below.

### 5.1.1 The Current State of ICT in the Educational Policy and Plans

#### 5.1.1.1 Policy makers' views

All participants thought that ICT in the present was much better than it had been in the past in terms of its provision and use in the teaching and learning process. PM 1 stated that, *"IT was only a subject students have to undertake as part of their curriculum less than 20 years ago, but now ICT is for everyone in the school, management, teachers and students."* PM3 observed that, *"Our department now works more for the whole educational process than [it did in] the past, when the work was around administration and the IT subjects in schools."* PM1 stated that, *"government initiative and trends towards the use of ICT in the sectors in the countries had made [a] positive change in regard to the use of ICT in schools."* PM2 stated that, *"the main focus and aims for any plan and project in education come from the*

*national plans that require in general all the state's ministries to keep up with overall global developments as well as in regard to the use of technology; and, in particular, the Ministry of Education for the continuous development in education and the learning and teaching process as the general education policy aims for the same."* PM5 added that, *"ICT is believed [to be] very important for the teaching and learning process that can build the whole society and the evidence [is] its application all around the world."* These quotes reveal that there is agreement on the development of ICT, initially it was only taught as a subject, however it is now moving towards integration within the whole learning process. It was revealed that government initiatives are behind this development as part of their overall strategy for the nation.

Although policy makers were in favour of ICT use in the educational environment and believed in ICT, they revealed their concern on the use of ICT in schools if ICT is employed inadequately in the whole learning and teaching process. PM3 stated that *"the large issue in schools is that most teachers use ICT only for themselves, for example, for their lessons' preparation or administration, rather than integrating ICT in the whole educational process and engage their students in this process."* They argued that teachers and students might lose their educational interaction if ICT is used inappropriately. This implies if teachers use ICT only for their benefits but not for their students learning.

In addition, they emphasised that if ICT to be integrated appropriately in the teaching and learning process, ICT needs to be equally accessed by all students and all teachers in all school. For example, PM3 said *"to prepare our children for a brighter future, the government heavily invested in schools and the provision of the necessary ICT resources, and so, an equal access must be ensured for all in schools."* Therefore, they argue, if these issues are not addressed, the use of ICT will not make a difference in the educational process in classrooms, and may create a problem in students receiving a quality education. For example, PM2 said that, *"I think if ICT is not pedagogically and equally employed, ICT could be adversely negative approach since learning is always a priority."*

#### 5.1.1.2 ICT policy

It was important to ask about the meaning of ICT policy in their views. All participants defined it as a complete document that explicitly has all the necessary information,

including: the policy nature, definitions, objectives, goals, target, strategies, guidelines, roles and evaluation. PM3 stated that, *“ICT policy is like any other policies that include all important information for readers to understand and for practitioners to depend on.”* This was supported by PM1 as he said, *“Most people regard policy as a piece of paper that includes only information related to the nature of that policy, [however,] a policy is intensive guidelines rather than only information.”*

All policy makers confirmed that there was a lack of specific ICT policies. They confirmed that there are no clear policies that have been made, but the majority of the existing documents are about initiatives that were based on the overall national strategy, which requires change from all sectors including education. PM1 noted that, *“in [the] education system in the Kingdom, we only have one policy but in regard to ICT there are no clear policies in this regard, which means there are no strategies as well; all we have [are] plans which we carefully work on.”* Then he suggested that, *“we need researchers in the country, like you and other researchers, to carefully raise such issues in research so the Ministry could be warned or aware of such issues which some officials may not [have considered] before.”* Therefore, policy makers felt that it is not surprising that many teachers are still not using ICT because many of them still do not know what the ICT guidelines really are.

However, policy makers claimed that even if explicit ICT policies are not available; the Ministry’s ICT initiatives, including projects and their related programmes, are taken seriously and implemented in schools. PM4 stated that one of the top objectives in any plan is *“to build a technological environment in education that enhances the whole process of education; and to teach students in more digital and innovative ways to enable them to discover new knowledge from all [over] the globe.”* All participants confirmed that in every initiative to integrate ICT in schools, the Ministry assigns it to a particular department for drawing and designing all required plans before the actual implementation of any projects. The educational studies research centre in the ICT department of the Ministry of education is no exception. These departments are required to plan their projects with all required information before these plans are sent out to stakeholders. They state that when a plan is ready for its implementation in practice, the Ministry communicates with the educational authorities in all regions for the immediate effect of the implantation. PM2 stated that *“we have enthusiastic people working on any ICT plans but one of the issues confronting us is*

*that we do not have up to date policies and strategies that we can refer to as each plan is dealt separately.”*

The majority of interviewees claimed that most of the plans relating to educational development have been adopted from developed countries or from third-party companies without carrying out any pre-plan studies or visits to observe the current practices in schools. This was supported by PM4 who said, *“one day I was looking for a plan which was distributed all around the Ministry departments and found that plan was copied from another country’s plan without making any changes in [a] number of areas that cannot be applied in our schools.”* All participants revealed that the Ministry is strongly focused on education development, including teachers’ professional development and the integration of ICT in education. However, they admitted that, despite many of these serious attempts at educational development, there are many internal issues affecting the continuation of many initiatives. All of them revealed that most of the MOE-related issues that affect educational development, including the use of ICT, were due to the priorities of ministers or the heads of MOE departments.

For example, PM 2 criticised MOE ministers’ priorities, observing that they had been made above many developing programmes or even strategies. He added, *“three years ago, I and my colleagues in my department made a study which was accepted to be developed to be a strategy the Ministry can depend on. Unfortunately, the minister of education at that time was changed [and] the new minister cancelled this strategy before its implementation, although it was ready for its implementation.”* He added that, *“in less than two years, we had three different ministers with different priorities and not one of them prioritised ICT integration development initiatives, but instead put building and transportation as on the top of the priority list.”* PM2 supported that when he said, *“the e-connect curriculum portal was ready to be implemented when the new minister told [us] to suspend this project [for] the present and work on new jobs.”*

### **5.1.2 The Role and Responsibilities of Stakeholders**

In this section, a number of roles for different stakeholders were stated by policy makers and are presented, as follows.

#### 5.1.2.1 The Role of the MOE

According to government recommendation, the Ministry's ICT plans depend on set requirements. PM1 stated that, before any school implements any projects related programmes, *"We require education authorities to introduce these projects to the supervisors [LEAs' school subject leaders], who should then deliver the necessary training to teachers."* The MOE ensure the provision of all resources needed for any project before local education authorities are required to take actions of the planned projects. The MOE requires LEAs to ensure all plans to be implemented in schools before they report any evaluation to the MOE to consider the counteraction of the projects.

#### 5.1.2.2 The Role of the Education Authorities

LEAs receive confirmation about any projects and requests for training stakeholders. Those stakeholders should then train teachers about any new project and ensure the implementation of the project. The LEAs carry out maintenance jobs for any school in their region upon a head teacher's request. LEAs arrange visits to schools if the schools have any concerns or queries about the available ICT recourses. However, visits usually only happen after a request from a school, which makes the role of the school management team more difficult in dealing with ICT issues. For example, PM4 stated, *"as soon as LEA receive any request from head teachers for any concern about ICT in their schools, the specialised team is informed to deal with such issues."*

#### 5.1.2.3 The Role of School Management

PM4 highlighted the head-teachers' role, as they should request any ICT-related resources required in their school. Another part of their role is to encourage teachers to register for ICT training programmes available at the training centres in the LEAs. They should also monitor the situation and the real practice of ICT in their school, and then report that to their LEA. PM5 confirmed that *"there is lack of head-teachers communications with the local education authority in many areas and ICT is one of them."* PM 4 stated that *"without contact between LEA and schools management, the Ministry of Education will not be aware of any change required."* Moreover, PMs concerned about head-teachers knowledge in ICT integration in the process of teaching and learning since they are usually more familiar with ICT for administration purposes than ICT in pedagogy. However, PM4 stated that, *"Head*

*teachers are also responsible in ICT integration in the educational process by encouraging teachers to employ ICT and communicating with LEA for any ICT concern and support.”*

#### **5.1.2.4 The Role of Teachers**

Most projects consider the development of the teaching and learning process. However, in terms of the teachers' role in the project plans, all policy makers admitted that teachers are not involved. Teachers should join the training courses available at the training centre in the LEA or in the resources room available in the schools. One of the policy makers stated that, “[as] one of their ICT-related roles, they should use ICT resources that are available at school in their teaching.” Policy makers claim that most teachers are resistant to change as most of them still depend on the traditional methods in their classrooms, which affects their students' learning. PM5 supported that as he confirmed that, “*teachers are still resistant to change since only [a] few teachers in the city attend any professional development courses we introduce.*”

#### **5.1.3 No relation between ICT departments in the Ministry of Education**

Participants confirmed that the Ministry in turn is responsible for the planning and provision of any project-related needs. However, interviewees at the local authorities did not agree with that as their responses revealed that the Ministry does not have such information, as LEAs are responsible for school visits for any assessment and evaluation after a project has been introduced to the LEAs by the MOE. However, most schools should have the required equipment and each LEA should have introduced the necessary induction and training for any projects released by the Ministry. Thus, these responses confirm the lack of a relationship between the MOE and its other related departments, which also may indicate that (lack of) accountability is an important factor in the failure of ICT use in education. It was observed that IT-related departments were working together on everything specified for technology in education, such as plans for projects. However, PM1, PM2 and PM3 noted that now a number of departments had the title of IT but many of them were no longer related to IT in the teaching and learning process. Thus, participants gave that as a significant reason for why they were not able to provide me with certain important information, PM1 said, “*That is why we do not have the information you need as we are no longer working together.*” Thus, they justified why they had little experience or awareness about what

exactly is happening in schools in terms of using ICT. PM3 confirmed that, *“We do not make visits to schools but our education authorities and their related sectors should check that [the use of ICT in classrooms] when they visit schools.”* Another participant argued, *“...but mostly we do not receive their feedback [about] what actually happens in practice. However, from the information we have there are different education authorities who are enthusiastic [about] planning and implementing new and different ICT programmes [in] schools.”*

Since this section concerns the MOE’s policies and plans, it is important to point out that it would be more significant if I had been able to access ICT policies to gain more understanding for the purposes of this research. I had attempted, using different methods, to access ICT policy documents, which should be clearly and explicitly stated and operated as what we call policies, but failed to access any policy documents related to ICT. PM1 admitted clearly that, *“There are no available documents [that] can help your research as most of the documents we have are specific documents for us to work on the ICT background in the Ministry and the priority is always for the Ministry and its related departments and schools’ websites and administration portals. Actually, we are not [alone in] the responsibility [for] ICT integration in schools, as that is planned by the government and all ministries are required to consider this as the development plan in their ministries and related sectors.”* PM2 stated that, *“Honestly, we may have some [policy related documents] but they are very confidential and not to be shown [to anyone other] than people who have the right of access to such documents.”*

#### **5.1.4 Support issues**

Participants confirmed that necessary support, overall, is always provided from the government, including training and equipment, as the government is required to develop all sectors. They also added that the government believes in the importance of ICT in the educational environment as the best process in the teaching and learning process. However, a number of organisational factors were identified and are presented as follow:

##### **5.1.4.1 Training Opportunities**

Policy makers revealed a number of issues affecting teachers’ ICT use in classrooms. PM1, 2 and 3 reported that the MOE requires LEAs to provide professional development training,

including ICT, to teachers: as many teachers still prefer the traditional methods of teaching and lack quality in the delivery of their lessons. For ICT, PM2 confirmed that, *“each school must have one teacher assigned only for the learning resources centres where the necessary ICT resources are available.”* However, policy makers were also concerned about the quantity and quality of this training. For example, PM1 revealed that, *“we know that training programmes provided by LEAs are not enough and still do not offer good quality for teachers because training are[sic] mostly theory based with little practicality”*

PM4 and PM5 from LEA agreed and further clarified this as most of those teachers are not experts in the field of ICT and do not have adequate skills, as originally they taught other school subjects but have undertaken a learning resources course to work in the learning resources centres in schools. However, this course is inadequate and does not cover all the necessary training for ICT in education. Thus, on the other side, this would result in a lack of training opportunities for teachers as well. PM5 argues, *“it is really a problem that those teachers choose to undertake this course to avoid the extensive work load they would have when teaching their original subjects.”* Also, PM5 added, *“this course does not offer training for the teaching and learning process but rather focus on ICT basic skills.”* So, PM4 and PM5 argue that the MOE does not provide enough training opportunities for those trainers, i.e. those working in learning resource centres (LRC). Since this course is offered in the Saudi universities, based on an agreement between the MOE and universities, all policy makers’ emphasis on the need for improving the quality of this training to enable those trainers to adequately assist their colleagues in schools.

So, the majority of policy makers revealed that good training will enhance the acceptance and attitude of teachers towards the use of ICT. PM2 believed that, this issue *“can be addressed if teachers are well trained”* and PM1 stressed that, *“teachers training programmes need to raise teachers’ awareness about the advantages of ICT that can enhance their educational process”*, and interestingly, he added, *“off course, verbally sending these advantages to teachers without teaching them how to practice them will not make a difference.”*

All policy makers argue that training can be the key to the development of educational quality, including ICT. But without specific policies and strategies that guide the whole school holistically, this training will do nothing in the process of educational development.

For example, PM4 admitted the failure of the interactive whiteboard (IWB) during the past years (a board that projects images from a computer and can digitally read a teachers' pen marks). He said the Ministry simply notified LEAs that the IWBs would be delivered to schools and told them to ensure that the schools used them once they were installed, without any training being available concerning their use. He added that, in brief, these have been installed in schools, after the government paid large amounts of money to the IWBs company, but they were kept hanging on walls and not being used as, *"teachers could do nothing with it as they do not know how to use it, some teachers do not even have the basic skill on ICT use."* Also, schools were waiting for the Ministry to fulfil their promise to provide digital resources for all school subjects so teachers could learn from the teachers that knew how to use the IWBs. Finally, the most important point in this case, he said, *"I volunteered to deliver a session for the IWB after I registered my interest in learning about this."* So, he prepared an equipped room for this session and delivered it to only 20 teachers in the region who were interested in learning about IWB. The whole thing was voluntary and it was only session that lasted no more than an hour.

#### 5.1.4.2 Teachers' related issues

All policy makers agree that time is a very challenging problem that all teachers face in the education system, which affects the successful implementation of ICT. This is referred to as the workload put on the back of teachers, as PM5 reported that, *"teachers work most of the day with little rest and this definitely will reduce their motivation to attend training courses."* PM2 said, *"being in stress all the day is an enough reason why most teachers do not attend training delivered out of school hours."*

Another issue related to teachers is the lack of recognition such as financial rewards that many teachers require. Both PM4 and PM5 share this issue because they know teachers more closely than the MOE. PM5 said, *"teachers do not ask for money as an appreciation for their ICT use but they seem to feel not equally treated in upgrading system that is [sic] available to all employees in other governmental fields."*

#### 5.1.4.3 Resources

The Ministry provides expensive resources to implement most projects, but projects are only trialled in selected schools in each region of the country. Then, if a project has succeeded

and there are enough funds available, it can be expanded to other schools, as planned. This is one reason why some projects fail this process and are cancelled or suspended until further notice

In terms of the actual condition of the ICT environment in schools, PM4 from LEA admitted: “We are definitely aware about this issue but it is not our responsibility to change these non-working and old resources without a formal request made by school management.” They felt that some head-teachers did not request new resources in order to avoid any accountability issues that might arise if the LEA knew that they were not using technology in their schools.

PM4 and PM5 stated that the LEA has ICT supervisors who visit schools to check if they need any maintenance or want to report any issues related to ICT in the school in general. PM5 revealed that not all issues are dealt with or any action taken by the LEA to address these. He further justified: *“Because we are sure if [we] do some actions, schools’ head-teachers will require us to provide them with appropriate training courses to learn how to use these types [of resources] and learn any new [techniques] they are not aware about. In this case, we could not accept such requests as the first responsible body for that is the Ministry; they need to organise and prepare effective courses and pay for resources and for any stakeholders, so we can do the job if everything is available.”*

There are also issues of maintaining resources. Each LEA is only allowed to employ a specific number of people for maintenance, which is not enough, as each authority has at least 300 schools. In terms of assigning maintenance staff in each school, this has been impossible so far.

### **5.1.5 Failure of Development Projects for General Education Stages**

Policy makers stated that the Ministry has a number of ICT projects and it works on implementing them. However, one policy maker stated that, *“the usual issues concerning the success of these projects relate to the education authorities and their schools’ management, as the MOE could not be responsible for the LEAs’ neglect and carelessness in implementing the Ministry’s projects.”* An example they gave was the King Abdullah project for educational development in 2007, when each student and teacher was provided with laptops. One policy maker said that, *“The government provided a good budget for this*

*project, but admitted that it had failed and no longer existed.” They stated that what had happened was that the integration of technology in this project was only part of the educational development plan in general and it was only implemented in a few selected schools in each region in the country and no evaluation had been done. The LEA interviewee claimed that, “different stakeholders in the Ministry did not put any thought into the technology and thus the devices were not used. Therefore, these devices were collected again by the project officials from the selected schools.”*

All the policy makers confirmed that they have not seen any evaluation results or reports about the King Abdullah project. They surmised that this is because the project is no longer implemented or available. One policy maker suggested that if there are any available documents assessing the project then these would be with the Ministry’s holding company commissioned to design and implement the project: Tatweer. Tatweer’s CO was asked if he would be willing to provide any evaluation of the project but explained that the MOE would hold any information regarding an assessment of the project. In addition, other employees of Tatweer were surprised that an assessment was even requested, since the project had been terminated. This reveals a possible lack of due diligence towards expensive implementations of ICT, and at best this suggests a deliberately lack of transparency or at worst a systemic failure from the top.

## 5.2 Theme Two: ICT patterns of practice in classrooms

**Table 5.3: Theme two**

Main theme	Theme	Subtheme	Main Participants
ICT patterns of practice in classrooms	ICT use in classrooms	Teacher ICT use	25 teachers and 25 student focus groups
		Types of ICT used in the classroom	
		The frequency and intensity of ICT use in the classroom	
		Teaching and learning practices with the use of ICT in the classroom	

### 5.2.1 Teachers using ICT

It was noticed during the observation conducted in 25 classrooms in five schools that there was a lack of ICT use by teachers in the majority of classrooms. Only 12 teachers used different ICT in their sessions, and their use of ICT differed in different aspects, including types of ICT used, the frequency and intensity of use, and the methods used for learning and teaching while using ICT. All of these areas will be described in the following themes in this section. The subjects taught by the teachers who used ICT were as follows: English (five teachers), religion (two teachers), physics (two teachers), geography (one teacher), Arabic (one teacher) and biology (one teacher): 12 teachers out of 25. Thus, it can be seen that teachers who did not use ICT were more than those that did use it in their classrooms when the observation took place. This ranged over different subjects and schools.

During the student focus groups, students confirmed the data collected by methods, observation and interview, with regard to whether or not teachers used ICT in their classrooms. Students in all 25 focus groups confirmed the data collected during the observation by revealing that those teachers who did not use ICT when being observed never used it, while teachers who used it differed in their use in terms of the aspects mentioned above, which will also be described later. One group even claimed that, *“those teachers who do not use ICT in their lessons at least in some sessions need to be questioned or even dismissed if they continue being reluctant to use ICTs.”* Which also reveals that there is a demand from the students to be taught using ICT.

The majority of the focus groups revealed that most of their teachers do not use ICT at all in their classrooms. The majority of them claimed that they felt that the teachers were happy to not use ICT for different reasons. To illustrate their agreement with that belief, one group stated that, *“...honestly, we feel [that] teachers do not prefer or [even] want ICTs to be used during their lessons.”* All focus group students supported this belief with a number of reasons, including teachers' dominance over students, lack of teachers' ICT skills, teachers' ICT awareness and teachers' insistence on traditional teaching.

#### 5.2.1.1 Teachers' views towards the use of ICT in classrooms

All teachers who participated during the data collection showed positive views towards the significance of ICT in education. However, four teachers (two maths teachers, one Arabic teacher and one Quran – a religious subject: the Islamic holy book teacher) believed in the importance of ICT in education but claimed that ICT would only be helpful for particular subjects other than theirs. They felt that their curriculum content does not encourage them to use ICT in their teaching. For example, the T17 who teaches Quran mentioned that, “*there is no way to use ICTs in the teaching of my subject as all I need to [do is] read [the] Quran and then ask [the] students to read the same.*” In contrast, T2 teaching the same subject in another school, where ICT was observed more than other schools participated in the research, revealed that, “*I found teaching [the] Quran using ICTs such as microphone, speakers, YouTube and video players and various educational resources very helpful not only for me but also for [my] students.*”

#### 5.2.1.2 Advantages of ICT use in education

All participants in this theme (teachers and students) agreed on the overall advantages that ICT offers for the teaching and learning process. They confirmed that, when all the necessary support from all areas is available, ICT facilitates the pedagogy not only for teachers but also for students. All teachers confirmed that ICT offers ease and speed in their lesson preparation and during the session. T7 said, “*ICT enables me [to] prepare my session more easily, with considerable [time savings], more [than using] the traditional way.*”

The majority of Teachers and students believed that ICT displays the content of the session more clearly and that attracts students more than when the blackboard is used and makes them focus on the lesson. A student from focus group 3 stated that, “*when my teacher displays the lesson technologically, I enjoy it and focus more.*”

All participants agreed that ICT use is one way of avoiding the boredom found in a school's daily routine for both teachers and their students. All of them confirmed that ICT enabled more participation and engagement from students in the sessions. T11 stated that, “*when I use ICT in my session I see my students actively engaged in the session more than [in] other sessions without ICT use.*”

The majority of participants confirmed the advantages that educational digital resources bring for the teaching and learning process. They explained that these resources usually offer more knowledge and activities that both teachers and students can practise more enjoyably using more creativity. FG13 pointed out these resources make them understand more as they help them to think before answering quizzes provided in their activities.

Another example of ICT resources was the use of the Internet; there was full agreement from all the participants on the massive advantages that the Internet can offer for teachers and students. They confirmed that information found on the Internet was often enough to enable the lessons to be understood. They confirmed that they checked different educational and non-educational websites to search for the information they wanted. T1 stated that, *“even [though] I feel [I am] familiar with the content I deliver in my classrooms, I regularly check the Internet for more information and to expand my knowledge.”* FG6 confirmed that, *“The internet is my major means of searching for information related to a particular session that I am studying at my school, and I have found it very useful in providing me with extra knowledge.”* Another source they confirmed that they frequently visited via the Internet is YouTube and similar websites for educational purposes. Another focus group confirmed that, as they found YouTube very useful, particularly in science-related subjects.

The majority of participants believed that ICT facilitates the process of teaching and learning to be more pedagogically effective since ICT can be one way of changing the traditional teaching approach. They confirmed that when ICT is used teachers use a different approach in their classrooms that involves students in the whole process. T25 stated *“the use of ICT facilitates the use of new methods of teaching and learning because ICT attracts students’ attention, which is not the case when the traditional methods are used.”* F21 said that, *“even teachers who do not involve students in their sessions [most] of the time, they sometimes change their method of teaching and involve us when ICT is used.”*

All participants agreed that ICT offers an advantage for students to be more independent in their learning. They confirmed that this was due to the worldwide information on the Internet and other educational resources from which students can learn, especially in their time outside school hours. T8 said that, *“I think most of [the] students have laptops or PCs [in] their home and I doubt if there was no student has a Smartphone with internet connection where they can access many sources [and] they can gain knowledge more independently.”*

The majority of teachers thought that ICT enables students to be more creative as they can learn from different sources with different information. They added that students then build their own knowledge after searching for different information from different sources. Most participants believed that ICT increases students' achievement, as it is a method they enjoy using. They confirmed that using ICT for learning enhances their learning more than memorisation, which is the traditional method of learning in most subjects. They believed that ICT helps students to search for more information and apply it in different ways, which is not the case when studying only their text books without having extra knowledge or applying it to practice.

## **5.2.2 Types of ICT use in the Classroom**

First of all, it is essential to show the availability of resources in the classrooms observed during the data collection for this research. Before describing that, it is also important to indicate that the observed classes were taking place in two different locations, namely the traditional classroom and labs equipped with technology.

### **5.2.2.1 ICT availability in traditional (ordinary) classrooms**

In terms of hardware availability, computers were not available in all the classrooms observed in all five schools that participated in the study, only a few classrooms had one. However, the majority of those classrooms were fitted with data projectors although computers were surprisingly not. Most teachers revealed that most of these projectors are not working and rarely used because their installation was a part of previous initiatives to implement ICT. They are never checked or repaired by IT specialist from the LEA. An example of this came from T19 who argued that *“these projectors are only a ceiling decoration and not being used for a long time... LEA needs to repair them or even provide brand new devices.”* However, school head teachers were not happy with that, for example, H2 confirmed that *“I am the first person in charge to report to LEA any technical issues as they have a specialist team for such issues and responsible for any maintenance, for example, I have contacted them many time to do something with projectors issues but we had no response from them.”*

In addition, brand new IWBs were available in almost all classrooms. A few teachers brought in their personal laptops and/or iPad while all teachers had their personal smartphones. Regarding software, there was no software available or used in any of the traditional classrooms. In addition, Internet connectivity was not installed in all of these classrooms. The majority of teachers indicated that they prepared their lessons using CD resources bought from the stationery and used their laptops at home, but overall the environment in the classrooms did not encourage the use of technologies.

#### 5.2.2.2 ICT availability in special labs

Some teachers who were interested in using ICTs in their sessions used special labs. They had equipped them with the necessary ICTs they felt able to use, either by themselves or from the LEA in the region. All of these labs were equipped with computers, data projectors, overhead projectors and IWBs. In terms of educational software, only six teachers had this during their observed sessions. The five English teachers had obtained it from the MOE, while the biology teacher had to buy it from a third party. In terms of Internet installation, only three teachers had connectivity in their labs. All of those teachers revealed that they had requested Internet connectivity in their labs for them to access the Internet either during their lesson preparation or during their teaching. Other teachers felt that they did not have time to access the Internet during their short lessons, although they showed very positive interest in the Internet for the teaching and learning process. Five teachers also used their iPads during lessons. In terms of using their smartphones, a few teachers sometimes referred to them. In fact, all the teacher who participated revealed they would be more than willing to use their smartphones and the internet for anything they felt would benefit them in their lesson, however, they argued that the massive content of their subjects does not fit with the time constraint and that does not allow them to use their devices effectively. For example, T22 stated that *“it is my personal phone and so I can use it at any time, however, in terms of using it in my classroom, yes it is a good idea and I think this would be useful for my teaching but the limited time forces me to focus on finishing the content of my teaching subject.”* Another teacher clarified *“I think 45 minutes are appropriate for teaching my students, but the inappropriate is the existing curriculum and that the MOE need to reform them with less content and more students’ activities as at the current situation, engaging students in in most of the lesson time is almost impossible [sic].”*

At this stage, it is also important to state how many labs had ICTs other than the aforementioned special labs that were requested by the teachers themselves (in other words how many labs provided by the Ministry were equipped with ICT in the schools observed.). All five schools had one IT lab each, which was only used by IT subject teachers (who were not participating in all observed classrooms) and no other teachers were allowed to use them. The only other room that was equipped with some ICT resources was the resources learning centres where any teacher can use it, which was available in all schools. No observation took place in these rooms during the study. However, most of the teachers revealed that these rooms were very well equipped with tools. They explained that the resources room required an early reservation, which makes it difficult for the same teacher to use it regularly. T16 stated that, *“if someone finds [an] available slot in the booking for [the] LRC he is lucky, as from my experience this room is always booked.”*

Most of teachers argued that many teachers who use this room do not use ICT in their teaching but rather find the LRC have ICT skills and they usually depend on students who have ICT skills or on the resources room technician.

#### 5.2.2.3 Types of ICT used

After describing the availability of ICTs during the observation, we can now move to the description of what those ICTs were used for in practice when the observation took place. From the few participating teachers who used ICTs in their teaching, a wide use of projectors, which are basically connected to computers, was observed. They used this type of ICT for the purpose of displaying their lessons, using different sources such as software (e.g., PowerPoint, Word, paint, photos viewer and video player) and Internet browsers. However, very few teachers used the Internet during their lessons. Only four teachers were observed to use their personal iPads from time to time during their lessons. In the interview, T4 revealed that, *“This iPad belongs to me and [is] not provided by the MOE but, because I felt more comfortable when using it for my subject in the classroom, I decided not to wait for such equipment to be distributed to teachers.”* T21 added that, *“[the] iPad is similar to smartphones that most people use every day who can deal with many applications and functions in these devices, and so I found myself is more familiar for using this device than using computers, which requires many skills.”* The majority of teachers who used ICTs during the data collection of this research were also observed using their smartphones. They

seemed to be checking and looking for something for less than a minute or so, and did so at different times during the sessions. During the interviews, all of these teachers justified the reason for their use of their smartphones by stating that they were connecting to the Internet to check information related to their sessions at the time. T23 said, *“sometimes when I found myself stuck with some information during the lesson, I grabbed my phone without hesitation to find what I needed [in a] quick and short time.”* Five teachers out of all the teachers who used ICTs explained that they sometimes shared the information they found on their smartphones with their students by reading to them, if it was a text, or showing them what was on their screens. However, during the observations, teachers who showed what was on the screen did not move all around the classroom for other students to see. A few of the focus groups confirmed that not many teachers use their phone during the lessons and those that do rarely share exactly what they find.

Teachers who used ICTs confirmed that they preferred to refer to their own smartphones when they required access to the Internet rather than to the PCs provided for them in the schools. They explained that this was due to the lack of Internet access provided. All of them revealed the poor connection as well as the absence of the Internet in some classrooms because of the lack of maintenance and technical support.

Almost half of the teachers used computers for self-use. They stated that they mainly used it for two reasons: to check their prior lesson preparation in order to facilitate their lesson delivery and manage their time, and for student evaluation purposes.

Only English subject teachers in all five schools used an interactive white board (IWB) in their lessons, which are connected to a computer using educational software, which is provided by the Ministry of Education for this subject. However, all the other teachers revealed that the Ministry has not provided them with particular educational software for their teaching subjects. This has forced a few teachers to purchase third-party educational software themselves to facilitate their teaching. They further claimed that they would benefit from ICT use in their classrooms if the Ministry had had provided them with educational software, making them equal to the English teachers, and consistent with curriculum content. For example, T6 who used a computer and projector in his classroom stated that, *“of course I do not mind [using] other ICTs if I am skilled enough and if the necessary ICTs related [to] resources that my subject can benefit from are available, but because this is not the fact in*

*the present I would prefer to use [a] computer and projector because I know how to use them after I tried to learn [to use them] myself.*” In addition, all teachers using ICT explained why they do not use IWB in their sessions, despite their presence in the classroom. The teachers revealed different reasons for this including: lack of training, lack of confidence of use, the absence of their subjects’ software and educational resources, and lack of technical support, slow response and lack of maintenance. T12 stated that, *“how to use such technology if I was not trained how and for what educational purpose to use in my subject. I care about my students and so for pedagogical reasons I intend to focus on finishing the lesson with comprehension and understanding from, if not all them, most of the students.”* T3 added that, *“IWBs are perfect if all conditions are met, but in reality, many issues confront us, for example, IWB response is very slow, which surely will affect the whole time of the session, which will result in our lesson [being less effective].”*

T19 revealed that, *“we were surprised when IWBs were installed in our classrooms and simply were informed these IWBs need to be used by us as teachers although we had not attended any training [on] the use of such technology in our curriculum.”* T14 admitted that, *“we are always warned by EA and the school management for taking care of the ICTs provided in classrooms especially IWBs as they cost a lot of money.”* He continued, *“Unfortunately, there are [a] number of bullying students in most classrooms who cut [the] wires of these technologies and break them, and then we as teachers were responsible for their damage, which made most of us explicitly inform our head teachers [that] we were not going to use them at all to avoid any accountability.”* During the observation, there were two teachers who furiously pointed to the IWBs and asked their students, *“Who did this damage to this smart board?”* They then added, *“You know this behaviour will be reported to the management and the one who did this will need to bring his guardian to the school for questioning.”*

### **5.2.3 The frequency and intensity of ICT use in the classroom**

As mentioned in the first theme, only a few teachers used ICT in their classrooms. From those teachers who were observed, all the English teachers spent all their lesson time using computers, IWB, speakers system and educational software. During the interview, they confirmed that they intensively employed these ICTs in all their lessons; referring to the availability of equipment and resources they have in their special classrooms that facilitate

the teaching process in their subject. T3 stated that, *“I found using technology in my subject [to be a] fundamental requirement and so I never teach without [it].”* Other teachers of the same subjects supported that statement, but also explained that they were sometimes forced to suspend their use of ICT due to technical issues. T25 revealed that, *“the only time we do not rely on ICTs in our sessions is when there is a need for technical support that we do not know how to deal with.”* Students who were present in those teachers’ classrooms where the observations took place also confirmed during focus group discussions that those teachers always used ICTs in their sessions. All of those students stated that they were happy for the teachers to use ICT all the time, and in fact preferred them to do so.

Another group of teachers were observed to rarely use computers and projectors during their lessons. In total, they used these ICTs for about 10 minutes of the 45-minute lesson time. They revealed that they did not always employ ICT in their lessons and, when they did use, they only did so for a short time. They explained that this was due to the lack of resources that are provided for their subjects, and to the curriculum itself, which does not allow them to use ICT for a long enough time and so they preferred to continue to use traditional teaching methods. The majority of those teachers agreed that the extent and intensity of their ICT use depended on the needs of the session so, if there was any pedagogical need for ICT use, they declared that they would use it. For example, T13 stated that, *“I love using technology in my teaching when I feel it is worth [it] for the pedagogical aspect because, to be honest, the process of teaching and learning that complies with the curriculum objectives and outcomes is the most important thing for [me].”*

This view, however, was surprisingly only supported by two students, both of whom were in the same focus group of students (FG5) who did not believe that ICT use was always necessary in certain subjects, namely English and Maths. Their view is encapsulated in the following quotation: *“OK, we need ICTs in all subjects because [of] their importance for the educational environment but, in some sessions of English and Math subjects, we would go with teachers’ instruction on the white board more than the use of ICT because we feel our understanding through the traditional way can be faster than [through] the technological way.”* They gave an example to illustrate that, one of them explaining, *“when a teacher brings technologically ready resources and displays, for example, in Maths  $3+2=5$  where the answers already provided to the students; while teachers following the traditional method will usually do  $3+2=?$  Or  $3+?=5$  which makes students think and learn to answer*

*the question.*” The same students continued with their views by giving another example, this time for English, one of them stating that, *“our English teacher is well educated and we think he has the technological and pedagogical skills but we do not want him to use ICT intensively because when he let us listen to a native speaker rather to his voice that students are familiar with, our understanding decrease.”*

Other than the English teachers, there was only one teacher – a biology teacher – who was observed intensively using different ICTs in his classroom, namely a computer, iPad, smartphone, projector, slideshow and Internet. He mentioned that he always used ICTs and confirmed that most of the resources belonged to him, as he explained that ICT is the best way of teaching biology, not only for teachers but also for students. He (T4) stated that, he had been teaching for approximately 20 years, and had experienced many changes in education, and stated that, *“ICT is the best invention ever for the biology subject.”* He added that students used to be *“very passive”* and did not *“love”* his subject until he introduced ICTs, after which it became their favourite subject. He ended by stating that, *“I have not been provided with any ICT-related educational resources”*, having provided them himself not only for his sake but for the students as well, *“for the best learning and teaching environment.”*

The focus group with students (FG4) attending the same classroom stressed the attraction of this subject with this teacher. One of those students revealed that, *“in the past, I hated [the] biology subject as we used to have a teacher delivering his lesson theoretically more than practically, which is not the case for biology subject-related content. However, with my teacher now, my favourite subject is biology because of the tools he is using [in] every lesson.”* Another student from the same group stated that, *“of course, biology is the subject [about] creatures, which is not logical to learn theoretically without practical learning. This the material of biology subject, of course, will not allow us to see the life of creatures but ICT will do.”*

## 5.2.4 Teaching and learning practices with the use of ICT in education

### 5.2.4.1 Teaching and learning approaches

During the classroom observations, the dominant teaching approach was a teacher-centred approach. The traditional method of teaching and learning was followed in almost all the classrooms observed, without the use of ICT during classes. Starting with teachers who did not use ICT at all during the observation periods, (the majority of the research sample) almost all of them started their lessons by writing the lesson outline on the blackboard, including examples and even quizzes or activities such as homework in some cases. This meant that they frequently had to turn their backs on the students to write this pre-lesson preparation on the board. This amounted to 10-15 minutes of the 45-minute lesson. Students could, and did, misbehave. In the interview T18 stated that, *“sometimes, I had to borrow at least five minutes from the teacher of the prior lesson to use the blackboard for the preparation of my coming session.”*

Despite the positive views of those teachers who did not use ICT towards ICT for teaching and learning process, they still regarded ICT as only a supplementary tool but not as a main method for the teaching and learning process.

On the other hand, teachers who were observed using ICTs in their classrooms utilised a mixture of teaching and learning approaches in all sessions, but all of them believed that the use of ICT in education is a method of pedagogy. T25 stated that, *“ICTs are without doubt [an] assistant to teachers in their preparation and have many advantages on this side but also if ICTs are applied correctly they can be pedagogical methods that benefit the whole process of teaching and learning.”* T8 supporting that adding, *“...when ICT is pedagogically involved in [the] classroom, its advantages will [not] only [be] for teachers but also for their students’ learning.”* There were two groups of teachers who used ICT in their classrooms; the first group, which has the majority of teachers using ICTs, mainly led their lessons with their instruction based on what they had already prepared. They were actually delivering their lessons by displaying the content using ICTs such as projectors and IWBs, and mainly explained and described what was being displayed. They rarely referred to the ‘hard’ material provided for their subjects, which were the original curriculum and students’ activities book. All of those teachers claimed that these materials do not encourage and

support ICTs to be used. T12 indicated that, *“usually the subject’s hard materials do not motivate me to use ICTs and so it is time consuming to refer to them while I am teaching, and I instead prepare my session using my subject’s prepared educational resource that I had to buy from the stationery.”*

In the second group, the teachers were mainly under the umbrella of the student-centred approach as a number of activities were used in practice. These methods where students were part of the teaching and learning process included collaborative learning and inquiry-based learning.

The latter approach was observed being applied more than collaborative learning. T1 illustrated that, *“when I decided to use the collaborative learning, the learning approach the learning environment was positively changed [for] all of my students.”* T25, *“by involving students in the teaching and learning process you will definitely avoid and overcome any boredom and tiredness from your students.”* In addition, T7, *“when modern approaches of teaching and learning exist in the classrooms environment, students’ interest in these methods is not only because they change or even break the routine but also because they [the students] can feel they are trusted in the process for being [as] involved as their teachers.”* All students in all focus groups welcomed these strategies and all agreed with the statement stated by FG4, *“the new strategies encourage us to focus and learn more than traditional methods.”* FG11 also confirmed that, *“when the routine of the learning environment has been changed by some of our teachers we felt more like actively learners.”*

All teachers from both groups who were using ICT in their classrooms showed very positive interest towards different teaching and learning methods, especially when ICTs are employed more than the traditional methods that most teachers use. T21 stated that, *“we are in the area of globalisation and modernisation and so the traditional method of teaching has to change to more effective approaches that benefit and involve both teachers and students in this world of knowledge.”*

Although most non-users of ICT viewed ICT as a supplementary tool in practice, they also supported their colleagues’ views on the teaching and learning approaches. However, they indicated a number of reasons for the lack of such teaching and learning strategies in their classrooms. Those reasons include: physical environment such as tables and chairs, lighting,

cleaning, windows and air conditioning; large number of students; small classrooms; time of the session; workload, lack of professional development; and intensive curriculum contents. One example of this was revealed by T20: *“I love, and my students [do] too, the collaborative learning strategy in my classrooms but there I found it very difficult to apply it regularly because I have a small classroom and a big number of students.”* T16 added that, *“the issue with the collaborative learning method is that students need to change their places where they need to carry and organise their tables in circles, groups, since my original classroom table system has five rows where each of them has six students, where the classroom should only accommodate a maximum [of] 18 students, so if this method is applied we surely lose 10 minutes to organise this small place with many people.”*

With regard to the professional development reason, the entire sample of teachers who participated in this study stated that there is a lack of professional development. They all asserted that any professional development courses of the few training programmes were intensively theoretical without any real implementation and application during the training programmes, and then there is no evaluation of these programmes after their introduction. Also, more interestingly, they all agreed about the poor training environment and the lack of the trainers’ skills, as well as time of the course and lack of motivation and recognition. T13 stated that, *“I attended such programmes only for my professional record as I did not find them useful because the programme itself has [a] number of issues that need to be dealt [with], such as the time of programmes, skills of trainers, the absence of practice and the absence of motivation and reward.”* T6 added, *“I attended a number of programmes with less benefit but I did not stop and I continued developing myself professionally, but unfortunately I did not see any recognition in my school environment at least from the management part.”*

#### 5.2.4.2 Students’ engagement

The engagement and participation of students in all observed classrooms when ICT was not used at all were always very weak and the majority of students were passive throughout the sessions. They were simply recipients for all the information given by the teachers, who acted as the instructors throughout all the sessions. At the end of most classes, students were given written homework to be handed in for the next session. This indicates that the teaching

approach adopted in these classrooms was causing weak engagement by students (Parkinson, 2014).

As noticed during classroom observations, although almost half of those teachers at the beginning of the session spent two to three minutes revising the key areas learnt in the previous session with their students, they rarely asked students questions or allowed them to participate. It was almost impossible to know about students' knowledge prior to the teachers' lesson instruction. Thus, students in these classrooms had no chance at all to construct their knowledge via any means. It was noted that in classroom observations there were a few students (two or three) in most of the lessons were chatting, using hidden phones, sleeping and/or eating nuts. After they had prepared their lessons on the blackboards, most of the teachers spent their session time sitting on the centre chair in front of their students, which made things difficult for some students at the back of the classroom. Students in classes taught by teachers who did not use ICTs were rarely asked questions. Additionally, they never worked together in any area throughout the session.

In contrast, in classrooms where ICTs were employed, student engagement was, in general, clearly observed. Students were encouraged to become involved in the teaching and learning process by working with their teachers and with the different types of ICT used. This happened in all classrooms; but only two to three students worked with their teacher for the purpose of teaching involvement in most classrooms. However, student engagement when the learning and teaching approach was more student centred actively existed in those classrooms. Students were cooperatively working together in groups while teachers only intervened when it was necessary. All activities were displayed on the IWB or via the projector, while each group leader showed their understanding and knowledge at the front of the class by pointing to the displayed content. Although the evidence from the findings of this study shows that ICT was a significant way towards changing the way teachers teach, it is not to say that by only providing ICT that the students' engagement will happen but by utilising them for the educational process (Livingstone, 2012; Law et al., 2008; Kozma, 2008). This is also confirmed with students who suggest ICT resources may be available, but it was not necessarily the case that they would be used if teachers themselves do not use them in classrooms for the process of teaching and learning. This is because, as mentioned before, some teachers found in this study used ICT only as a mean for their own teaching interest such as their lesson preparation but not for pedagogical purposes.

In other classrooms, teachers were seen engaging their students in the learning and teaching process only sometimes during the session, as they were asking different students about their opinions and sometimes asked them to go and explain their answers using some of the technologies used in the classroom. The majority of teachers allowing students to engage in the teaching and learning process believe in the crucial necessity of their involvement in this process. Especially when ICT is employed, as students in this generation live with, and love using technology: they see the advantages that ICT can offer them. For example, T21 said *“one significant way to enhance students learning is involving them [in] using ICT in their learning not only at home but also in their classroom for the whole pedagogical process.”* Therefore, based on the findings of this study, student engagement in the educational practice was mainly influenced by the teaching approaches used by their teachers and that ICT use was one way of enhancing the process of teaching and learning in classrooms (Swan et al., 2007).

However, in the interview, all of those teachers in the other classrooms confirmed that a number of factors had caused them to allow little time for students' engagement during their lessons. T3 revealed that, *“because of the load or our workload, contents of [the] curriculum and large number of students, I usually choose to do more of the job to be able to deliver all of the session contents.”*

All those teachers confirmed in the interviews that, in each new session, a few different students are appointed and allocated particular tasks in order to involve them in both teaching and learning. T4 stated that, *“it is really important that students prepare for each session and the best way of doing so is by involving them in the teaching process by using various ICTs.”* T8 believed that, *“when students engage in the process of both teaching and learning, their confidence, creativity and knowledge will be positively affected, especially when ICTs [are] used, which is not like when students are only receiving others' knowledge without searching for knowledge.”* All of those teachers stressed the equal engagement of all students in the teaching and learning process with the use of ICT, as they all felt that the use of ICT was one way to effectively engage students in their learning. For example, T6 stated that, *“...although I am sure there are [a] number of students who do not care about their learning, they need to be involved in the same process for equity reasons across all students and because I believe their learning will improve when they engage in the process with the students attracted equipment [ICTs].”*

As part of the student engagement in each classroom, the majority of teachers confirmed that most of the time they encouraged their students to learn and to construct new and more knowledge about the present session and the next session using ICTs such as their smartphone, tablets and/or PCs when they returned home. T12 explained, *“In all cases, we are all Internet and technology users, students or teachers, and so I usually give them homework using their available technologies to keep them open to the wider knowledge.”* Most of those teachers also revealed that they asked their students to conduct some research on the same session and the following session, in order to be well prepared and to construct their knowledge before the intervention by teachers. For example, T21 said, *“very proudly, most of my students return their projects that I have asked them to do at their homes almost every lesson and I found them with new knowledge and so they are always engaged in the learning and teaching process.”*

Only two teachers of those with ICT in their classrooms pointed out they never explicitly asked their students for any homework to be completed using ICTs because of their belief that such technologies were not available in some students' homes. In addition, they further explained that, in this case, students who do not possess ICTs in their homes for whatever reason would find it embarrassing to be given homework asking them to use such technologies at home. However, those teachers confirmed that they favoured the use of ICT by students for the positive engagement with their learning, but they asserted that they asked students for homework and told them to use any means they felt could help them in gaining knowledge. For example, T16 said, *“I am [for] students' engagement in their learning and teaching process and one way to do that [is to] let students prepare for the same purpose by using ICT and search for worldwide information. However, I feel it is an embarrassment for students who do not have ICTs in their homes or even may [be] prevented from [using them by] their parents for any reason and so I ask [them to prepare using] any means without indicating ICTs, to avoid any embarrassment.”*

Also, students in the focus group whose teachers were ICT users in the observed classrooms were given homework and projects for the next session or for the same session to complete using ICTs such as Google, YouTube, different websites, educational resources and different software such as Word and PowerPoint. All the teachers revealed that lessons were more interesting when students were engaged. This is also an indication that teachers who did this believed in the importance and advantages of ICT and wanted their students to be open to

learning and construct their own knowledge from various sources. This is especially significant as the study found that teachers even believe their students more knowledgeable than most teachers in using technologies as they are the generation of digital world. This approach employed by teachers could be because those teachers have more knowledge, including the desired knowledge suggested by the TPACK framework, than other teachers who fail to follow a similar approach. Such knowledge is mainly linked to teachers' professional development and training which is presented later in this chapter.

### 5.3 Theme Three: Factors affecting the use of ICT

**Table 5.4: Theme three**

Main theme	Theme	Subthemes	Main Participants
The factors affecting ICT use in the classroom	ICT factors	Personal factors	25 teachers and 5 head teachers.
		Organisational factors	

This final section of the findings presentation chapter is to describe any factors affecting teachers' use of ICT revealed by both teachers and their head teachers in all five schools that participated in the present study.

There are two main categories relating to factors affecting ICT use by teachers in their classrooms. The first category concerns teachers' personal factors, which begins with expectations from the use of ICT; this includes a number of areas such as their attitudes towards the use of ICT, their awareness, culture, time, confidence and motivation. The second category relates to the organisational support, which includes policy and resource availability.

#### 5.3.1 Personal factors

In this area, teachers gave their expectations relating to the use of ICT in the classroom. A number of factors emerged from this inquiry, as revealed in the following subsections.

#### 5.3.1.1 Teachers' attitudes towards the use of ICT and their awareness

The majority of teachers expect that the successful use of ICT in the classroom can have positive results in terms of the teaching and learning process. A number of them gave examples from education in Western countries, T15 that, *"if ICT was not really [a] facilitator in education, the developed countries would not [have] introduced it into their classrooms."* T25 indicated that, *"other sectors in our country are rapidly [becoming] dependant on technologies and we can see the national development in these sectors, which means ICTs have made a positive difference towards change."* However, teachers who did not use ICTs in their classrooms – a total of 13 teachers – claimed that ICTs will not make any change in the teaching and learning process if the education system's current situation remains as it is.

All teachers showed an interest in the integration of ICT not only in the management side but, most significantly, in the teaching and learning process. T10 stated that, *"despite my lack [of] experience in the use of ICT, I really welcome its use in education if I can use [it] correctly."* However, although all teachers showed a positive acceptance of ICT, three teachers were not in favour of the integration of ICT in their subjects, as they believed that ICT would not be helpful in some subjects, including theirs.

In regard to teachers' awareness, teachers revealed that they lacked awareness of the real importance of ICT in education. T11 argued that, *"I graduated from my university without [being taught] the significance of ICT that can enhance the pedagogical process but I learnt from the world that ICT is important for education."* T9 added, *"the only thing I am aware [of] about ICT in my school is the administrative tasks that employ [it] for the managerial roles."*

#### 5.3.1.2 School management

In terms of the school management factor, the majority of teachers believed the role of management is very important in ICT integration in education, while a few teachers viewed head-teachers as working as teachers and thus could not be blamed for the failure to integrate ICT in education, which is the same view held by all the head teachers. Teachers who claimed the importance of school management believed that head teachers provide the main link between teachers and the LEA in the region. They required head teachers to communicate with the LEA for any support needed in terms of ICT integration in education.

They gave examples of the equipment and educational resources and other support related to ICT, as they needed to work cooperatively with the LEA to provide the required support in their schools. T12 said, *“...from my experience, I worked in two different schools in the same region where my previous schools were almost equipped with new devices, as well as ICTs were employed much more than [in] my current school.”* He then referred that to the school management, as he continued, *“...Because the school head teacher in the previous school was more active and supportive for the use of ICT in the teaching and learning process, while my current head teacher does not seem to support that.”* However, all of the head teachers confirmed that from their experience the LEA does not respond to them as desired, which made them less enthusiastic to put any pressure on the LEA for the required ICT support.

The majority of teachers also claimed that, when considering ICT as an advantage for the whole learning and teaching process, head teachers needed to request enough resources that could be equally used for all teachers and students. However, they noted that their head teachers mainly wanted them rather than the students to use ICTs, to avoid any damage, and the related accountability issues. T11 stated that, *“my head teacher always asks us to make sure students do not do any damage to ICTs as the school management cannot be responsible for any problem [that] may happen, and warns us [that] damage will be [the] teacher’s responsibility.”* H5 confirmed that by stating that, *“when students [use] ICTs they are most likely to damage the equipment and there is nothing I can do if that happens, other than investigate that with [the] students or their teachers to report it finally to the LEA, if applicable.”*

In addition, all teachers confirmed that the school management place more importance on ICT in the management department, for administrative purposes. However, with regard to ICT for pedagogical purposes, they usually pay less attention. T15 stated that, *“...ICTs at the department level are up to date, and technical and maintenance support are regularly dealt with.”* This statement was supported by H2, who stated that, *“ICT [at] the management level is intensively employed since all our administrative tasks– either internally or externally – depend on ICT.”*

In terms of the role of head teachers inside the schools, interestingly, the majority of teachers confirmed that their head teachers are always encouraging them to use ICT in sessions in the

resources rooms, where ICTs are available for all teachers. This includes facilitating ICT labs for teachers who have an interest in the use of ICT in their subjects where rooms are available. All teachers in three of the five schools that participated in this research explained that their head teacher provided positive motivation for teachers who pedagogically used ICTs in their subjects; this was done by reducing their teaching hours per week. H3 stated that, *“when I realise teachers [are] using ICTs for [the] teaching and learning process, I reward them with [fewer] teaching hours each semester.”* However, teachers revealed that this is still not helping all teachers enough with their workload, as workload was repeatedly mentioned as another issue related to the management factor. They claimed that management should reduce teaching hours and administration tasks for all teachers as this affects the time they have to use ICT. All head teachers confirmed that, *“it is the MOE’s responsibility to bring in more teachers to the school so the workload can be reduced [for] all teachers.”*

#### 5.3.1.3 Time

Although all teachers confirmed that they intensively used their smartphones in their daily life, and the majority of them confirmed that they used their personal laptops, PCs or notepads in their homes, the majority also confirmed that they struggled to use them for educational purposes; especially for the whole pedagogical process, because of their time constraints. They explained that they had many commitments that often prevented them from using ICTs for teaching and learning purposes. These commitments were related to family, business, relatives and other commitments. T22 described that as, *“I work from 6.30 am and remain in the school till 2.00 pm so I return home exhausted, where I see my family and [we] have dinner together, and from 4.00 pm I start doing my daily commitments till 9.00. So, it is very difficult to find [any] spare time to do your school work, either with technology or anything else.”* So, not all of the teachers were happy about the timing of ICT and professional training, which usually takes place during the afternoon. T24 stated that, *“it is almost impossible for me to attend training [in the] afternoon because of my daily commitments.”* All of those teachers strongly required the training to take place during school hours. Interestingly, T7 gave the following example: *“countries like the UK, Australia and USA close their schools [to] students [to run] professional training for teachers without affecting their time and curriculum. So, the policy of the Ministry of Education and the policy of the school and the prior plans and strategies are very interlinked components that could overcome the issue [of] timing.”*

#### 5.3.1.4 Motivation

All teachers from both groups – those who used ICT and those who did not – confirmed that motivation is one of the top factors affecting their use of ICT. The majority of teachers stated that not being recognised by the MOE or school management for their educational mission are all motivational factors affecting their use of ICT. T8 said, *“I always hope [for] recognition from my manager at least.”* T5 stated that, *“unfortunately, the reputation of [the] teaching career has fallen to the lowest levels and so my motivation has also become low.”*

T1 stated that, *“I see teachers who use ICTs as professionals among their colleagues and so recognition needs to be paid to them.”* In addition to the recognition factor, all teachers mentioned the financial reward they should receive when ICTs are used. T21, *“it is unfair to get paid [the] same as teachers who resist change and remain teaching traditionally.”*

#### 5.3.1.5 Teachers' confidence

The majority of teachers did not regard their confidence in using ICT as a factor affecting their actual use of ICT. They justified this by observing that if there is training there should be no fear of using ICTs in the classroom. However, two teachers revealed that they were fearful of using ICT in front of their students. The teachers believed that their students were born in a digital world and knew everything about technologies and so they did not have the confidence to use ICTs in the classroom. T19 stated, *“I am not skilled enough to use ICT in my classroom and I do not want my students to see that fact. In my home, I use my computer for preparation purposes and I ask my children to help me with some stuff.”*

#### 5.3.1.6 Language and religion

The majority of teachers do not speak English and all of them indicated that language is one of the factors that affect their use of ICT or even learning about ICT. They claimed that most of the software that they had to purchase was not in Arabic, which made it difficult to learn. In addition, most of the non-English-speaking teachers explained that, even when they wanted to self-learn about ICT through an Internet search, for example, via YouTube, they found most of the results were in English even from Arabic websites where the content is mixed Arabic and English. For example, T25 stated that, *“I tried to learn [about] making*

*videos to employ them in my teaching but I found the instructions of most resources in [a] different language.”*

There were no issues around religion or belief revealed by any teacher in this study. All teachers confirmed their expectations of ICT in education were not affected by religion and belief issues at all. T14 stated that, *“my acceptance or rejection [of] the use of ICT is far away from any religion issues, as ICTs in the end are scientific[ally] made, [which] can be accepted or rejected by their users, and [which] do not make any connection with religion, in my opinion.”*

### **5.3.2 Organisational Support**

The interviewees revealed a number of organisational factors that they believe have affected the use of ICT in classrooms in Saudi schools; all of these factors will be discussed below.

#### **5.3.2.1 Policy**

All teachers and head teachers confirmed that the absence of ICT policies in Saudi education in schools is the top factor affecting teachers' use of ICT in their teaching. All of them confirmed that they were not aware of any ICT policies. They confirmed that there were no clear policies on which they could depend and they doubted if there were any real policies particularly designed for ICT. T23 said that, *“No, I am not aware of their policies and I do not know if they have [an] ICT policy but all I know from media, friends and colleagues [is] that they need an education environment with ICT use for both learning and teaching.”* T16 added, *“I heard that the MOE will provide schools with new ICTs to enrich the educational process and keep up with the developed countries.”*

However, regarding the official awareness from the MOE, the interviewees explained that all they knew was that the Ministry of Education sent out certain announcements or circulars to the local education authority in their city, who then sent them to all school managers, who then circulated them among all teachers for them to sign. H2 said, *“...what I do with such announcements is to keep a copy of them and then circulate them [to] all my teachers, requiring their signature to ensure they are aware of the nature of these letters.”* The majority of teachers stated that they did not find these letters useful with regard to their effect

on their use of ICT. Thus, they viewed these announcements as they did any other announcements received by the school from the local authority. They explained that the announcements related to teachers' use of the new ICTs in their classrooms, but did not contain any information or guidelines on how these ICTs should be used. Participants suggested that these announcements relating to ICT integration could be acceptable if they resulted from clear policies and strategies. They confirmed that the MOE has made initiatives with regard to ICT in education by drawing up plans and providing them with programmes, but that the MOE has failed to draw up a clear policy and strategy before announcing its plans. All participants also asserted that it is not surprising that the implementation of ICT integration in the teaching and learning process has failed in many programmes introduced in the past, because no detailed implementation guidelines have been drawn from the strategies. All of them gave the King Abdullah project for educational development in 2007 as a project that was widely funded but lacked many aspects, including the absence of a strategy which included the implementation phase. H1 stated, *"When the project was announced, I anticipated I would receive more details of the strategy of the project so the programme [could be] implemented properly, but there was nothing [about] any strategies. That is the main reason [for] its failure despite the resources that were available at that time."*

#### 5.3.2.2 Training

All participants in the present theme stressed their dissatisfaction with the training provided by the Ministry of Education from different angles.

In terms of the training factor that affects teachers' use of ICT in their classrooms, all participants agreed that training is a major issue that confronts them in their ICT use. All of them stressed the importance of training, both pre- and in-service training. All teachers confirmed the clear lack of training provision, and they all also noted the lack of ICT training they had received when they were students in higher educational institutions. The majority of them confirmed that they had not undertaken any ICT course during their studies, while a few mentioned that they had undertaken weak courses on the basic ICT skills. Therefore, in terms of ICT courses on the use of ICT in the teaching and learning process, all of the teachers confirmed that they had not undertaken any courses relating to that issue when they

were students. T20 stated that, *“it is the time to train us and teachers in particular [on] the effective use of ICT for the best outcomes in the learning and teaching process.”*

With regard to in-service training, all teachers confirmed the availability of these courses. However, they claimed that there were only a few such courses and that they were not pedagogically useful, but more for basic ICT skills. They also stated that all training courses were theoretical but not practical, which made them difficult to apply for educational purposes if there was no real practice during the training. H23, *“I am not motivationally interested in attending these courses because [of] the low advantages that I may gain from [them].”*

The majority of teachers pointed out that the trainers who train teachers on the training courses lack ICT knowledge relating to pedagogical purposes since most of them are ICT basic skills trainers. They claimed that these courses were on how to use ICTs but they were not about what, when and why they should be used in education. H2 stated that, *“I attended [a] few courses on ICT skills but the course trainers did not explain anything about when and what to use [in] the teaching and learning process.”* All participants revealed that the Ministry of Education requires the LEA to introduce training courses to their teachers and inform them of the nature of any training programme, without guiding them with any implementation and evaluation steps.

The majority of teachers and head teachers also compared the training course provided by the LEA in Ar-Rass city where they teach to other training centres in other cities, such as those in the capital city and cities in the western region. They criticised the training course provided by the LEA in Ar-Rass city and claimed it was poor compared to those available in many other cities in the Kingdom. There was a collective agreement that training courses needed to be equally provided to all teachers in the Kingdom and needed to contain the same content, carefully planned by the Ministry of Education and in particular the ICT department, rather than requiring LEAs throughout the country to plan and decide on their own courses. H1 stated, *“I usually receive announcements relating to teachers’ ICT training in the training centre from the LEA informing the school about the availability of any new programme or course with [few] details included, and find attached copies from the Ministry which were sent to the LEA stating unclear and short letters in regard to teachers’ ICT training without describing what these programmes should provide for teachers in their*

*career life. They were more requirements rather than information about the advantages of these course."*

Therefore, all teachers and head teachers believed that training meant not only making courses available, but that quality and equity needed to be the top features of this aspect, to ensure that all teachers were able to use ICT in their careers.

Teachers also stated that the environment of the training course could be a factor in ICT training. They claimed that the training takes place at the training centre, which belongs to the LEA in the city, and was often during afternoons. The majority of teachers revealed that they did not feel comfortable attending such training with people they did not know and that they preferred their training to take place in the school during school hours. They justified this as the best place to motivate and encourage all teachers to learn and use ICT in their classrooms. T22 stated that, *"I do not live in the city and I commute everyday to my school and so [the] time of training after school time is one of the reasons preventing me [from] attending these courses."* H3 added that, *"there are also training courses during the daytime but the issue is that teachers usually have a session or more before or after the training time, which make teachers either cancel their attendance [on]the courses or be absent [from] their lessons."*

The majority of participants confirm that the absence of cooperation between colleagues in the schools environment. Those participants confirmed that a few teachers trained their colleagues in their spare time during the day on some basic ICT skills. However, there were only three teachers who did this, one in each of three schools, which means that two schools did not have anyone training their colleagues.

#### 5.3.2.3 Resources' availability

All the teachers who participated confirmed that a lack of ICT equipment is a major factor affecting their ICT use in their classrooms. They gave a number of examples relating to this issue, including requirements to have: computers in all classrooms, more ICT labs and resource rooms in all schools, speakers and microphones in all classrooms, a laptop for each teacher, new projectors and new computers in ICT labs. For example, T3 stated that, *"considering there is only one resources room in each school, [having a] computer in each*

*classroom is essential so teachers can use them any time they want to.” H1 supported that by indicating that, “I am sure if there was [a] computer in each classroom, most teachers would use them during their sessions.” This was supported by H3, who admitted that, “one of the biggest issues we face in our schools is the [little] equipment available in the school: I only have one IT lab and one resources room, while I have 30 teachers in the school, which makes it difficult for them to [use] ICT in their classroom for most of their sessions.”*

In terms of educational resources, the majority of teachers and head teachers confirmed that there was a lack of educational resources to support the current curricula in most schools subjects. They explained that not all subjects were provided with such resources, and they criticised the content of the available resources as not being pedagogically supported, instead only presenting the curriculum content in a soft copy rather than instruction and guidance on the best way to use them in the teaching and learning process. The majority of teachers mentioned that they had to buy related educational resources from stationery as they were more helpful than those provided by the Ministry of Education in terms of its presentation. T3 stated that, *“the Ministry attempted to change the old curriculum and they did, but they announced all subjects will benefit from technological resources to support the new reform of the curriculum but they did not provide any of these resources until now.”* H4 said, *“...we were informed that the new reform of the schools’ curricula will include the provision of electronic content for each subject but we have not received any since then..”*

They also mentioned that they had heard that the Ministry was going to design portals for the whole curricula to be accessed from anywhere, for both teachers and students; however, none of these portals have been introduced.

#### 5.3.2.4 Technical support and Maintenance

Another factor revealed by all teachers and head teachers is that related to the ICT technical support; they revealed that there is no particular technician with the experience to deal with the technical issues ICTs experience. Teachers revealed that technical issues are one of the main reasons why teachers prefer not to use ICTs in their classrooms, as technical support is very poor and it takes a long time before ICT issues are fixed and most of the time they are not. T16 stated that, *“technical support needs to be reported to the management who should then report it to the technician at the EA, who always takes [a] long time to sort the*

*issue out.” H2 confirmed that as he explained that, “my job is to report the issue to the right people at the LEA; however, their response usually takes months to deal with the reported issues.” He added that, “I sometimes do not report some issues to the LEA as they make [an] investigation with me [about] why ICTs have issues, as they usually claim these issues [have] happened because of teachers and students’ misuse..”*

All teachers and head teachers mentioned maintenance issues, explaining that ICT equipment was out of date and needed to be checked regularly. They also wanted some ICTs to be completely changed. T13 stated that, *“Many PCs in the school [have been] in the school from 2001 and most of them are not working at all, which not only affects teachers who use them but also is an issue in terms of equity for students who attend these rooms as not all of them can use these computers.”* H5 claimed that the *“LEA simply provides ICT equipment in schools and [is lacking] in the maintenance aspect which is [a] significant requirement to make sure these devices work [at] all times.”* H4 stated that, *“the big problem with the maintenance [is] that when I contact the LEA for this purpose they usually claim that it should be our job to check them regularly, which is impossible as we do not have a special department for that.”*

Teachers and their head teachers also revealed that maintenance is required not only to keep ICTs in working condition, but also for maintenance of the whole physical environment, including cleanliness, health and safety, lighting and air conditioning. The majority of teachers claimed that most of the computers were affected by dust and were not clean, which not only stops them working but also affects students’ health. T18, teaching at the oldest high school in the city pointed to the windows of his classroom, saying, *“these windows [are] in [a] very dangerous condition and out of date; these windows are 37 years old.”* H2 revealed that, *“in my school of three floors, we have only two cleaners who are responsible for the majority [of] locations [in] the school but some locations like IT labs they [cannot access] because IT teachers lock their labs.”*

## Chapter Six: Discussion

This chapter will discuss the findings presented in the previous chapter from the perspective of the main research questions of the study. The three main research questions are:

1. What are the policy makers' views about the current state of ICT in education in Saudi Arabia?
2. What are the patterns of ICT practice in education in Saudi Arabian boys' secondary schools for the teaching and learning process?
3. What are the factors that affect Saudi teachers' use of ICT in classrooms for the teaching and learning process from a personal perspective, and in terms of the Ministry's policies, and its support and management?

The evidence base for this discussion consists of: five classroom observations; interviews with 25 teachers and five head teachers; 25 student focus groups in five secondary schools; and interviews with five policy makers. The triangulation of methods and informants aims to provide sufficient qualitative evidence to address the three research questions of the study.

It is worth reminding the reader about the main problems this research hopes to address. The advancement of ICT has influenced the education system in Saudi Arabia to encourage teachers to use ICT in their teaching and learning process. However, there is no formal research or evidence on the success or failure of this integration of ICT by teachers in Saudi Arabia. The main aim of this study is to find out what is behind this issue from the ground up: utilising classroom observations, teacher interviews and student focus groups. It was also necessary to go beyond the school level and explore the current situation of ICT under the umbrella of the MOE, this included examination of ICT policies, programmes, support, accountabilities and professional development and training. Policy makers were interviewed in regard to this. Both streams of work, at policy and school, have informed each other in the process of the analysis.

At school level, it was clear from the findings that teachers rarely used ICT in their classrooms. When they did, students never were directly involved in its use, that remained under the control of the teacher (e.g. preparing and/or presenting their lesson). Despite this, all participants thought that ICT in the present was much better than it had been in the past in terms of its provision and use in the teaching and learning process. This disparity indicates that perhaps educational actors are not aware of the potential uses of ICT in the teaching and learning process.

At the policy level, the findings showed that the MOE has certainly tried to promote the use of ICT in schools and has introduced many related initiatives. However, policy makers confirmed there is not a specific ICT policy for public education. Any plans for ICT in education are inferred from the state's national plans. Without such a specific plan to measure against, it is easy to see why the participants in this study thought that there was improvement. Any evidence of ICT in the classroom would be considered an improvement in this case, even if it sits dormant on a wall. The findings also revealed problems of coordination across levels of government (mainly between MOE and LEAs) in the implementation of the initiatives and unclear allocation of responsibilities in the support offered to schools. The deficient accountabilities and the complete absence of evaluations results in a cycle of mutual blaming between education actors when inquired about the limited effects of these initiatives.

In terms of the factors affecting the level and type of use of ICT in the classroom, these are categorized in two groups: internal and external factors. The main external factors identified by the study are: the absence of ICT policy, the insufficient provision of ICT equipment, discontinuity in the maintenance of this equipment, unavailability of digital educational resources, and inadequate design of professional development and training. As internal factors, the study identified: the level of English language, concerns about teacher's responsibility for ICT damage, workload constraints, and the question of professional incentives for ICT use.

In this chapter the main themes will follow a similar sequence to the findings presentation, which are in direct relation to the aims and questions of this research. The aim is that the interpretation and discussion of the findings will be in a form of logical flow to help achieve the research aims and answer its' questions. The discussion will start with the current

situation of ICT in Saudi schools in answer to the first research question. This will be followed by a discussion on the actual use of ICT by Saudi teachers in classrooms, in answer to the second research question. The final theme is the answer to the third research question, which considers the factors affecting teachers' ICT in Saudi schools.

## **6.1 MOE ambiguity towards ICT integration**

Despite the efforts made by Saudi Arabia in promoting the access and use of ICT in education in the recent years, the interviews with policymakers show significant problems in the design and implementation of educational initiatives in this field. Firstly, these national efforts do not respond to a clear vision and strategic direction of how ICT integration will contribute to the betterment of education in the country. The absence of a national ICT policy strategy in education is the clearest example of this deficit. Secondly, there is a major implementation gap in ICT initiatives at the local level due to the lack of collaboration between LEAs and schools, particularly in teacher training. Thirdly, the low institutional capacity of national authorities to collect data and monitor the implementation of these initiatives creates a disjuncture between the ambitious aims of the interventions and the more modest changes occurring in schools. Fourthly, the weak support and the lack of financial and professional incentives for teachers to integrate ICT into the teaching and learning process is undermining the potential use of new investments in ICT. Fifthly, the lack of transparency and public accountability of these interventions and their effects implied the need for a more open conversation of the underlying factors hindering the effectiveness of these initiatives. These five ideas are developed below.

### **6.1.1 Absence of ICT Policy**

The most important issue revealed in the interviews with policy makers is that a specific policy with the national strategy to integrate ICT in education does not exist in Saudi Arabia. Instead, all ICT related initiatives are derived from the national development plans discussed in the contextual chapter of this thesis. The lack of ICT planning clarity is also confirmed by a number of other Saudi studies that also found this a major hindering factor for ICT integration in education (Oyaid, 2009; Alharbi, 2014; Alsulaimani, 2012; Albugami, 2016). So, although there have been generous government funds made available for ICT implementation in Saudi schools, the perception of policy makers is that the use of ICT is at

a very disappointing level. Although these policy makers blame teachers for not using ICT in their teaching, they also admit that clear national ICT policies and ambitions would be important to encourage teachers to use these resources. The problem here is that teachers are asked to use ICT in their teaching without any prior direction on how to do it, including guidance on how ICT could be integrated in the deployment of the national curriculum (for example, the installation of IWB without any indication on how to use it.).

This study argues that the access to ICT will not be enough to make the changes needed for their full integration into the teaching and learning process. The most important aspect here is not emphasis on whether ICT is available in classrooms but how and why that ICT can enhance teaching and learning. This study has found this to be wholly inadequate. Therefore, ICT policy that addresses this issue and offers guidelines to schools and teachers is highly necessary. This is supported by Kozma (2008), who emphasises the importance of ICT policy to include its rationale, goals and vision in terms of how ICT not only guides school stakeholders on how ICT can improve the educational process but also for the whole community. This is also in line with many studies (Webb and Vulliamy, 2006; Vallance et al., 2009; and Wozney et al., 2006) that emphasize the importance of national policy strategies and implementation guidelines for the success of these initiatives. The question of how ICT can improve the process of teaching and learning is crucial for ICT to be integrated successfully. In this study, the majority of teachers are digital users but could not make use of ICT in their classrooms, even if teachers were familiar with ICT, again highlighting the necessity for dedicated ICT policy that also offers guidance of how ICT can improve teaching and learning. The majority of interviewees claimed that most of the plans relating to educational development have been adopted from developed countries or from third-party companies without carrying out any pre-plan studies or visits to observe the current practices in schools. These are essential if a successful ICT integration plan specific to Saudi Arabia is to be developed. Such a policy should also explicitly translate this into training programmes before any related initiatives are implemented in classrooms. This is to say that in the first instance teachers need to undertake adequate and appropriate training and then this should be followed by the provision of appropriate ICT resources and the actual implementation of ICT to make the necessary difference in the teaching and learning process.

It should also include steps to ensure that all students and all teachers in all schools can equally access ICT. It must also be immune from changing political priorities to ensure the sustainability of the initiatives developed from it. Specific ICT policy, then, is one key factor towards the successful integration of ICT for the purpose of teaching and learning. Not only for teachers in schools where ICT is actually implemented but also for other stakeholders who are all required to work consistently at all levels.

This study argues that in order to understand the importance of ICT in education, it is important to understand it in the context of the broad purposes of education. These purposes are directly linked to education policies including ICT. However, the findings confirmed that Saudi education system has only a basic educational policy and no specific ICT policy. The Saudi educational policy has not been changed since its first foundation in 1970 (Qahtani (2010) and Alessa (2009). The contextual chapter shows that although the Saudi educational policy and the national plans recognise the educational purposes but they fail to address adequately the quality of education. Even though there is a body of evidence showing the importance of ICT improving the teaching and learning process, the current situation is not showing evidence of it yet in Saudi schools.

The findings confirm previous evidence from the literature in relation to the low level of ICT integration for the process of teaching and learning in Saudi Arabia from a comparative perspective (Ageel, 2011). Some of these differences clearly relate to the policy level. In countries like Finland, the implementation of ICT policies followed a sequential path of piloting, evaluation, conscientisation and scaling up (Ubiquitous Information Society, 2010). In other cases, like in Australia, the government provided clear guidance to schools and teachers on how to use the new ICT provision. The deployment of resources was monitored and evaluated against a framework that included ten domains of quality use of ICT (Learning in an online world, 2008).

The findings of this study revealed not only there is not an existing ICT policy in Saudi education but also plans and initiatives of ICT are not clear and lack guidance and involvement of stakeholders because of the lack of specified ICT strategies which should be based on ICT policy. The Ministry of Education, should carefully learn from such examples when introducing a detailed ICT policy including, its visions, aims guidance of its implementation mechanisms including the responsibility of each actor; and involve teachers

and other stakeholders in the drawing up of and planning of this policy, and any related plans and projects. It should be clear here that learning does not mean a copy/paste exercise, as the findings in this study showed that the borrowed development plans in education were not successful. They need to make a concerted and clear Saudi specific plan before drawing any policy. For example, theory of change, discussed in chapter two, is a very useful approach to think carefully what are the necessary conditions in terms of resources and support for an ICT initiative to achieve its expected aims. If they decide to, they must involve different stakeholders, including teachers. Theory of change does not necessarily work for just policies, but it can be applied to many other areas, such as in-work training in other sectors, where a particular change is desired through particular means.

The findings of this study revealed a lack of MOE support, including access to ICT and ICT provision, teachers' ICT skills and teachers training. However, without clear ICT policy, such issues are difficult to address. This is in line with the ICC Commission on the Digital Economy (2017) that recommends a number of considerations to be taken into account in ICT policies. One of the most important recommendations is that ICT skills are required for teachers to use ICT in an effective way.

### **6.1.2 The uncertainty of stakeholders' roles**

It was clear from the findings of this study that each stakeholder (policy makers from the Ministry of Education, and from local education authority) puts the blame on each other for the failure of ICT implementation in practice. For example, MOE emphasised that their role is to provide support (financial support, provision of equipment, plans and strategies) to LEAs and they are responsible to enact and translate that to each school in their region – a similar view came from teachers and their head teachers. This indicates the lack of stakeholders' responsibility and accountability in ICT in education which is necessary to make change in classrooms effectively. This view is supported by Hargreaves and Shirley (2009), who argue that in order to bring change to education, responsibility and accountability are necessary. Where the former leads to the later. For this to happen, it is important that all stakeholders are involved in any ICT policy and planning, and get involved in any ICT initiatives so they can be familiar and knowledgeable with any ICT interventions before any implementation takes place. This is especially true when considering the findings of this study, that teachers and their students have never been involved in any ICT

consultation, but also have had no idea of any initiative until its implementation. This was also confirmed from the interviewees from the LEA.

This is a good justification of the necessity of a specific ICT policy, which can address such issues and include each actor. This echoes Twining (2007) who emphasised that the implementation of ICT policy could be easier if school stakeholders are recognised and guided in the policy itself, but of course only if the policy is clear in order for those stakeholders to understand it. Therefore, all stakeholders' roles would remain elusive if there were no clear policies they can rely on. Without a clear ICT policy, it is difficult for each stakeholder to know what they are responsible for because the findings also found that there is no relation between the ICT department in the MOE and the LEA.

### **6.1.3 No relation between the ICT department in the MOE and LEAs**

Every LEA may have different professional development programmes, including ICT. However, they cannot do these without relevant initiatives from the MOE. This is a good example of why many ICT projects have failed.

The interpretation of the findings found one possible reason why ICT is at a very low level and not reflecting the MOE related initiatives. This issue is related to the disparity or disconnection between the department of ICT in the MOE and LEAs. These departments are regarded as a leading department of ICT implementation in schools. This is why, as the findings revealed, much dodging and many excuses among administrative authorities and teachers exist. Again, this issue is mainly related to the lack of ICT policy: it would be less likely to occur if there was a policy to organise and guide the enhancement (or even direct cooperation) of ICT within educational development. This is supported by Tearle (2004) who claims that if ICT integration is to be successful it needs an integrated plan of different phases from the institutional body to the level of schools: formulate, implement and evaluate. So, involvements of all stakeholders, including teachers are necessary in any ICT policy and its plans (Almengash, 2006). However, as discussed above, the findings in this study found that teachers are not involved in any planning and they are not even aware of any. It is worth mentioning that with this disconnection between ICT departments themselves has led to the failure of some ICT initiatives.

The fact that LEAs have their own specific teacher training programmes in ICT, based on directions from the MOE, is encouraging. Teachers seem resistant to change as most of them still depend on the traditional methods in their classrooms so this initiative that was set up by the MOE could be quite useful. It is one way to improve education throughout the country, creating competition between LEAs and thus encouraging improvements. However, since LEAs are under the authority of the MOE and that LEAs cannot implement decisions without the permission from the MOE, their hands are tied and this initiative is likely to fail because the ICT policy that needs to underpin the LEAs attempts are absent, leaving each to proceed in the dark.

#### **6.1.4 Policy, planning and evaluation**

The findings of this study revealed that many ICT initiatives for educational purposes often have failed in Saudi Arabia, as already stated by Al-Thagafi (2008). This could be because those initiatives were not implemented correctly in practice, which leads to its inevitable failure as the findings of this study revealed. Since this study found there was a lack of teachers' knowledge of how to use ICT for pedagogical purposes (discussed later in more detail) this could be one reason why those projects failed. For example PM4 admitted that *"teachers could do nothing with it as they do not know how to use it, some teachers do not even have the basic skill on ICT use."* So, training teachers to gain knowledge types suggested, for example in the TPACK framework, is critical in order for them to be able to use ICT in the process of teaching and learning. However, the above mentioned indicates that this is a policy driven issue as argued in most of the aspects discussed in this chapter. A clear ICT policy is a very significant factor towards the successful integration of ICT in the process of teaching and learning (Alaqueel, 2005; Oyid 2009; and Webb and Vulliamy (2006).

One of the issues relating to better ICT policy making is evaluation. The findings gave an example of one laptop per student and teacher as one of King Abdullah's project and cite different evaluated reasons for the failure, such as the project piloting did not involve all schools – which seems to indicate a misunderstanding of the process of a pilot project. This is in contrast to the example of the Finnish ICT plan. Their plan started with a pilot project in 20 schools and included thorough evaluation against a concrete ICT strategic policy. So, this indicates the failure of one laptop per student and teacher project is not because its implementation was limited to a small number of schools but rather the lack of evaluation

of the project outcome. This is one of the significant requirements if ICT is to be appropriately implemented for the purpose of educational practice, as suggested by many authors (Alenezi, 2015 and Lee et al., 2014). This is consistent with findings of a relevant study conducted by Sulaimani (2010). Such evaluation should be linked directly to a specific ICT policy reform effort, as suggested by Tearle (2004).

This implies that this is a policy related issue because evaluation needs a policy framework to provide the assessment criteria, which is supported by Tearle (2004), in the Australian ICT framework example. So, it is not surprising the King Abdullah project failed – in fact it is surprising that any project could succeed. It is hardly a surprise that this study found an absence of evaluation of the state of ICT integration in schools when taking into account the disconnection between the MOE and its different stakeholders in the schools and other MOE related departments. Responsibility and accountability were hard to ascertain, which is never going to lead to any kind of successful evaluation. This is to say, that in order for any kind of evaluation support to take place, ICT policy needs to explicitly include the evaluation process in its documentation, including guidance, identifying the responsible actors/departments and a mechanism to learn from previous successes and failures in the design and implementation of initiatives derived from that policy. The absence of focused evaluation seems to be a major contributor to the failure of the MOE initiatives to date. The lack of clarity, lack of detail and lack of guidelines in the circular announcements the MOE distributes to teachers contributes towards the failure and slowness of ICT integration in schools.

Furthermore, given the fact that there is significant advancement of ICT use by teachers and students in their daily life, it is necessary to hear their voices in order to ensure they are satisfied with the integration of ICT in the educational process. This could be an approach in evaluating the actual state of ICT in real practice because it comes from the actual practitioners, which can inform any further relevant initiative with examples of real experiences and practice. At present there is a situation where initiatives are derived from a broad goal, money is spent on the ‘next best thing’ and then forgotten about. There is a lack of due diligence towards these expensive implementations. When it fails a culture of blame prevails and looks for a reason without any in depth analysis, with teachers feeling that most. This is caused either by a lack of transparency or by a systemic failure from the top. This cycle of spending, failing and blaming can only be broken by transparent, blameless, policy

evaluation. Successes and failures should inform the design and implementation of future initiatives, evolving a coherent, well thought out, suite of best practices for ICT integration. For example: To have extremely expensive IWBs hanging unused on the walls should be sounding alarm bells, and the failure of their implementation should be informing future initiatives, and yet no data appears to exist. An investment wasted, an initiative wasted, students and teachers confused and no lesson learnt for the future.

### **6.1.5 Support and Training**

Although the findings showed that training is under the responsibility of the MOE who require LEAs to conduct any training programmes and ensure those are implemented in their regions, the findings also confirmed that there was a lack of ICT training from the Ministry of education. This is the same results of other local studies (Oyaid, 2009; Alharbi, 2014; Almulhim, 2014; Alsahli, 2012) who confirm the shortage of ICT training opportunities. Policy makers at the Ministry of education were concerned about the quality and quantity of the training that the LEAs were providing, citing that it was mostly theory based rather than practical. Indeed this study discovered concern about the quality of ICT trainers, revealing that they are not well qualified to lead training. (This is supported by Alsulaimani (2012) who found trainers lacked knowledge of ICT.) There was little mention of how the MOE would meet their responsibility to improve this situation.

The study found that the responsibility for delivering training in schools has fallen to teachers working in ICT resource centres. They have little experience with ICT and that training is optional and often has a poor attendance. This is hardly surprising as the training is often out of traditional working hours and offers no perceivable benefit to teachers unless they are personally interested in ICT. In fact, it is seen as an additional workload. Professional incentives for teachers to adopt ICT would definitely help in this regard. In the present research, professional incentives on some of the reported factors did serve as incentives, but also in some cases, barriers to successful ICT integration. This will be discussed in more detail in section three of this chapter.

It was also mentioned in the findings that some teachers felt that head teachers deliberately did not request new resources in order to avoid any accountability issues. This is

understandable in a culture of blame where the process of maintenance is cumbersome and there is a lack of professional incentives to integrate ICT.

The findings showed that any training opportunities in schools are limited because they are conducted in the ICT resource centres, which are one per school. Booking in training sessions is difficult, as this resource is in constant use. This research found the training environment was an issue of ICT training, and hence, a dedicated training room would be an ideal solution.

It is clear then that the present situation needs careful consideration on the training quality provided to teachers. A significant start towards this would be to improve the training courses provided to those in teacher training courses at universities, ensuring that ICT integration is a core area of study. This would require the MOE to collaborate with the universities to ensure a consistent and coherent reflection of the technological pedagogical process and knowledge they will need to effectively integrate ICT in the teaching and learning process. As these new teachers take up their jobs in schools, it will have a knock on effect as they will shift the culture towards ICT integration, they will be more likely to offer in service training to older teachers. The MOE therefore needs to ensure that they appoint highly qualified trainers who can provide the necessary quality to these training programmes.

Well trained teachers and staff can facilitate the process of teaching and learning as discussed in the TPACK framework and can help teachers integrating ICT effectively in the educational process. This is especially true when bearing in mind the confidence of participating teachers in this study was not a hindering factor to the use of ICT in their teaching though they believed confidence is one of the issues could face teachers in regard to the use of ICT in classrooms. Interestingly, although the majority of teachers did not use ICT in classrooms, they confirmed they do not have a confidence issue in using ICT. However, their primary request is to receive training on how ICT should be used to improve the process of teaching and learning. As mentioned before, teachers in this study believe in the advantages that ICT offers for education. However, when bearing in mind their lack of knowledge of ICT integration in the educational process, their positive confidence towards the use of ICT may be is a result of a digital world which may minimise the issue of teachers' confidence in using ICT in schools. Especially when taking into account the responses of teachers who confirmed their use of ICT in their daily life such as using smartphone, iPad

and computers. This disparity between competent use of ICT in their daily lives not being translated into teachers using ICT in the educational process could be caused by the nature of that ICT use. The devices used at home provide guidance on their use, offer internet access and are designed to be user friendly and easy to use. This sort of guidance is not present in the training programmes revealed by this study. The limited and poor guidance provided in these training programmes on how to use ICT effectively in the classroom could be a possible cause for the poor use of ICT by teachers in the classroom. Also, the ICT used in a teacher's daily life is designed to guide, whereas, using ICT in the classroom requires a teacher to be content creators – this is a skill that needs proper training.

Another significant way to improve the quality of training is to involve teachers in the planning process for such training. It is very important to hear from teachers and discuss with them what they really need in their training programmes in order to improve the quality and pedagogical approach of training.

## **6.2 Lack of teachers' ICT use in classroom**

According to the findings of this study, in general, it can be said the use of ICT by teachers in classroom for the process of teaching and learning is still low despite ICT initiatives provided by the MOE. The situation is consistent with Saudi studies presented in chapter two and three, and similar to Mulhim (2014) who argues that despite the intensive attention regarding the integration of ICT in schools by introducing many initiatives, a significant number of studies in KSA have revealed there is still a lack of ICT use in the classroom. Other Saudi studies supporting this finding include: Alreem (2008); Alotaibi (2011); Alghamdi (2008); and Mulhim (2013).

Two main types of ICT use are discussed in the literature: ICT as a tool and ICT as method (Wasson and Hansen, 2014; Gager and Lokman, 1999). The former refers to using ICT as an assistant tool in teachers' teaching and; while the second type means using ICT as an integral method for the educational process. Since observation methods allowed me to record what I saw and to note any incident that was relevant, I was able to compare the difference in the use of ICT by teachers between the time when the observations took place and the time when I was myself as a student or later as a teacher in similar context. So, the findings from the classroom observation of the current study showed that the use of ICT, in general,

by teachers is greater than in the past, at least based on my experience and the sample in this study. This was evident in other relevant studies such as that conducted by Oyaid (2009) who found better use and provision of ICT if comparing to the situation to the preceding years. Evidence from the results obtained from policy makers have confirmed that, as PM3 commented: *“Our department now works more for the whole educational process than [it did in] the past, when the work was around administration and the IT subjects in schools.”*

However, the observable uses were mainly based on ICT as a tool approach, which is also confirmed by students. Interestingly, all attitudes of all participants, including teachers were extremely positive towards the advantages of ICT in teaching and learning. There was greater engagement of students and motivation was higher. However, using ICT as a method was not quite the case, as the current study found, based on the data collected from participants in schools. The findings revealed the ICT users view that these advantages go beyond ICT as a tool but also as a method to facilitate the process of teaching and learning including the employment of other teaching methods different to traditional ones. On the other hand, non-ICT users although they agreed on the advantages of ICT for teaching and learning, they did not see its importance as a method for the process of teaching and learning. This was largely subject specific; it is more obvious for how ICT can benefit some subjects over others. Some teachers struggled to understand how their particular subject could benefit from ICT as in the example cited of the Quran teachers. This was largely a symptom of a lack of exposure to new ideas and training.

It was observed that training courses are available, but these courses are few and far between, and not particularly pedagogically useful. If training programmes are to be useful then they need to meet the need of the teacher and the subject that that teacher teaches.

Surprisingly, although the overall use of ICT is low the few teachers that do use ICT, use it intensively during the whole class. Moreover, teachers and students in these classes confirmed teachers use ICT in all of their lessons attributing that to the availability of ICT in their special classrooms. This is also down to those teachers fully embracing ICT and self-training in its use. There is then, some improvement over the past despite the current informal policy of throwing ICT at classrooms and hoping for the best.

It is important to comment here that while the literature, for example Sumalatha & Ramakrishnaiah, (2007) argues that the important aspect is not the quantity of ICT in classrooms but rather of how that ICT can be used to make change in the process of teaching and learning, but quantity of ICT resource can help. The findings of this study confirmed this, as teachers who used ICT did not teach in the normal classrooms but rather their lessons took place in special ICT equipped rooms. The issue of this matter is discussed in section three on this chapter. Moreover, teachers in those special rooms used ICT most of the lessons. Although IWBs were fitted in most classrooms, few computers were available to support the data projectors. What computers there are, are used for teachers and the IWBs hang uselessly on the wall. Both indications were confirmed in the interviews with teachers who explained they do not use ICT at all because the adequate ICT provision is not available, with a few others confirming they rarely bring their laptops to connect them to the available ICT to use them. This was clear when all teachers reported that they are happy to use ICT if they are available, and they confirmed that they have an interest in using LRC in their schools where ICT is provided. However, these rooms were not always available and subject to advance booking.

### **6.2.1 Pedagogy**

In terms of pedagogies practiced in classrooms, the majority of observed classrooms followed a teacher-centred pedagogy. The control of most of the lessons was taken by teachers where students were only receiving the knowledge transformed by teachers. It was as Schweisfurth (2013, p. 10) pictures it, as "...a teacher pouring knowledge into the empty vessel of the learner." Therefore, students who were taught through this approach, were passive throughout the sessions and only permitted to participate when the teacher asked questions without having the opportunity to work with others or even with themselves (Muir-Herzig, 2004, and Ahmed, 2013).

Students in classes taught by teachers who did not use ICTs were rarely asked questions. Additionally, they never worked together in any area throughout the session. However, in line with the focus of this thesis, the discussion will be limited to teaching methods with the use of ICT (i.e. teaching methods employed by teachers who used ICT).

As Ertmer & Ottenbreit-Leftwich (2010) and Harris et al., (2009) argue teachers use ICT mainly for transmitting the information to learners rather than facilitating their construction of knowledge. The findings of this study echoes that and showed the majority of those teachers who use ICT as a tool, where they displayed the content of their taught subjects using ICTs such as projectors and IWBs. They controlled the class by explaining and describing what was being displayed to their students. This confirms findings from other studies for Saudi Arabia (Al-assem, 2001; Al-ashrafi, 2004; Al-jlad, 2007).

All of those teachers, i.e. ICT users as a tool claimed that ‘hard’ materials do not encourage and support ICTs to be used, and so they rarely referred to them. However, although these classes were teacher centred, students told how that they are more excited when ICT is used in classrooms, and they were seen to be clearly more engaged and active than classes with teachers who did not use ICT. According to Peter (2010) excitement is one motive of why ICT is used in the educational process, however, the author links this feature to the improvement of learning.

Only a few teachers from those that used ICT made their classes more student-centred. Students in these classes were observed exchanging their knowledge and worked in groups and, while teachers encourage them to do so by displaying what they taught on the IWBs and allowed leaders of each group to explain the outcome of their groups in front of their classmates. Similar to (Ceirniak et al., 2011) only two or three students were allowed access to computers for planning the process of teaching and learning. However, interestingly, teachers during the interviews confirmed all students are equally permitted to be involved in this in other sessions. In line with Mckenna (2013) about the meaning of students centred approach, this indicates that student centred approach offered equal access to ICT and involvement in the process of teaching and learning as their teachers value their role in this process, which is in contrast to students in other classes where ICT was employed in a teacher-centred pedagogy.

As DeCorte (1990) advocates the need for blending and balancing both the use of instruction, teacher-centred education, and construction, student-centred education, approaches when employing ICT in classrooms. So teachers need to be ready for both approaches and decide which one is more appropriate for their teaching at any given time. However, only teachers who have the required knowledge of ICT integration in the educational process can decide

which pedagogy is appropriate for students learning at a given point, and use ICT to support it.

The observed classes where student centred learning was the employed approach showed more effectiveness and collaboration than those with teacher-centred classrooms. This is to say; the use of ICT can offer result in positive learning in both pedagogies with more effectiveness showed with the student-centred classrooms. This is in accordance to UNESCO (2002) that the role of ICT is not only its ability to make changes in a student's learning but also is vital in changing the role of their teachers and their teaching approach in the classroom. However, teachers need to be ready for both pedagogies as discussed above.

All users and non-users of ICT revealed their interest in employing teaching methods where students are more engaged during the teaching and learning process, but there are several factors preventing them from doing that: large number of students; small classrooms; time of the session; workload, lack of professional development; and intensive curriculum contents. These factors seem not only to prevent them from employing different teaching methods than the traditional approach, but also from using ICT in their classrooms. This is because the findings revealed that the majority of teachers asked their students to use ICT for doing some research and prepare for their next sessions to construct their own knowledge. Although students are in favour of using ICT for learning, their engagement was very little. That could be why they showed negativity towards teachers who excluded them from ICT access. Students confirmed using ICT, such as smart phones and iPads out of school, (although there were some potential inequalities in ICT accessibility out of school) and it seems that they would prefer to use ICT in their schools not because it is attractive for them but because they are familiar with ICT and know that it can help improve their learning. Teachers generally fail to ask students about their current ICT knowledge out of school. This is a rich area of learning: skills that students already possess can be utilised to enrich their learning experience, increasing their motivation. Also, just being allowed to use expensive ICT equipment indicates a level of trust that the students would appreciate, encouraging them to feel confident to contribute.

From the discussion above, despite the small number of teachers who do use ICT for the educational process, it was clear that the use of ICT in some cases created more active and effective learning as students were more engaged and active by constructing and sharing

their knowledge, working collaboratively, and interacting with their teachers and fellow students (Ertmer et al, 2012; VanMerriënboer and Brand-Gruwel, 2005; Ahmed, 2013). The successes of these approaches would be an ideal area for further research in order to construct a specific ICT policy

### **6.2.2 Teachers' development**

It is well-accepted by the specialised literature in the field (Celik & Yesilyurt, 2013; Tezci, 2009; Cennamo et al., 2010) that ICT of itself will do nothing, but requires the intervention of teachers as the key operators or implementers for ICT integration in the teaching and learning process. The feature of the current research is its consideration of teachers and their use of ICT. Unlike many studies, that have considered learning without teaching, this thesis argues that learning can be effective when teachers understand how to use the ICT that is introduced in schools, because teachers are pivotal to the educational process (Hargreaves, 2016). So, having understood from the findings of this study that teachers' ICT use is still low and that most teachers do not use ICT despite their positive attitude towards the use of ICT (Cox et al., 2003), it is important now to discuss teachers' need to integrate ICT more effectively.

In this section, the discussion will be for teachers' knowledge base that they need if ICT to be integrated more effectively. The findings of this study revealed a lack of professional training programmes as one main reason behind the poor use of ICT in schools, and that all ICT training is about ICT basic skills. However, in accordance with literature, such as Altoderi (2005), for ICT to be integrated in the teaching and learning environment effectively, other teachers need to know how ICT can be effective for teaching and learning. This indicates that such knowledge is missing in ICT training for teachers in Saudi Arabia, this is another important reasons behind the low level of ICT use in the observable classrooms. Similar to Alsahli (2012), this indicates that teachers lack knowledge of how ICT is integrated in the process of teaching and learning, as successful ICT integration does not only require ICT skills but also teachers need to understand how ICT can make change in the process in teaching and learning. Regardless, the lack of ICT training for Saudi teachers is a concern as that training is ICT basic skills based only. According to Mishra and Koehler (2006), teachers are no longer required to simply learn how to use technologies but rather need to develop their technology knowledge and skills alongside relating that to their

appropriate knowledge in pedagogy and their subject. So ICT professional training is necessary in training teachers in this regard, especially when bearing in mind that the findings of this study shows poor training. To understand this in detail, the TPACK framework (Mishra & Koehler, 2006) is adopted here to discuss the important kinds of knowledge that teachers are required to have in order to successfully integrate ICT in their teaching. What is interesting in this framework is that it also guides the training towards the appropriate programmes for training (and teachers' professional development) to acquire the appropriate knowledge to help them effectively integrate ICT within classrooms (Denise et al., 2009).

In training programmes, teachers need to acquire technological skills but also other kinds of knowledge. So, teachers need to acquire knowledge in pedagogy and knowledge in content. They need to understand all of these types and ultimately they are required to have an integrated knowledge of all of this knowledge, which has been called the TPACK framework: Technological Pedagogical and Content Knowledge (Mishra & Koehler, 2009). The integrated knowledge helps teachers to use the appropriate technology for the appropriate content of their teaching of subjects with the employment of the appropriate pedagogy. However, findings from this study revealed that their teaching curricula do not motivate them to use ICT and that they are required to finish all units of their subjects which are too much. In this study, the poor training is the main determinant of the low level of TPACK that teachers have had since all training was on ICT skills and dominant by theory.

There are different factors that need to be taken into account to promote training of such types. For example, two teachers teaching the same subject (Quran) with a split view towards ICT in their teaching with one view being that it is appropriate; while the other sees it as to not make a difference. Another two teachers also viewed ICT as not being helpful for their subject, but it can help other subjects. This suggests that educational change is needed to reform the curricula content so ICT can be employed in their subjects. However, this is not to say all subjects' content cannot be taught with ICT but rather teachers' knowledge of their subject content is very important.

What is interesting here is that in all of these classrooms, there were no computers for students but only for teachers. When students were allowed access to computers they enjoyed working with their teachers and fellow students. This confirms the claim that the

important issue is how ICT is used more than its extensive provision. This is in line with the literature.

So, it is very important for professional training to promote TPACK among teachers by providing them training in ICT skills. Training them on different methods of teaching with or without ICT. Training them on their subjects and most importantly training them on the integration of all of these areas in order to not only use ICT technically right, but to understand the best teaching methods that are appropriate with the use of ICT for any particular content of subject.

### **6.3 Factors affecting teachers' ICT use in classroom**

#### **6.3.1 Personal: Motivation, confidence, reward and recognition**

One of the most important personal factors is that teachers in this study were not happy for being ignorant of any motivation, including reward and recognition. This view is confirmed by Hennessey et al. (2005) who found motivation as one factor in their review of ICT related research. This issue was recognised by some policy makers and also schools head teachers as one of them revealed he motivated productive teachers with less teaching hours, echoing the teachers' perception that they lacked time to learn ICT. This is because according to the study conducted by (Cox et al., 2003) who revealed that teachers who have been motivated to use ICT were successfully able to accept change and teach with ICT. The study found that lack of motivation was one reason for their lack of enthusiasm and interest in attending optional training provided in their region. It should also be noted here that most current ICT software is primarily in English and this is a considerable barrier to teacher self-learning and makes the development of specific training programs a necessity.

Reward and recognition are important factors for teachers in using ICT in their classrooms and is recognised in literature, such as Becta (2009); Ministry of information and communication technology in Jordan (2012), and Alzaida (2008).

Generally speaking, the issue of teachers' financial salaries is a government related problem because teachers are the only government workers who cannot be promoted or upgraded. Therefore, this issue needs to be raised with the MOE if teachers are to be recognised. This is important when bearing in mind that the reputation of the teaching profession has not

recently been recognised as the same as in the past, which not only puts teachers under pressure but also affects their confidence and ultimately their teaching.

The strategies above rely on extrinsic motivation by offering conditions or rewards to influence teachers, but some of the strategies discussed below may appeal to teachers' intrinsic motivation to use ICT in the classroom and prepare themselves professionally to do so.

### **6.3.2 Awareness**

In accordance with Mishra & Koehler (2006); Okojie et al. (2006) and John & Sutherland (2005), the findings of this study revealed that teachers' awareness in regard to the educational policy itself, and ICT initiatives and how ICT can be employed effectively is absent. This is because teachers are neither involved in planning any ICT initiatives nor provided with guidelines they can refer to in any implementation of these plans. Instead they receive announcements that focus on an overview without any guidelines for implementation. The involvement of teachers in ICT policy or any related plan is important as they are the official implementer of those in practice and their experiences would raise issues that policy makers might not be aware of. It may also facilitate their motivation by making them feel like valued stakeholders whose needs are understood. In addition, teachers' awareness of how ICT can be effective in their teaching can be dealt with in offering those teachers professional training programmes that involve teaching strategies for both with and without the use of ICT.

Family commitment is also among the factor that prevent them from attending ICT training out of school hours to learn how to use ICT in educational purposes. Teachers with more use of ICT seem to managing their time and self-learn the use of ICT, suggesting intrinsic motivation. However, considering the range of needs and motivations among teachers, teachers should be trained during the school' hours as this not only motivates them to attend the ICT training but also influences their ICT use in the classroom.

### 6.3.3 School management support

Another reason found as an internal factor affecting teachers use of ICT in the current study is related to the support from the school management. Teachers confirmed that their head teachers are motivating them to use ICT but that to take place in the LRC. This is because, as head teachers confirmed, there is poor provision of ICT in classrooms. However, the majority of teachers claimed that, when considering ICT as an advantage for the whole learning and teaching process, head teachers needed to request enough resources that could be equally used for all teachers and students. So, they blamed head teachers for not requesting the provision of ICT from LEA as head teacher are the link between teachers and LEA. In contrast, head teachers claimed that the reason behind this issue that LEA does not always respond to their requests. Based on head teachers' justification on their control of ICT situation in their schools, this contradicts the MOE authorisation to head teachers in being the direct supervisors for the educational process and their schools and being the first and direct body in communication with LEA as stated in the literature by King Khaled University (2014). So, this means, as discussed in section one of this chapter, the uncertainty of stakeholders' roles creates conflict and space for shifting accountabilities. Equally, it could be because head teachers prefer avoiding accountability for any ICT issues in requesting the necessary resources.

In accordance to the Saudi study conducted by Alshowaye (2002), teachers in this study revealed that priority from school management hindered teachers from using ICT as teachers are assigned for administrative jobs with the use of that ICT. This is because teachers revealed that school management prioritise the administrative while paying less attention to ICT for education.

Consequently, this priority seems to affect teachers' workloads because they were not only teaching but also doing administration tasks that are not part of their jobs. Findings revealed that workload is another factor to affect teachers' ICT use, echoing Becta (2009), Jones (2004), Ertmer et al. (1999) and Rogers (2000) who found that teachers need more time in order to prepare lessons that apply ICT in the education process. Those teachers revealed they are affected by the workload and other tasks that they are not responsible for; these tasks in school are related to the responsibility of school management. It is as Mumtaz (2000)

and Pelgrum (2001) suggest that allocation of extra classes impedes on a teachers professional development.

It is important to note here, this means that the lack of time prevents teachers both from using ICT and attending ICT training programmes (with one obviously affecting the other). This finding is in accordance with Pelgrum (2001); Lawless & Pellegrino (2007); Ministry of information and communication technology in Jordan (2012); Becta (2009) and Holden et al. (2008). So, this is to say without prioritising ICT use among the school management, reducing teachers' workloads and allowing adequate time for teachers to use and learn ICT, it is unlikely for teachers to use or sustain their use of ICT in their teaching.

The majority of teachers placed a great importance on the school management of ICT to be successfully implemented in their schools. The education system presented in the literature by King Khaled University (2014) describes school management in Saudi Arabia as the direct link between teachers and the LEA, and that head teachers are responsible to ensure the educational process is appropriate, and that any regulations and rules that come from the LEA are applied and implemented, including the educational policies and its related plans and programmes. This is not to deny the pressures on headteachers and the difficulties in fulfilling all the roles demanded of schools, with limited resources. It is a question of allocating resources effectively to balance the need for teachers' time, the school and Ministry's administrative demands, and, of course, ICT resources.

#### **6.3.4 External factors: ICT resources provision**

Another group of factors affecting teachers' use of ICT in classrooms were those related to externally-driven resource factors. The findings of this study revealed surprising results in terms of ICT availability in the visited schools. Generally speaking, lack of ICT provision was a major hindering factor stated to be affecting teachers' ICT use in this study. This is in line of other studies such as Dakich et al. (2008); Alshowaye (2002); Almohaisen (2003); who also found this lack of ICT provision as hindering factors affecting teachers use of ICT. These issues include a number of issues related to this topic for example: providing computers in all classrooms, a laptop per teacher, new projectors and new computers in IT labs. The latter was surprising because as stated before IT labs are only used by ICT subjects' teachers, so while no ICT teachers took part in this study, it was surprising that teachers were

concerned for rooms they do not teach in. This gives an indication that those teachers made comments on the environment of these labs because of the importance of the overall educational environment. This is important for the use of ICT and consequently important for students learning.

The issue of ICT resource provision in this study also includes software and educational resources, which is in accordance with the findings of Alsaif (2006) and Wasserman & Millgram (2005) on the importance of the availability of educational resources. Teachers were concerned why subject specific digital resources are only available for English teachers. This is one example that confirms that curriculum reform is needed in Saudi schools because the digital resources associated with particular curricular subjects were effectively identical to the printed versions and therefore added little value. So, the education development plans need to be related to all the issues together, i.e. ICT and curriculum, if ICT is to be integrated in all subjects as promised by MOE ICT initiatives.

The finding in this study revealed that teachers argue that do not use ICT because their current subject content is not appropriate for the use of ICT. Similar to Alobaid (2002) and Alsaif (2006), another related issue is most of the language of the software available on the market is in English, whilst most teachers are not English speakers. This was revealed as a hindering factor and a barrier for them to try out software for their subjects. Where Arabic resources were available they did not add anything extra to the content of the hard material.

It was confirmed by all participants that one reason behind the poor use of ICT is the poor provision of ICT resources in schools. Adding that without an adequate presence of ICT in good condition then ICT cannot be used. As discussed before, this was clear from the classroom observations, as computers were not available in all normal classrooms despite data projectors and IWB being available in these classes. These devices cannot work without computers being linked to them, so this is a good example of poor planning. As discussed before, head teachers directly influence this issue, as it is their responsibility to report such issues to the LEA once teachers have raised them. Consequently, the MOE need to ensure the provision of all necessary ICT resources to the schools if ICT initiatives are really to be implemented successfully. It does not matter how well trained a teacher is in using ICT, if there is not a clear strategy for dealing with faulty equipment then ICT cannot be used for teaching and learning.

This is important when some teachers in this study revealed they brought their own laptops to classrooms when they felt ICT would make a difference in the process of teaching and learning, which indicates their willingness to integrate ICT. Clearly then, they are being hindered from doing so, such as this issue as well as other issues revealed in this study.

### **6.3.5 Technical support and maintenance**

In terms of technical support and maintenance, it is similar to the ICT provision issue where ICT was noticed during the classroom observations as well as in the interviews with participants. So, lack of technical support and maintenance was one of the significant issues hindering teachers from using ICT, which is in line with Almosa (2002) and Waite (2004). Findings revealed many computers and projectors are out-dated and not working. With regard to the IWBs mentioned above, teachers and students revealed that these devices have never been checked or fixed. This makes the situation worse, contributing to slow implementation of ICT integration in classrooms and increasing the chance for failure.

To sustain the good condition of ICT resources in order to help their use by stakeholders in schools, a maintenance team should be available to every school because the findings of the study revealed that such issues are dealt with by a team from the LEA. They are not always able to respond to school requests as head teachers claimed in this study. This is significant when taking into account that LEAs have up to 300 schools to supervise throughout their areas, and there is only one maintenance team available to deal with the technical and maintenance issues in all of these school. It is impossible for this team to visit the all of the schools under their jurisdictions even just once a year, and especially in Saudi Arabia, which is a very large country: the 13<sup>th</sup> largest country in the world. So, the best and most effective solution for this is to assign one technical specialist in every school or at least two technical specialists per every 10 schools. Anecdotally it has been reported that some head teachers are willing to self-fund their own technical staff to deal with repairs. This appears to be backed up by some management staff reporting in this study that administration offices were completely different to the rest of the school environment as ICT was kept working by their own funds.

### 6.3.6 Attitudes

It is important to note that teachers' attitudes were not explicitly among the hindering factors in this study, though their use of ICT is still low. This is in accordance to the finding of Ng and Gunstone's (2003) study. This of course assumes that their self-reporting of the issues reflects their real views – it is noteworthy that a small number of teachers were able to overcome the barriers and deficits and use ICT in engaging ways, suggesting that a range of attitudes exists among the teachers. It seems that the use of ICT in teachers' everyday experience including their ICT use for educational purposes at home is one reason behind their positive attitude. The only cultural issue found in this study was a language related issue. Teachers were concerned that most of the educational resources and software are in English, which make it difficult for them to learn as most of the teachers do not speak English. Most software, and the help for that software is presented in English. Without some proactive action by the MOE, ICT use in the classroom will remain poor. This is a major barrier, as teachers will naturally choose not to use ICT unless the MOE spends the resources needed to translate everything that is needed into Arabic.

The findings of this study revealed that religion was not among the hindering factors affecting the use of ICT. This is against the findings from Alreem (2008) where religion was found as a hindering factor affected teachers' ICT use in school. However, this is possibly because a decade later teachers are aware that Islam urges to teach a quality education to learners. However, religion might possibly be one reason why traditional method of teaching is prominent in Saudi schools is because it may be still influenced by (*katatib*) education system, the old education system for teaching students before the kingdom was united (as mentioned in the context chapter). Learners mainly learnt religious subjects, which is based on memorisation, which underpins the traditional pedagogy. So, although teachers did not state this as a cultural issue, their traditional teaching is a cultural issue and not related to Islam. If some teachers do attribute their actions to religious directions, they may misunderstand the conceptions or directions of education in Islam (Sulaimani, 2010).

The literature shows that the Saudi education system is mainly based on Islamic Law (Sharia) and the country's whole culture in every aspect is based on that. It could be that there is misunderstanding of some people about Islam religion, and particularly in Saudi Arabia as the country where the two most holy mosques are based. For this reason, the

government in Saudi Arabia has clarified to the public in Saudi and the World that many issues thought to be Islam related, are rather social culture related issue that misunderstand Islam in some aspects especially in education and women. An example is the ban on women driving, which will be allowed from July 2018. Moreover, the Crown Prince Mohammad bin Salman at the end of 2017, said that Saudi Arabia will revert to, where we were before, “moderate Islam”, open to and respect all religions, values and cultures. What he means here is that there are some limitations in Saudi Arabia that are allegedly linked to Islamic rules and that are not true in the true Islam. In 60 minutes TV programme on March 2018, he explicitly demonstrated his moderate Islam’ claim by pointing out that 50 years ago, Saudi people did not ban women driving or the unveiling of their faces, but he claims that since then the Saudi educational curricula were rigidly controlled by the Muslim brotherhood and their thought. The prince as a result promised the current curricula will take a massive reform to abolish their thoughts which are now deemed not to be related to Islam at all.

One of the means to improving the quality of education in line with true Islamic thought is ICT. The whole Saudi educational development plan, during the last two decades, has attempted to implement the integration of ICT in the process of teaching and learning. Regardless of the success or failure of these attempts, the findings of this study confirmed other studies that did not find the culture as a hindering factor affecting the use of ICT in schools. Rather on the contrary, culture was found as an influencing factor of teachers’ use of ICT in the observable classrooms, as well as non-users of ICT who wished the opportunities to use ICT when hindering factors are addressed. The findings of this study are supported by Al Mofarreh (2016) who found that trend in Saudi culture to adopt digital devices has positively influenced school culture and values in terms of ICT in education. The study found that almost all teachers and students have their own computers and smartphones with Internet connection to use in their daily life. On the other hand, the lack of internet connection was reported in this study as a critical factor towards the successful integration of ICT in the process of teaching and learning. Just having good access to the internet is in itself very helpful for teachers and students to self-learn. It is very effective for searching and linking to the appropriate content of any taught subject with a World of information made available to them.

Although religion was not reported as an issue affecting teacher ICT use, it seems that its prevalence in the education plans sometimes takes over other educational priorities. This is

because the educational policy itself is not very clear and it emphasises religious principles in the top articles of the policy. The problem here is not about including such principles because implanting these principles in children in their education is one way to help them to be good Muslims. The problem here is, as the Prince claimed above, that curriculum makers and decision makers in the past related mainly to the religious articles in the policy documents and ignored the other articles in the policy that included the development of children's education through enabling their acquisition, access and use of the new technologies.

## Chapter Seven: Conclusion

### 7.1 Summary of the thesis

This research aimed for a deep understanding of the current situation of teachers' ICT use in boys' secondary schools' in Al-Rass, Saudi Arabia. This research has achieved its aims through answering its research questions. The three main aims of the study were:

1. To understand the current state of ICT in education from the perspective of policy makers.
2. To explore and understand how teachers actually use ICT in teaching and learning processes in classrooms.
3. To reveal the factors that might affect Saudi teachers' use of ICT in schools.

Consistent with these aims, this study strove to answer the following research questions:

1. What are the policy makers' views about the current state of ICT in education in Saudi Arabia?
2. What are the patterns of ICT practice in education in Saudi Arabian boys' secondary schools for the teaching and learning process?
3. What are the factors that affect Saudi teachers' use of ICT in classrooms for the teaching and learning process from a personal perspective, and in terms of the Ministry's policies, and its support and management?

Qualitative methodology within the Interpretivist paradigm was used in this study, and triangulation method was used for the data collection. The methods used were: 25 classroom observations; interviews with 25 teachers and five head teachers; 25 student focus groups in five secondary schools; and interviews with five policy makers. The data collected was analysed based on thematic analysis.

The findings of this study found that the government has paid huge attention to ICT for education development, introducing many ICT initiatives. However, the findings revealed that the current utilisation of ICT is unsatisfactory and has not reflected the expectations and goals of the educational development initiatives. These became not surprising when the finding confirmed that ICT policy is not existed and so necessary strategies are absent too, and so failure in ICT integration in education is logic with the absence of foundation. It is similar to the traditional Saudi expression that “*those who live without foundation, they will soon collapse.*” The study argued that because of this absence the following key findings are affected.

The study found a very low level of ICT use in general, and ICT integration in the teaching and learning process in particular. Although positive views and attitudes were revealed, this was not enough to encourage teachers using ICT for educational purposes. Traditional pedagogy was the dominant approach, and students’ engagement in the majority of classrooms was passive. Only a few teachers were allowing students’ engagement in the educational process. The majority of students were interested in using ICT for their learning and for their teachers to employ different pedagogies with ICT.

The finding of this study revealed a number of obstacles affecting teachers in integrating ICT in the educational process. The main hindering factor is the absence of ICT policy; teachers mostly were not aware if there is any ICT policy. ICT policy at least can raise their awareness of the importance of ICT in the educational process. It is the basis for any initiatives, including strategic planning, and related projects and programmes. Again, without addressing the issue of a lack of ICT policy, educational change is likely to fail. How teachers are supposed to integrate ICT if they are not guided on how effectively they can do so. Teachers need to be recognised and be involved in policies and any planning as they know what is required in the practice of teaching more than anybody else.

Another issue was the lack of professional training on how to effectively use ICT in the educational process. This means that teachers lack the integrated types of knowledge, TPACK (Technological Pedagogical and Content Knowledge), they need if they want a successful integration of ICT to improve the teaching and learning process. However, curricula were identified as not supporting them to use ICT. Curriculum is necessary to shape what ICT can offer within education, and so, its reform needs to be addressed. Another issue

related to provision of resources is the lack of ICT equipment. Although, the government has a large budget for the development of education and these resources are part of it, it seems ICT equipment was not a priority. As the policy makers confirmed, ICT projects were not priorities for the ministers of education. The schools' management was also identified as a hindering factor, especially in requesting necessary ICT resources from authorities and managing the workload of teachers.

As described above, many of the hindering factors affecting teachers' use of ICT could be addressed through better ICT policies and institutional support. This is to say; fixing the policy issue first, would help to address the other factors.

## **7.2 Limitations**

Every research project could face some limitations, especially when considering the context and the constraint of time. This was no different, and of course, extra time and resources would have resulted in a richer data sample. It was not possible to conduct the study in other secondary schools in Alqassim, a Saudi administrative region, which is one of the country's largest administrative regions. If these constraints did not exist, then, expanding the research to other secondary schools in the region's cities and rural zones would contribute to increasing the depth of the research. However, choosing secondary schools in Al-Rass seemed useful because one of the key elements of this research was an in depth understanding of teachers' ICT use in classrooms, so visiting many different schools could have diluted this. However, the study successfully managed to gain detailed data from different views and participants as well as different methods. Policy makers supported the data being collected from schools, emphasising the importance they felt this study had.

Another limitation is the absence of female participants in this study. This was because male access to female schools is impossible in the gender segregation based education system, making classroom observation difficult without extra funding for a female research assistant. However, the conclusion of this study did not include gender as a hindering factor, partially because men and women do not work together. This does not mean that it is not important. Indeed, it is particularly important in contexts where gender is not segregated. So, having both males and females sharing the same curriculum and education system which are all overseen

and administrated by the MOE, the findings of this study are helpful towards improving ICT integration in both male and female schools.

### **7.3 Recommendations**

Having discussed the findings of the present study a number of recommendations are suggested in this section. Despite the obvious intervention from the Saudi government to improve education and the use of ICT in schools, the use of ICT in Saudi schools for the teaching and learning process is still disappointing, as confirmed in this study and other relevant studies ( e.g. Mulhim 2014; Alreem, 2008; Alotaibi, 2011; Alghamdi, 2008; and Mulhim, 2013).

The present study revealed a number of issues affecting the successful implementation of ICT, particularly at policy level, school management level and teachers' level which all contribute to the failure of ICT initiatives that this study has found. Therefore, based on the findings of this research and the understandings from the literature review underpinning and complementing the study, I can suggest some recommendations. They initially suggest the necessity of having clear polices to improve the implementation of ICT in classrooms. These policies should take into account the important role of head teachers in the enactment of any change at school level. Head teachers are supposed to be in direct contact with LEAs, which depend on the MOE, as described in the contextual chapter. This is followed by recommendations in terms of ICT resources provision, what was found in this study as a management linked issue. Finally, I make suggestions in regard to professional development and training. The organisation of this section was ordered to assist the reading moving from level to another, but there is no one recommendation more important than another as I feel all of them are very important towards the improvement of ICT use in the educational process. Details of those recommendation are as follows:

1. Since this study found that schools do not have the full authority to ensure the integration of ICT by providing all necessary requirements for this, then the MOE and its related ICT department needs to work together, and all involved in any ICT initiatives, to ensure the successful ICT implementation in all schools. The study found the distinction between these departments make the poor ICT use worse because they are the responsible bodies for ICT initiative implementation in Saudi

schools. So, the MOE and its ICT-related departments should share a clear vision, policy and guidelines in order to direct them on how to improve the use of ICT in classrooms.

2. Awareness issues in relation to educational policy were revealed in the findings of this study, which is also confirmed in the discussion of this issue in the literature review chapter in thesis. Therefore, it is vital to make sure all stakeholders, especially teachers, are aware of the Saudi educational policy, and ICT educational policies (or plans and initiatives as found in this study). These policies should be available to every school. They can be made available through: the MOE website, LEA website, all electronic portals, in the schools' management office, in teachers' rooms, schools post notes as well as handed to everyone in the schools. After that, training, workshops or conferences should be introduced for all stakeholders to ensure policies and their related initiatives are explained and clarified to all stakeholders. This is important because this study, and other studies, show that the majority of Saudi teachers are not aware of this issue, or as Alessa (2009) doubts if teachers even know that there is an existing educational policy in the education system in the country.
3. The findings of this study indicate the importance of school head teacher's role in the integration of ICT in classrooms. So, given the role of management in any educational plans or projects, which comes after the MOE and LEA roles discussed in the contextual chapter, the level of school management is very significant to be considered and involved in any national ICT planning. As discussed in the contextual chapter, schools cannot have their own policies but all education policies are drawn and directed by the MOE. These usually come as a result from national plans and initiatives which is an advantage to the education system in KSA, just as Kozma (2008) asserts the importance of the national ICT policy for better implementation of it in classrooms.

This involvement should include at least their opinions on initial drafts of any planning because they have experience and knowledge of what actually happens within the school and the classroom.

In addition, one of the issues preventing the implementation of ICT initiatives is the LEA and their shortage of school visits; thus school head teachers should be given

more confidence in overseeing the implementation of ICT initiatives in their schools, including their evaluation. This is especially important when taking into account the findings of this study as it revealed that head teachers motivate their teachers in the use of ICT. Investment to support this is recommended.

4. The provision of resources was found in this study as a critical issue concerning teachers and students as they claimed that head teachers usually fail to request the needed provision from LEA. So, by giving them more authority as suggested in recommendation (see previous point), it is also very important the MOE assign special and adequate measures for each school, so head teachers can overcome the issue of ICT provision and be responsible for ensuring this provision is achieved without referring to the LEA. The LEA supervises a large number of schools, which can lead to difficulty dealing with each school in a timely fashion. This is particularly important when taking into account the lack of relationship between the organisational levels which affects the ICT implementation in classrooms.
5. The necessity of providing equal ICT resources to all schools, regardless of their location or stage of study is important. The difference in ICT resources provision was observed in the findings and again this is an issue that could be resolved if the school management was given more authority over the implementation of ICT initiatives.
6. Introduction of additional LRC in each school is recommended, and in cases where there is a large number of students in some schools, a number of additional LRC should be created. The findings noted that LRCs were equipped and being used more than those available in classrooms. So, increasing similar centres could be an option of improving the use of ICT in classrooms because teachers in this research were concerned with the difficulty of booking an available slot in their schools' LRC as they are usually busy and booked in advance.
7. Ensuring provision of adequate professional development training on ICT integration in the teaching and learning process, it is important to take into account the following:
  - Raising the awareness of the importance and advantages that ICT offers for educational development. Teachers in this research admitted that training

sessions they had undertaken were around computer basic skills but failed to teach them the importance of ICT for teaching and learning process.

- The integrated nature of knowledge of technology, pedagogy and content, as found in the TPACK framework, suggests that teachers need help to understand what ICT skills they need to employ for a particular subjects and which pedagogy in order for them to effectively integrate ICT in their classroom. These issues were critical in the study findings when teachers argue that the few training courses available do not consider this key knowledge that teachers should acquire if ICT to be used appropriately in their teaching.
8. The timing for training courses was an issue found in the present study, which also confirmed in recent studies such as (Amoudi & Sulaymani, 2014). So, making all professional development training during the school day could be effective, if this does not cause any disruption for classes, lessons and activities. If it does, then trainings are recommended to take place during a school day while students are in staff training holiday.

## **7.4 Suggestions for future research**

Future relevant research can build on this present study. Some suggestions for further research are as follows:

1. While this research uses the triangulation based method of observation, interviews and focus groups, it is suggested that fourth mode would achieve by adding greater depth, such as a document review of the relevant MOE publications, including results of initiatives in the field.
2. Another suggestion for future research is to replicate the study on female secondary schools in the same context of this study.
3. It is also suggested to conduct a similar study in other cities in the country to aid in generalising the findings.
4. Further study could be focused on the nature and mechanism of training provided to teachers by observing training sessions, holding interviews with trainers and

reviewing training documents. A triangulation-based method would work for this too.

5. Finally, a comparative research between ICT integration in Saudi Arabia and other countries, especially developed ones, could raise policy makers to improve the state in Saudi Arabia, especially in terms of ICT policies and strategies.

## **7.5 Conclusion**

Saudi Arabia is undergoing major developments across the board, including education, where many initiatives have been implemented. This includes the use of ICT to improve the educational process. However, evidence, including the findings of this current study, shows that ICT integration in the teaching and learning process is still very low. By understanding this, the present study argues that understanding the current ICT situation in public education; and how teachers use ICT, as the main ICT implementer in practice; and the factors hindering their use in practice could contribute to the effective use of ICT in the educational process. Triangulation method assisted in unpacking the current state of ICT integration in Saudi education; revealing disappointing ICT integration in the teaching and learning process; and identifying several barriers affecting this integration in practice. Both streams of work, at policy and school, have informed each other in the process of the analysis.

At policy level, the study found the MOE has attempted, through many relevant initiatives, to promote ICT use in schools. However, because ICT plans in education are all inferred from national plans of the KSA, specific ICT policy in education does not exist. The present study confirmed this. In addition, another major issue found in this study was poor coordination between the MOE and LEAs in terms of ICT initiative implementation, evaluation and support provision in schools. Therefore, a culture of blame has arisen due to this lack of coordination as shown in this study between the education actors in their responses regarding the limited success (or unsatisfactory status) of these initiatives.

At school level, teachers' ICT use was rare in their classrooms and was mainly limited to preparing and/or presenting their lessons. Their control over the educational process made the involvement of their students in using ICT classrooms almost impossible. The study

emphasises that all students and all teachers in all schools need to equally access and use ICT. Interestingly, although there was a lack of teachers' ICT use in their classrooms, they thought the availability of ICT and their use in the educational process was improved comparing to its status in the past. This study has attributed this discrepancy to the possibility of teachers' lack of awareness towards the optimum use of ICT in the educational process. This could be possible because the study found that teachers' training courses are few and far between, and not particularly pedagogically useful. If training programmes are to be useful then they need to meet the need of the teacher and the subject that teacher teaches.

In regard to the factors affecting teachers' ICT use in their classrooms, two categories were found in this study: internal and external factors. The key external factors include the absence of ICT policy, the insufficient provision of ICT equipment, discontinuity in the maintenance of this equipment, unavailability of digital educational resources, and inadequate design of professional development and training. In terms of internal factors, they are the level of English language, concerns about teacher's responsibility for ICT damage, workload constraints, and the question of professional incentives for ICT use.

The study's findings could be of interest in particular to the MOE to improve ICT integration in the educational process, especially in terms of the necessity of ICT policy because, as this research considered, this is as the umbrella of other hindering factors found. This means that in order to address these hindering factors, ICT policy needs to be addressed first. What is clear from this study is that the availability of (and access to) ICT resources does not automatically mean the successful integration of ICT in the educational process. To achieve successful integration consideration must be made to finding out how ICT can enhance teaching and learning and why ICT will enhance teaching and learning. This study has found both of those to be wholly inadequate. Therefore, ICT policy that addresses all these issues and offers guidelines to schools and teachers is of necessity.

Finally, the study could be valuable in the other relevant subjects especially when taking into account its triangulation method by observing the actual practice, speaking to policy makers, head teachers, teachers and listening to the student voice.

## **7.6 Closing comment**

The Saudi ‘Sophia’ hopes to one day have a family and interact with human beings (BBC, 2017). She could also have a country as well as a family, if ICT is effectively integrated into the teaching and learning process. To accept such a thing, today’s students need high quality education in ICT if they are to shape tomorrow’s digital world. To achieve this, concrete ICT policy must be created and barriers to this must be openly raised and addressed.

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# Appendices

## Appendix 1: Participant Information Sheet (For teacher)



University  
of Glasgow

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College of Social  
Sciences

### Participant Information Sheet

(For teacher)

Study title and Researcher Details

**Title of the study:** The current state of using ICT in education in boys' secondary schools in Saudi Arabia: teachers' perspectives

**Name of the researcher:** Abdulwahab Alharbi (PhD student)

**School/ University:** school of education/ University of Glasgow.

**Supervisor:** Dr. Oscar.Valiente. Tel no: 00441413304538

**Second supervisor:** Prof. Michele Schweisfurth. Tel no: 00441413304445

\* Please note that the format of this PIS has been taken from the college of social sciences in the university of Glasgow.

Invitation

*You are being invited to take part in a research study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask me if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.*

Thank you for time and cooperation.

What is the purpose of the study?

Saudi Arabia has recently made significant changes in its educational system with the aim of increasing the use of ICT in schools for teaching and learning. However, so far, in Saudi Arabia there has been little discussion regarding the actual state of using ICT in schools by teachers which indicates the importance of conducting a study that would focus primarily on teachers' use of ICT and attempts to reveal the issues that might hinder their use of ICT.

Therefore, the aim of this study is to find out what the actual use of ICT is by teachers in their teaching. The study also seeks to reveal what might hinder teachers' use of ICT in their teaching.

Why have I been chosen?

As the study is mainly about teachers use for ICTs, your participation have been chosen as a teacher working in a boys' school whose headteacher has given permission for them to be contacted after they have received the permission letter I have obtained from the Ministry of Education to access to these schools and observe and interview the participants and discuss with students through focus group.

Do I have to take part?

It is up to you to decide whether or not to take part. If you decide to take part you are still free to withdraw at any time and without giving a reason. Please note that if you choose not to take part, there will be no negative consequences.

What will happen to me if I take part?

The research project will last about four months but your involvement will just be for part of one day. Each participant will be observed and interviewed once. The observation should last 45 minutes and the interview will last about 30 minutes. The observation is to know what and how ICTs are being used in the classroom; and the interview is to understand in more details about what have been covered in the observation. Also three or four students from the same observed classroom will be participated in focus group to discuss their experiences of ICT.

Permission is taken by the head teacher for your time of interview and thus it should not affect your time in the school. The interview will be audio –recorded with your permission.

Will my taking part in this study be kept confidential?

All information, which is collected about you during the course of the research, will be kept strictly confidential. You will be identified by an ID number and any information about you will have your name and address removed so that you cannot be recognised from it.

What will happen to the results of the research study?

Firstly, I will use the results to write my PhD thesis. These results will be analysed during the study. The study results will be shared with those who are interested to know about it if they wanted to. Also an anonymised summary of the final result of the study will be sent to the schools for

headteachers to share with teachers and students that have participated. To ensure and protect confidentiality of data the observation notes and the audio recorded interview and the transcripts will be stored in my personal computer or other devices with a password required to access the files. The data will be stored in these devices until I finish my PhD study. After I complete my PhD study I will delete all data not required to be retained by the University of Glasgow. All participants will not be identified in any report/publication.

Who is organising and funding the research?

Firstly, I am organising this research for my PhD study. This study is funded by The Royal Embassy of Saudi Arabia: The Saudi Arabian Cultural Bureau in London is the contact point and has helped to secure access. The PhD study is based at the University of Glasgow.

Who has reviewed the study?

College of Social Sciences Research Ethics Committee in University of Glasgow.

Contact for Further Information

**Name of the researcher:** Abdulwahab Alharbi  
[a.alharbi.1@research.gla.ac.uk](mailto:a.alharbi.1@research.gla.ac.uk)

**Email address:**

**University:** University of Glasgow

**Mobile number:**

**Name of supervisor:** Dr. Oscar.Valiente

**Email address:** [Oscar.Valiente@glasgow.ac.uk](mailto:Oscar.Valiente@glasgow.ac.uk)

If you have any concerns regarding the conduct of this research project, you can contact the College of Social Sciences Ethics Officer Dr Muir Houston, email: [Muir.Houston@glasgow.ac.uk](mailto:Muir.Houston@glasgow.ac.uk)

## Appendix 2: Participant Information Sheet (For student)



University  
of Glasgow

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College of Social  
Sciences

### Participant Information Sheet

(For student)

Study title and Researcher Details

**Title of the study:** The current state of using ICT in education in boys' secondary schools in Saudi Arabia: teachers' perspectives

**Name of the researcher:** Abdulwahab Alharbi (PhD student)

**School/ University:** school of education/ University of Glasgow.

**Supervisor:** Dr. Oscar.Valiente. Tel no: 00441413304538

**Second supervisor:** Prof. Michele Schweisfurth. Tel no: 00441413304445

\* Please note that the format of this PIS has been taken from the college of social sciences in the university of Glasgow.

Invitation

*You are being invited to take part in a research study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask me if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.*

Thank you for your time and cooperation.

What is the purpose of the study?

Saudi Arabia has recently made significant changes in its educational system with the aim of increasing the use of ICT in schools for teaching and learning. However, so far, in Saudi Arabia there has been little discussion regarding the actual state of using ICT in schools by teachers which indicates the importance of conducting a study that would focus primarily on teachers' use of ICT and attempts to reveal the issues that might hinder their use of ICT.

Therefore, the aim of this study is to find out what the actual use of ICT is by teachers in their teaching. The study also seeks to reveal what might hinder teachers' use of ICT in their teaching.

Why have I been chosen?

As the study is mainly about teachers use for ICTs, teachers' classrooms will be observed and teachers are chosen as they are working in boys' schools whose headteacher has given permission for them to be contacted after they have received the permission letter I have obtained from the Ministry of Education to access to these schools and conduct my research. If you choose to take part, you will participate as a group member of four students for the focus group. The focus group will be conducted to understand students' experiences of ICT in their classroom. You, as the other members of the focus groups, have been chosen as a student attends the observed classroom and have been recommended by your head teacher to take part of the study if you accept that.

Do I have to take part?

It is up to you to decide whether or not to take part. If you decide to take part you are still free to withdraw at any time and without giving a reason. Please note that if you decide not to take part, this will not affect your grades and your relationship with teachers and head teachers.

What will happen to me if I take part?

The research project will last about four months but your involvement will just be for part of one day. Each focus group of the 20 groups will be conducted once. This should last 30 to 40 minutes. Permission is taken by the head teacher for your time for the focus group discussion and thus it should not affect your time in the school. The focus group will be audio-recorded with your permission.

Will my taking part in this study be kept confidential?

All information, which is collected about you during the course of the research, will be kept strictly confidential. You will be identified by an ID number and any information about you will have your name and address removed so that you cannot be recognised from it.

What will happen to the results of the research study?

Firstly, I will use the results to write my PhD thesis. The results will be analysed during the study. The study results will be shared with those who are interested to know about it if they wanted to. Also an anonymised summary of the final result of the study will be sent to the schools for headteachers to share with teachers and students that have participated. To ensure and protect confidentiality of data the audio recorded focus group and the transcripts will be stored in my personal computer or other devices with a password required to access the files. The data will be stored in these devices until I finish my PhD study. After I complete my PhD study I will delete all data not required to be retained by the University of Glasgow. All participants will not be identified in any report/publication.

Who is organising and funding the research?

Firstly, I am organising this research for my PhD study. This study is funded by The Royal Embassy of Saudi Arabia: The Saudi Arabian Cultural Bureau in London is the contact point and has helped to secure access. The PhD study is based at the University of Glasgow.

Who has reviewed the study?

College of Social Sciences Research Ethics Committee in University of Glasgow.

Contact for Further Information

**Name of the researcher:** Abdulwahab Alharbi  
[a.alharbi.1@research.gla.ac.uk](mailto:a.alharbi.1@research.gla.ac.uk)

**Email address:**

**University:** University of Glasgow

**Mobile number:**

**Name of supervisor:** Dr. Oscar.Valiente

**Email address:** [Oscar.Valiente@glasgow.ac.uk](mailto:Oscar.Valiente@glasgow.ac.uk)

If you have any concerns regarding the conduct of this research project, you can contact the College of Social Sciences Ethics Officer Dr Muir Houston, email: [Muir.Houston@glasgow.ac.uk](mailto:Muir.Houston@glasgow.ac.uk)

## Appendix 3: Participant Information Sheet (For parent)



University  
of Glasgow

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College of Social  
Sciences

### Participant Information Sheet

(For parent)

Study title and Researcher Details

**Title of the study:** The current state of using ICT in education in boys' secondary schools in Saudi Arabia: teachers' perspectives

**Name of the researcher:** Abdulwahab Alharbi (PhD student)

**School/ University:** school of education/ University of Glasgow.

**Supervisor:** Dr. Oscar.Valiente. Tel no: 00441413304538

**Second supervisor:** Prof. Michele Schweisfurth. Tel no: 00441413304445

\* Please note that the format of this PIS has been taken from the college of social sciences in the university of Glasgow.

Invitation

*Your child is being invited to take part in a research study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask me if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish your child to take part.*

Thank you for time and cooperation.

What is the purpose of the study?

Saudi Arabia has recently made significant changes in its educational system with the aim of increasing the use of ICT in schools for teaching and learning. However, so far, in Saudi Arabia there has been little discussion regarding the actual state of using ICT in schools by teachers which

indicates the importance of conducting a study that would focus primarily on teachers' use of ICT and attempts to reveal the issues that might hinder their use of ICT.

Therefore, the aim of this study is to find out what the actual use of ICT is by teachers in their teaching. The study also seeks to reveal what might hinder teachers' use of ICT in their teaching.

Why have I been chosen?

As the study is mainly about teachers use for ICTs, teachers' classrooms will be observed and teachers are chosen as they are working in boys' schools whose headteacher has given permission for them to be contacted after they have received the permission letter I have obtained from the Ministry of Education to access to these schools and conduct my research. If you accept your child to take part, your child will participate as a group member of four students for the focus group. The focus group will be conducted to understand students' experiences of ICT in their classroom. Your child, as the other members of the focus groups, has been chosen as a student attends the observed classroom and recommended by their head teacher to take part of the study of you and your student accept that.

Do I have to take part?

It is up to you to decide whether or not your child to take part. If you decide your child to take part your child still free to withdraw at any time and without giving a reason. Please note that if you decide your child not to take part, this will not affect his grades and his relationship with teachers and head teachers.

What will happen to me if I take part?

The research project will last about four months but your child involvement will just be for part of one day. Each focus group of the 20 groups will be conducted once. This should last 30 to 40 minutes. Permission is taken by the head teacher for your child time for the focus group discussion and thus it should not affect your child time in the school. The focus group will be audio –recorded with your permission.

Will my taking part in this study be kept confidential?

All information, which is collected about your child during the course of the research, will be kept strictly confidential. Your child will be identified by an ID number and any information about your child will have his name and address removed so that your child cannot be recognised from it.

What will happen to the results of the research study?

Firstly, I will use the results to write my PhD thesis. The results will be analysed during the study. The study results will be shared with those who are interested to know about it if they wanted to. Also an anonymised summary of the final result of the study will be sent to the schools for headteachers to share with teachers and students that have participated. To ensure and protect confidentiality of data the audio recorded focus group and the transcripts will be stored in my personal computer or other devices with a password required to access the files. The data will be stored in these devices until I finish my PhD study. After I complete my PhD study I will delete all data not required to be retained by the University of Glasgow. All participants will not be identified in any report/publication.

Who is organising and funding the research?

Firstly, I am organising this research for my PhD study. This study is funded by The Royal Embassy of Saudi Arabia: The Saudi Arabian Cultural Bureau in London is the contact point and has helped to secure access. The PhD study is based at the University of Glasgow.

Who has reviewed the study?

College of Social Sciences Research Ethics Committee in University of Glasgow.

Contact for Further Information

**Name of the researcher:** Abdulwahab Alharbi  
[a.alharbi.1@research.gla.ac.uk](mailto:a.alharbi.1@research.gla.ac.uk)

**Email address:**

**University:** University of Glasgow

**Mobile number:**

**Name of supervisor:** Dr. Oscar.Valiente

**Email address:** [Oscar.Valiente@glasgow.ac.uk](mailto:Oscar.Valiente@glasgow.ac.uk)

**If you have any concerns regarding the conduct of this research project, you can contact the College of Social Sciences Ethics Officer Dr Muir Houston, email: [Muir.Houston@glasgow.ac.uk](mailto:Muir.Houston@glasgow.ac.uk)**

## Appendix 4: Teacher's Consent Form



College of Social  
Sciences

### Teacher's Consent Form

**Name of Researcher:** Abdulwahab Alharbi.

**Title of Project:** The current state of using ICT in education in boys' secondary schools in Saudi Arabia: teachers' perspectives

#### Information about your involvement

- As mentioned in the *participant information sheet* the aim of this study is to find out about the actual use of ICT is by teachers in their teaching. The study also seeks to reveal what might hinder teachers' use of ICT in their teaching.
- The research project will last about four months but your involvement will just be for part of one day. Each participant will be observed and interviewed once. The observation should last 45 minutes and the interview will last about 30 minutes. The observation is to know what and how ICTs are being used in the classroom; and the interview is to understand in more details about what have been covered in the observation. Also three or four students from the same observed classroom will be participated in focus group to discuss their experiences of ICT.
- Permission is taken by the head teacher for your time of interview and thus it should not affect your time in the school. The interview will be audio –recorded with your permission.
- Please note it is up to you to decide whether or not to take part. If you decide to take part you are still free to withdraw at any time and without giving a reason.

#### Please complete the following:

1. I confirm that I have read and understand the Plain Language Statement for the above study and have had the opportunity to ask questions.	
2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.	
3. I confirm the interview is to be audio recorded.	
4. I confirm that my classroom will be observed.	

5. I confirm participants to be referred to by pseudonym in the study.	
6. I agree to take part in the above study.	

_____	_____	_____
Name of Participant	Date	Signature
_____	_____	_____
Researcher	Date	Signature

## Appendix 5: Student's Consent Form



College of Social  
Sciences

### Student's Consent Form

**Name of Researcher:** Abdulwahab Alharbi.

**Title of Project:** The current state of using ICT in education in boys' secondary schools in Saudi Arabia: teachers' perspectives

#### Information about your involvement

- As mentioned in the *participant information sheet* the aim of this study is to find out about the actual use of ICT is by teachers in their teaching. The study also seeks to reveal what might hinder teachers' use of ICT in their teaching.
- The research project will last about four months but your involvement will just be for part of one day. Each focus group of the 20 groups will be conducted once. This should last 30 to 40 minutes
- Permission is taken by the head teacher for your time for the focus group discussion and thus it should not affect your time in the school. The focus group will be audio –recorded with your permission.
- Please note it is up to you to decide whether or not to take part. If you decide to take part, you are still free to withdraw at any time and without giving a reason.

#### Please complete the following:

1. I confirm that I have read and understand the Plain Language Statement for the above study and have had the opportunity to ask questions.	
2. I understand that my participation is voluntary and that he is free to withdraw at any time, without giving any reason.	
3. I confirm my participating in the focus group is to be audio recorded.	
4. I confirm participants to be referred to by pseudonym in the study.	
5. I agree to take part in the above study.	

_____	_____	_____
Name of student	Date	Signature
_____	_____	_____
Name of Person giving consent (if different from participant, eg Parent, Carer)	Date	Signature
_____	_____	_____
Researcher	Date	Signature

**For the school head teacher:**

I agree the child to take part in the above study if his parent agrees	
--	--

_____	_____	_____
Head teacher	Date	Signature

## Appendix 6: Parental Consent Form



College of Social  
Sciences

### Parental Consent Form

**Title of Project:** The current state of using ICT in education in boys secondary schools in Saudi Arabia: teachers perspectives

**Name of Researcher:** Abdulwahab Alharbi.

1. I confirm that I have read and understand the Plain Language Statement for the above study and have had the opportunity to ask questions.	
2. I understand that my child's participation is voluntary and that he is free to withdraw at any time, without giving any reason.	
3. I confirm the interview with my child's is to be audio recorded.	
4. I confirm my child as participant to be referred to by pseudonym in the study.	
5. I agree my child to take part in the above study.	

\_\_\_\_\_  
Name of parent

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Name of Person giving consent  
(if different from participant, eg Parent, Carer)

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Researcher

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

**For the school head teacher:**


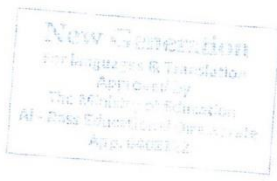
I agree the child to take part in the above study if his parent agrees	
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\_\_\_\_\_  
Head teacher

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

## Appendix 7: Schools access permission

New Generation for Translation		
1469	APP# 0402122 ترخيص رقم: ٠٤٠٢١٢٢	
الموضوع: ..... المشفوعات: ..... الرقم: ..... التاريخ: / /		
<b>KINGDOM OF SAUDI ARABIA</b>	Planning and development	
<b>MINISTRY OF EDUCATION</b>	<b>No.</b> 36913595	
<b>DIRECTORATE OF EDUCATION AT AL-RASS PROVINCE</b>	<b>Date:</b> 23 Feb 2015	
<b>Planning and Development Dept.</b>	<b>Enclosures:</b>	
<p align="center">Circular for all Intermediate &amp; Secondary Schools (Boys)</p>		
Dear School Principal		
Peace be upon you all,		
<p>As per the request from PhD student in Glasgow University in the U.K. Mr. <b>Abdulwahab Rabah Al-Harbi</b> who asks for the permission to visit the intermediate &amp; secondary schools. The tool of the study entitled : The Current State of Using ICT in Education in Boys Secondary Schools in Saudi Arabia: Teachers Perspectives, was collecting information from the educational field, interviewing teachers and students, and observing several classrooms.</p>		
<p>Kindly, do your best to facilitate his mission and allow him to observe the classrooms from inside, meet the school teachers and students, and provide him with full cooperation needed.</p>		
<p align="center">With all best wishes and kind regards</p>		
<b>Official Seal</b> "affixed"	<b>Director of AL-Rass Educational Directorate</b> Dr. Khalifah Salah Al-Masoud "signed"	
		
<p align="center">القصيم - الرس - هاتف - ٠١١٣٣٩٥٠٠٠ - ٠٥٣٢٣٩٥٠٠٠ QASSIM, ALRASS, TEL: 0163395000, 0532395000</p>		

## Appendix 9: Ethics Committee approval



CSS July 2014

### Ethics Committee for Non-Clinical Research Involving Human Subjects

Staff Research Ethics Application ☐

Postgraduate Student Research Ethics Application ☒

#### Application Details

Application Number: 400140149

Applicant's Name Abdulwahab Rabah Alharbi

Project Title The current state of using ICT in education in boys' secondary schools in Saudi Arabia: Teachers' perspectives

#### Application Status

Approved

Start Date of Approval (d.m.yr) 13/04/2015

(blank if Changes Required/ Rejected)

End Date of Approval of Research Project (d.m.yr) 05/02/2018

Only if the applicant has been given **approval** can they proceed with their data collection with effect from the date of approval.

#### Recommendations (where Changes are Required)

- Where changes are required all applicants must respond in the relevant boxes to the recommendations of the Committee and upload this as the **Resubmission Document** online to explain the changes you have made to the application. All resubmitted application documents should then be uploaded.
- If application is Rejected a full new application must be submitted via the online system. Where recommendations are provided, they should be responded to and this document uploaded as part of the new application. A new reference number will be generated.

(Shaded areas will expand as text is added)

#### MAJOR RECOMMENDATION OF THE COMMITTEE

#### APPLICANT RESPONSE TO MAJOR RECOMMENDATIONS

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#### MINOR RECOMMENDATION OF THE COMMITTEE

#### APPLICANT RESPONSE TO MINOR RECOMMENDATIONS

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Page 1 of 2

University of Glasgow  
College of Social Sciences  
Florentine House, 53 Hillhead Street. Glasgow G12 8QF  
The University of Glasgow, charity number SC004401

Tel: 0141-330-3007 or 1990  
E-mail: [socsci-ethics@glasgow.ac.uk](mailto:socsci-ethics@glasgow.ac.uk)

## Appendix 10: Classroom observation

Objective of this observation:

*This observation is to observe teachers' actual use of ICT in the classroom.*

Subject		School:	
Grade level:		Duration:	

***Section one: The ICTs types used in the classroom:***

Type of ICTs used
Use of each type
Student engagement for these types

***Section two: frequency of use***

Frequency of use
Students engagement
Teachers use

***Section three: Observation of teaching and learning practices***

Main teaching method

Students participation
Students engagement in the lesson process
Activities used
Any tasks to be submitted later by students

***Section four: for the observer use:***

1. Are there any comments to be added regarding the observed classroom today?
Critical incidents to raise for discussion with teacher

For the observer:
Teacher (optional):

## Appendix 11: Teacher interview

How are you currently using ICT in your teaching?
What are the different types of ICT you use in the classroom?
How often do you use these ICTs?
During the session, why do you use these types in this way?
How intensive and frequent is your use of these ICTs and why?
In your view, what are the advantages that ICTs provide for both teaching and learning?
What is your main method in you lesson?
What are the other methods you use in your teaching?
Do you allow your students to participate and use ICTs tools in your session, how and why?
Do you give your students any tasks to do at home using ICTs, why and how?
Would you like to use ICTs more in your teaching?
Have you undertaken any professional development training? Please describe.
From your experience, what prevents you using ICT in the teaching and learning process?

For the interviewer:
Teacher (optional):

## Appendix 12: Student focus group

How do your teachers use ICT in their teaching?
What are the different types of ICT used in the classroom?
How often do your teachers use these ICTs?
How intensively are your teachers using these ICTs? What would be your ideal in terms of ICT use intensity?
In your view, what the advantages that ICTs provide for both teaching and learning?
In what ways do your teachers create opportunities for students to participate and use ICTs tools in the session, how and why?
Do you do any tasks to do at home using ICTs, why and how? How many of these are assigned from school? Is ICT-based homework more enjoyable than other tasks?
What are your views on the ICT facilities that are available in the school?

For the interviewer:
Students (optional):

## Appendix 13: Policy makers interview

What is your view about the current ICT state in schools?
According to your experience, what does ICT policy in education mean?
So, does the MOE have ICT policy in education? please explain in either answers?
What are efforts made towards ICT integration in education, if there are any?
Who are the responsible bodies concerned with ICT integration into education?
what is their mechanism before the actual implementation in schools?
From your experience, please explain whether the MOE adopt any external ICT initiatives?
what is the state of teachers professional development programs in regard to ICT integration?
Can you please explain the roles of all stakeholders in the process of ICT integration in education?
Are teachers involved in any ICT planning? If yes, please explain how?
Are teachers involved in any ICT planning? If yes, please explain how?
From your experience, are there any issues affect the successful ICT integration in education in Saudi schools?
What are the state and the outcomes of ICT projects and programs implemented in schools?

For the interviewer:
Policy maker (optional):

## Appendix 14: Head teachers interview

Are you aware if there is an ICT policy from the MOE?
What is the role of head teacher in the integration of ICT in their schools?
How are the schools management informed about any ICT initiatives?
What actions do you take to response to any programs or projects?
Could you explain the process of the provision of ICT resources in your school?
What do you do to encourage teachers to use ICT in their classrooms?
From you experience, how successful are ICT initiatives, and why?
Could you Please explain the current state of teachers training on ICT integration, including its nature and delivery process?
what are the hindering factors affecting ICT integration schools?

For the interviewer:
Head teacher (optional):