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Makkah kindergarten teachers' perceptions regarding the use of computer technology as a pedagogical tool: a case study

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Dedication

This work is dedicated to

The memory of my great father ***Soud****. Although he was my inspiration to pursue my PhD degree, he was unable to see my graduation. This is for him and it is not enough.*

May his soul rest in peace.

My dear mother ***Aisha*** *and dear mother-in-law* ***Gazwa***

My beloved and supportive husband ***Jari***

My lovely boys ***Talal*** *and* ***Saud***

My brothers and sisters

For their unfailing love and tremendous support

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Abstract

This research aimed to explore Saudi kindergarten teachers' perceptions, pedagogical beliefs and practices regarding the integration of computers into teaching and learning in Makkah kindergarten classrooms. The objectives of the research were to (1) explore the current use of computer technology by kindergarten teachers in the classroom; (2) understand kindergarten teachers' perceptions about involving computer technology in the classroom; and (3) identify the challenges and opportunities faced by the kindergarten teachers in using computers.

A comparative case study design was employed. Data were collected via semi-structured interview with teachers and headteachers in three kindergartens reflecting different environments and levels of Information and Communication Technology (ICT) acceptance and use, as well as the director of the kindergarten department in Makkah General Directorate of Education. Twenty-four lessons were observed involving six teachers, two in each kindergarten. The Unified Theory of Acceptance and Use of Technology was employed to inform the research methodology and help explain the findings. Data were analysed thematically.

The findings revealed that, although teachers showed enthusiasm toward ICT, their classroom use of ICT technologies was limited, largely confined to using the computer as a presentation tool. Teachers' pedagogical beliefs and experience strongly influenced integration practices. Furthermore, internal and external environmental conditions posed several challenges to computer use in the classroom.

This research addresses gaps in the literature on ICT integration in Early Years Education in relation to practitioners' perspectives, particularly in Saudi Arabia. The study is

especially timely since it coincided with the launch of the Kingdom's Vision 2030, which declared plans and strategies for expansion and development of EYE and enriching settings with modern infrastructure. The study provides a detailed picture of the current ICT practices, informing recommendations for various stakeholders on how they might facilitate and support ICT integration towards improving the educational environment in EYE.

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Abbreviations

ACOT	Apple Classrooms of Tomorrow
ADHD	Attention Deficit Hyperactivity Disorder
AERA	American Educational Research Association
AGFUND	Arab Gulf Programme for Development
AI	Artificial Intelligence
BECTA	British Educational Communications and Technology Agency
BERA	British Educational Research Association
CAI	Computer-assisted Instruction
CEDA	Council of Economic and Development Affairs
CRT	Cathode Ray Tube
DAPs	Digital Audio Players
DATEC	Developmentally Appropriate Technology in Early Childhood
DHT	Deputy Headteacher
ECE	Early Childhood Education
EU	European Union
EYE	Early Years Education
GaStat	General Authority for Statistics
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
GPGE	General Presidency for Girls' Education
HT	Headteacher
ICT	Information and Communication Technology
IT	Information Technology

ITS	Intelligent Tutoring Systems
KG1	Kindergarten Grade One
KG2	Kindergarten Grade Two
KG3	Kindergarten Grade Three
KSA	Kingdom of Saudi Arabia
LCD	Liquid Crystal Display
MBS	Mohammed bin Salman
MENA	Middle East and North Africa
MGDE	Makkah General Directorate of Education
MKD	Makkah Kindergarten Department
MoE	Ministry of Education
MoHE	Ministry of Higher Education
MoLSD	Ministry of Labour and Social Development
NAEYC	National Association for the Education of Young Children
NTP	National Transformation Programme
SCT	Social Cognitive Theory
TAM	Technology Acceptance Model
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UTAUT	Unified Theory of Acceptance and Use of Technology

Chapter 1

Introduction

Chapter outline

Chapter 1 Introduction

1.1 Research Background and Motivation

This thesis reports an in-depth qualitative exploration of kindergarten teachers' perceptions, practices and pedagogical beliefs towards the integration of Information and Communication Technology (ICT) into teaching and learning in Saudi Arabian kindergarten classrooms.

Over the last four decades, there have been developments in digital technologies, making them more accessible and portable, and these have been accompanied by increasing integration of ICT into teaching and learning in many education systems. However, with regard to Early Years Education (EYE) debates have continued over whether and how ICT can appropriately be integrated into classroom practices, and what the impacts may be for children's cognitive, social, emotional and physical development. Some scholars (e.g. Plowman, McPake et al., 2012; Neumann & Neumann, 2014) suggested wide-ranging benefits for children's language, creativity, problem-solving, collaboration and attitudes to learning. Others, including House (2012) and Sigman (2012) express concerns that over-use of technology leads, inter alia, to poor concentration and social isolation. Overall, however, it is widely believed in many Western countries that there is a place for developmentally appropriate use of ICT in EYE as a part of a wide range of teaching strategies and approaches (Plumb & Kautz, 2015).

Teachers' use of ICT is influenced not only by different explanations of how children learn, with different implications for ICT, but also by a variety of personal and

contextual factors. In particular, effective use of ICT in education depends on the attitudes, skills and beliefs of the teacher. Teachers' practices are influenced by internal and external factors, such as classroom conditions, equipment, teachers' confidence with ICT and their pedagogical knowledge and beliefs (Ertmer et al., 2012; Fullan, 2013).

These issues currently have particular significance in the Saudi Arabian context, where ICT is attracting attention as part of government plans for educational reform. The Saudi government's interest in ICT in education can be traced to the Tatweer project for public education development (Tatweer, 2007), which included among its objectives, introducing ICT in this area. Despite a substantial budget of SR 8 billion, however, the project was ultimately unsuccessful, due to the lack of teacher involvement and training (Al-Essa, 2009). Moreover, the project focused on secondary schools and gave no attention to EYE.

More recently, in Vision 2030, an ambitious plan for socio-economic developments, the government has announced plans for educational reforms, including the expansion and development of EYE. Vision 2030 acknowledges the importance for the kingdom of keeping pace with digital technology, and the integration of ICT in teaching and learning at all stages is emphasized in the plan. Nevertheless, researchers such as Alasimi (2018) report limited use of ICT in EYE (mainly as a presentation tool) and a lack of clear policy and pedagogical knowledge or guidance on how ICT can contribute to teaching and learning in EYE. Moreover, the present researcher, in her roles as a former kindergarten teacher and, now, a lecturer in EYE at Najran University in Saudi Arabia has visited numerous kindergartens to observe and evaluate teachers'

daily practice. This experience has led her to conclude that there is a place for ICT in kindergartens. However, availability of ICT resources varies. In addition, while some teachers seem favourably disposed towards new ways of teaching incorporating ICT, others are anxious about ICT and sceptical of its value to themselves or students. If the potential benefits of ICT in EYE are to be realised, it is important to understand teachers' perspectives and the challenges they face when considering or attempting use of ICT, and the present research addresses a shortage of scholarship on these matters in non-Western contexts, and Saudi Arabia specifically.

1.2 Aim and Objectives of the Research

Because of the relatively limited research available about the use of ICT in Saudi Arabian kindergarten practices, this study aimed to explore teachers' perceptions and pedagogical beliefs towards using computers in Makkah kindergarten classrooms.

The overarching aim of the study was achieved through the fulfilment of the following objectives:

- To explore the current use of computer technology by kindergarten teachers in the classroom.
- To understand kindergarten teachers' perceptions about involving computer technology in the classroom.
- To find out the challenges and opportunities faced by the kindergarten teachers in using computers.

To meet the identified objectives, the main research question [MRQ] was formulated:

What are the perceptions and pedagogical beliefs of kindergarten teachers towards using computer technology in classrooms?

To address the MRQ, six sub-research questions [SRQs] were developed, as follows:

SRQ1: What ICT resources are available in the kindergarten classroom?

SRQ2: What are kindergarten teachers' perceptions regarding the needs for better ICT resources in the classroom?

SRQ3: What are kindergarten teachers' perceptions regarding the future of computers in the classroom?

SRQ4: What are the positive and negative impacts of using the computer in the classroom?

SRQ5: How do kindergarten teachers use the computer in the classroom?

SRQ6: What are the opportunities and difficulties reported by kindergarten teachers in using computer technology in classrooms?

1.3 Significance of the Research

This study responds to a paucity of literature on ICT integration in teaching and learning in EYE from practitioners' perspective, particularly in Saudi Arabia. It is a unique study of actual ICT use, potential impact and current challenges from multiple perspectives, drawing on evidence from three contrasting settings (urban and rural) in an under-researched, non-Western context. It contributes to the literature by providing deep insights into teachers' practices and the role played by teacher characteristics, training and environment, drawing on perspectives neglected in prior research; not only teachers, but also headteachers and a district EYE director's; drawing on these three perspectives, this the first study of its kind in Saudi Arabi, and the Arab world generally. The study is also significant in employing, as a theoretical framework, the Unified Theory of Acceptance and Use of Technology (UTAUT: Venkatesh et al., 2003), thereby contributing to validate its use in a new context. The UTAUT model is

helpful in identifying factors that facilitate or hinder ICT integration and may assist stakeholders in various contexts in developing approaches to integrate ICT successfully.

The study will potentially be interesting and useful to a variety of EYE policymakers and practitioners, as it draws practical implications for classroom practice, kindergarten management, the government role, and the training and continuing professional development of kindergarten teachers. It also provides a foundation for future research, which it is hoped will contribute to benefit the integration of ICT into EYE in Saudi Arabia.

1.4 Research Approach

This is a comparative case study involving the triangulation of different methods and sources. Data were collected from teachers and headteachers in three contrasting kindergartens reflecting different environments and levels of ICT acceptance and use, in the Makkah district of Saudi Arabia, as well as from the director of the Makkah kindergarten department. Semi-structured interviews were conducted to explore participants' perceptions and beliefs towards uses of computers in teaching and learning. In addition, observations were carried out in a number of lessons, in order to understand the classroom environment, obtain insights into how ICT was being used as a pedagogical tool in practice, and identify the difficulties faced by teachers in integrating this technology into their practices. A full account of the research method can be found in Chapter Four.

1.5 Definition of Terms

This study explores kindergarten teachers' perceptions and pedagogical beliefs regarding the use of ICT in Saudi kindergartens. To facilitate the reader's understanding of this research, it is necessary to clarify some basic concepts that are used throughout the study. There are five key terms involved in this study: ICT, ICT integration, kindergartens, pedagogical beliefs, and perceptions.

ICT

ICT has a number of definitions, which are derived from different contexts. For example, UNESCO provides the following definition:

> "The tools and processes to access, retrieve, store, organize, manipulate, produce, present and exchange information by electronic and other automated means. These include hardware, software and telecommunications in the forms of personal computers, scanners, digital cameras, handhelds/PDAs, phones, faxes, modems, CD and DVD players and recorders, digitized video, radio and TV and programs like database systems and multimedia applications" (UNESCO, 2010, Section Two, para 6).

In this study, ICT refers mainly to computers, including hardware and software. These being the devices most relevant to the Saudi educational context.

ICT integration

Yildiz and Usluel (2016) considers ICT integration as a flexible, dynamic and changeable process and, so, various definitions of this process have been proposed in the literature. Cuban et al. (2001) presented integration based on the type of applications in which teachers have used ICT within the learning environment.

Another interpretation proposed by Hennessy and Warwick (2010), concerns how ICT is employed by teachers to improve and encourage classroom practice, and how such use may change these learning activities to contribute to the learning process of the students. Similarly, according to Rosnaini Mahmud and Mohd Arif (2008), ICT integration is the process of planning where and how ICT fits in the teaching and learning scenarios. In this research, ICT integration is seen as the use of ICT resources such as desktop computers, laptops, projectors, projection screen, Internet, or other forms such as speakers in kindergarten education for instructional and supportive purposes.

Kindergartens

The German educator Friedrich Fröbel coined the name kindergarten in 1840. This German word means, literally, "children's garden" (Puckett & Diffily, 2004). In Saudi Arabia, the educational institutions which serve children aged from three to six years are called kindergartens (known as preschools in some countries like the UK); for children younger than three years they are called nurseries. In this study, the researcher uses the word kindergarten throughout the thesis when referring to early years education (EYE) centres.

Pedagogical beliefs

Ertmer (2005) defined pedagogical beliefs as the beliefs of teachers about teaching and learning related to the integration of technology into the classroom. Ertmer et al. (2012) argued that pedagogical beliefs typically have two dimensions: traditional and constructivist beliefs. Traditional beliefs, also known as teacher-centred beliefs, refer to the view of learning as the transmission of knowledge, which leads the teacher to

adopt teacher-led activities for the whole class and individual drill-and-practice exercises as pedagogical practices. Constructivist beliefs, also known as student-centred beliefs, refers to a view where learning is seen as the construction of knowledge, leading the teacher to adopt group work and exploratory learning projects as pedagogical practices (Ertmer et al., 2014; Mertala, 2017).

Perceptions

This term has been studied in various areas and appeared in diverse of definitions. One of the definitions of perception is "a thought, belief, or opinion, often held by many people and based on appearances" (Cambridge Dictionary, 2020). Tran (2018) described teachers' perceptions as teachers' attitudes and beliefs through which they explain new phenomena. Niederhauser and Stoddart (2001) suggested that perceptions play an important part in how teachers plan, interpret and make decisions about teaching approaches and learning tasks. In the current research, perceptions are defined as individual understandings, views and attitudes.

1.6 Structure of the Research

Following from this introduction, This research comprises a further seven chapters. Chapter Two provides an overview of the Saudi Arabian context. This chapter outlines the geographical, religious and economic aspects that shape the distinctiveness of the Kingdom. Particular attention is paid to the system of education in the Kingdom, with a focus on early years education (EYE) in the Kingdom. The chapter discusses the Tatweer education reform project, which was intended to promote a new approach to teaching and learning, with an emphasis on integrating ICT. The chapter also

introduces the Kingdom's Vision 2030 development plan, with particular focus on plans for education and development in EYE.

Chapter Three is a literature review, intended to clarify key concepts and theories, to assess recent knowledge and thinking on ICT in EYE, and to identify research gaps where this study can contribute. It consists of three main sections. The first reviews developments in ICT in EYE and debates on its impacts on children's learning, social skills, emotions and health. The second addresses learning theories: behaviourism, cognitivism and constructivism, and their implications for ICT use. Lastly, the focus turns to the role of the kindergarten teacher in acceptance and use of technologies in education, and the need is identified for research on teacher beliefs and perceptions, and environmental influences on their practices.

Chapter Four provides an explanation of the research methodology. It shows how the research questions led to the adoption of a qualitative case study design underpinned by constructionist and interpretivism. The selection of strategies and methods for data collection, implementation and analysis procedures and criteria for assuring research quality are all explained, and ethical considerations are addressed.

The research findings are presented in two chapters, beginning in Chapter Five with the observation outcomes, including profiles of the participating kindergartens, their organisational structure and learning environment, and the observed use of ICT in lessons. This is followed in Chapter Six by an analysis of the interview data, presented under four themes: ICT resources, the impact of computers, approaches, and obstacles to using the computer.

Chapter Seven contains a discussion of the research findings in the light of the research questions and of relevant literature. The discussion begins by addressing in turn the four themes identified above. There follows a consideration of relationships between teacher characteristics, such as age and experience, and their perceptions and practices towards the use of computers in the classroom. Lastly, the UTAUT model is employed as a framework for assessment of the implications of the research findings for ICT acceptance and use in Saudi EYE, and to evaluate the model's applicability and value in that context.

Chapter Eight concludes the thesis by summarising the main findings, acknowledging its limitations, identifying its contributions and drawing implications for practice and policy. Avenues for future research are suggested, and some final thoughts are offered on the research journey and the potential value of the outcome.

Chapter 2

The Context of Saudi Arabia

Chapter outline

Chapter 2 The Context of Saudi Arabia

2.1 Introduction

This chapter is aimed at giving an insight into the wide cultural and historical dynamics in Saudi Arabia so as to give an overview of the context of this work. The chapter is subdivided into five sections. The first outlines the geographical, religious and economic aspects that shape the distinctiveness of the Kingdom of Saudi Arabia (KSA). The second section is focused on the system of education in the Kingdom, and in the third, the focus is on early years education (EYE) in the Kingdom. The fourth section discusses the Tatweer education reform project, which was intended to promote a new approach to teaching and learning, with an emphasis on integrating ICT. Lastly, the Kingdom's Vision 2030 development plan is introduced, with particular focus on plans for education and development in EYE.

2.2 Geographical, Religious and Economic Characteristics of Saudi Arabia

Geographical Profile

The Kingdom of Saudi Arabia comprises about two-thirds of the Arabian Peninsula, a landmass constituting a strategic location, which connects three continents: Asia, Africa, and Europe. The Kingdom covers an estimated area of approximately 2.25 million square kilometres (making it the world's 13th largest state). It is bounded on the west by the Red Sea; on the north by Kuwait, Iraq, and Jordan; on the east by the Gulf, the United Arab Emirates, Bahrain, and Qatar; and on the south by Oman and Yemen. According to the Saudi General Authority for Statistics (GaStat), the

population of the country was 33.4 million in 2018; Saudi nationals numbered 20.8 million (of whom 51 per cent were male, and 49 per cent female), and the non-Saudi nationals' population was 12.6 million (of whom 68.5 per cent were male, and 31.5 per cent female). It is estimated that 58 per cent of the Saudi population is under the age of 30 (GaStat, 2018).

Religious Profile

The Kingdom of Saudi Arabia is widely considered to be the birthplace of Islam; in the western region of the Kingdom the two holy mosques are located in Makkah and Madinah. Islam is the dominant religion in Saudi Arabia. Islam as a religion encourages learning and seeking for knowledge. All Saudis are Muslims, although the Kingdom of Saudi Arabia (KSA) also contains significant numbers of foreign workers of other faiths. Therefore, policies in education and other aspects in KSA are intertwined with Islamic practices and beliefs. In KSA there is great emphasis on religion, with Islamic education forming the basis of the Saudi culture (Al-Jadidi, 2012). According to the Saudi Ministry of Education (MoE, 1976), the principal goal of education in the country is enabling students to completely understand, embrace and practise Islam. It focuses on spreading and inculcating the Islamic doctrine, offering students Islamic instructions and values, alongside acquisition of diverse skills and inculcating upright morals, strengthening the society economically, culturally, and socially and developing learners to become effective members of society. One of the educational goals is encouraging scientific research and thinking.

Economic Profile

Since the discovery of oil in 1938, the Kingdom has transformed from clusters of Bedouin settlements to the modern cities that characterise it today. The revenue from the petroleum produced has funded rapid developments in several aspects of day to day life. Social changes preceded the economic ones. The original Bedouin communities, which were characterised by a nomadic lifestyle, changed to highly urbanised ones. This move automatically changed peoples' attitudes and lifestyles. In the 1970s, the KSA government initiated a series of five-year development plans that included the establishment of new infrastructures, including public amenities like schools, hospitals, universities, communication systems, roads and houses (Khalifa, 2001). The Saudi economist Hafiz (2019) stated that the Kingdom is an active member of the G20 group, not only because of its oil power but also because of its economic size and also for its contribution to world growth and financial stability.

In 2016, the government of Saudi Arabia introduced a long-term economic blueprint, known as Vision 2030, with the aim of diversifying the country's economy away from dependence on oil as the main source of government revenue (this vision will be discussed in more detail in section 2.6). The increase in economic requirements and the change in lifestyles have led to an increase in the number of women participating in the workforce. The growing number of women in Saudi Arabia has also given many women in the country the motivation to work away from their maternal duties and develop their careers (Gahwaji, 2013). Nevertheless, according to the Ministry of Labour and Social Development (MoLSD, 2019), although women comprise about 49 per cent of Saudi's population, only 25 per cent are actively involved in the workforce.

2.3 Education in Saudi Arabia

This section commences with a general outline of the chronological and historical development and the current form of education in Saudi Arabia, with a special focus on girls' education, as it is the girls' education department that is assigned responsibility for all public and private kindergarten institutions.

2.3.1 The Development of General Education

Formal education started in Saudi Arabia in 1926 when King Abdulaziz realised the importance of formal education in the development of the nation and ordered the establishment of the Directorate of Education (MoE, 1981), to develop primary and secondary education and also employ teachers from outside the Kingdom, mostly Egypt (Kabli, 1999). After the founding of the KSA in the year 1932, the authority of the Directorate of Education increased and it took full responsibility for education in the country (MoE, 2019a). The first national curriculum for primary education was produced by the directorate in 1935. A school building programme started in 1945, which has led to the large number of schools, more than 32000, in operation today (MoE, 2019b).

2.3.2 Girls' Education

It was not until 1960 that formal state education for girls commenced in Saudi Arabia. Before that, some families within the Kingdom who felt that formal education was important for their daughters organized private tuition for them (Al-Zarah, 2008). There were also a few private institutions that offered formal education to girls, although they were closer to home tutorship than schools (Al-Rawaf, 1999). The girls were taught basic Mathematics, the Quran and the Arabic language (Al-Zarah, 2008).

The pioneers of such schools started in Madinah in the 1930s and also in the region of Hijaz, but were not influential and also girls' education was more exceptional than a requirement (Al-Sharari, 2010).

Owing to traditional dogmas held by some religious authorities, it took until 1960 to establish a law supporting the education of girls in Saudi. The government of the Kingdom by this time had realized that the economic, social and cultural development of the country called for women's participation and this was only possible by empowering them through education. For the purpose of satisfying the religious bodies, girls' learning institutions were kept under their supervision. Also, strict segregation was maintained between them and their male counterparts. The General Presidency for Girls' Education (GPGE) was established in 1960 as an independent body to monitor girls' education (Al-Sayed, 2002).

The education of girls commenced with the establishment of 15 primary schools in the main urban centres in the Kingdom, together with one class in the Institute of Elementary Teachers' Preparation. The number of pioneer female students in the country at that time was barely 5,180. A notable development is that the government of the Kingdom abolished the GPGE in 2002 and the Ministry of Education took total control of the education of both girls and boys in the Kingdom (Al-Hogail, 2003).

By 2018 the number of girls' schools had grown to 17,000, with more than 3 million female students, and 347, 598 teachers and administrators. Interestingly, in 2018, for the first time in the Kingdom's education history, the number of female students exceeded that of male students. Table 2.1 shows the relative growth in the number of

male and female students in the Kingdom between 1970 and 2018 (Al-Rawaf, 1999; MoE, 2018a).

Table 2-1: Male & Female Students in Saudi Arabia 1970 - 2018

Year	Male	Female	Total
1970	412,000	135,000	547,000
1975	673,000	311,000	984,000
1980	951,000	511,000	1,462,000
1985	1,273,000	876,000	2,149,000
1990	1,624,000	1,310,000	2,934,000
1995	2,022,000	1,912,000	3,934,000
2000	2,405,000	2,369,000	4,774,000
2012	2,628,319	2,559,179	5,187,498
2018	2,937,844	3,043,875	5,986,414

In Saudi, there are six stages in Education: kindergarten, primary, intermediate, secondary (under the MoE), undergraduate and postgraduate, under the Ministry of Higher Education (MoHE). In 2015, the MoE was merged with the MoHE (MoE, 2019a). Education is free throughout the Kingdom and it includes provision of health facilities and books to the students. The education policy in the Kingdom explicitly stipulates that co-education is prohibited at all stages except in kindergartens (MoE, 1976). According to higher education statistics, in 2018, there were 71 public and private universities and colleges in the Kingdom. Twenty-eight of the universities were government-funded and these harboured 1,385,620 students. In addition, there

were 14 private universities and 29 colleges financed by the private sector, which included 78,579 students (MoE, 2018).

2.4 Early Years Education (EYE) in Saudi Arabia

The first institution of early years education in the Kingdom was established in 1965 when the first private kindergarten, Dar Al-Hannan, was established in Jeddah, in the western region. Others followed, and within four years, there were 13 kindergarten centres in the country. According to Al-Jadidi (2012), the private sector took responsibility for kindergarten education in the Kingdom until 1975, when the Ministry of Education (which was also concerned with boys' education) opened the first public kindergarten in Makkah and took responsibility for the kindergarten centres (MoE, 1989). In 1980, the GPGE, which was later merged with the Ministry of Education, officially assumed the responsibility for all private and public kindergartens and for licensing teachers to work in this field. Subsequently, the government decided to develop early years education and contributed to an increase in the number of kindergarten schools, which were divided between the public and private sectors. The following table 2.2 illustrates the growth of EYE in Saudi Arabia from 1984 to 2016 (MoE, 2004, 2016a).

Table 2-2: Growth of EYE in Saudi Arabia from 1984- 2016

	1984-1985	1994-1995	2004-2005	2011-2012	2016-2017
Kindergartens	543	794	1320	2461	3403
Classes	2589	3928	5704	12266	17619
Children	79608	83649	100032	182435	293234
Teachers	4630	7007	9744	17993	26611

Source: (MoE, 2004, 2016a)

As shown in the table, at the beginning of this decade, the number of kindergarten schools was 2461, with 12,266 classes, which included 182,435 children and 17,993 teachers (MoE, 2011). In 2016/2017, this number rose to 3403 kindergarten schools, with 17,619 classes, 293,234 children and 26,611 teachers (MoE, 2016). The number of children joining kindergarten schools in urban areas was much higher than in rural areas (Khomais, 2007). The rate of enrolment in kindergarten was 15.4% of the Saudi early years population in 2016, according to estimates, but in the government view, this was still insufficient relative to the total number of children (MoE, 2016a). The take-up of Saudi kindergarten education is still limited, compared to the primary education stage, which serves 2,981,789 children in 15,818 schools (MoE, 2016a).

Notably, the kindergarten enrolment rate in KSA is reportedly the lowest among the Gulf Cooperation Council (GCC) countries and significantly lower than the regional, average, which is 64.4% (see Table 2.3). As a result of the low enrolment rate in kindergartens, the Government of Saudi Arabia has created plans to increase the enrolment rate in kindergartens, which will be discussed later in this chapter, under section 2.6.

Table 2-3: Kindergarten enrolment rates in the GCC countries.

	Gulf Cooperation Council (GCC) Countries					
	Bahrain	Kuwait	Oman	Qatar	UAE	KSA
Enrolment rate (%)	55.26	67.9	56.7	60.14	81.85	15.4

Source: (MoE, 2016a; UNESCO, 2016).

2.4.1 The system of EYE

In the Kingdom of Saudi Arabia, the Early Years Education system is divided into two types of settings: nursery, which provides care for the youngest children, ages 0-3 years, and kindergarten, which offers both care and instruction for children aged 3-6 years (Aljabreen & Lash, 2016). The current study is concerned with Saudi kindergarten settings. Children are enrolled in kindergarten grade one (KG1) at age three, followed by kindergarten grade two (KG2) at age four, and then kindergarten grade three (KG3) between the ages of five and six (Madini, 2005). Children of both genders are allowed to go to kindergarten institutions, but all the teachers and caregivers are female, as this is a government requirement (Al-Jadidi, 2012).

According to the *Organisational guide for nursery and kindergarten* in Saudi Arabia (MoE, 2018c), there are three types of kindergartens in Saudi Arabia: public, private, and applied public. An applied public kindergarten is a distinguished kindergarten supporting the other two types of kindergartens in administrative and technical aspects. This supportive kindergarten has particular objectives such as contributing to raising the performance of public and private kindergartens, offering workshops and training courses related to the early years stage, training of female teachers in the implementation of kindergarten programmes and organisation of classroom environments, and providing a rich library of educational tools for children and teachers.

In Saudi kindergarten schools, both sexes follow the same curriculum (AlKhatib, 2006). Attending kindergarten in Saudi Arabia is not a requirement for enrolling in primary school (UNESCO, 2011). The MoE considers EYE as a preliminary stage and

"an independent stage in its curricula and structure" (MoE, 2004:18). Madini (2005) reported that 74.2 per cent of children attend only KG3, because parents prefer their children to adapt to the educational environment before primary school and they consider the last year of kindergarten is sufficient to ready a child for the next stage, as they can more easily see the relevance of the more formal and structured teaching in KG3 than the 'play' in KG1 and KG2. Similarly, the data of an Education and Training Survey issued by the General Authority for Statistics (GaStat, 2016) show that 76.4 per cent of kindergarteners were attending the third grade. When children graduate to primary school, the legally mandated system of gender segregation starts, whereby girls and boys each have their respective institutions (in 2019, this system was changed, and more information will be provided in section 2.6).

2.4.2 Objectives of kindergarten

In Saudi Arabia, the main objective of kindergarten is to orient children to the educational life and its challenges, by means of "upright and moral upbringing in tandem with tenets of education" (Samadi & Marwa, 2006:23). The MoE (1996) formulated the aims of kindergarten so as to integrate them with the overall policy of education in KSA. The aims are:

- Nurturing the instincts of the children. This involves pursuing the children's moral, physical and mental development in a natural environment close to that of the family, with compliance to the tenets of the Islamic faith.
- Orienting the religious inclination of the children and inculcating the virtues and values of Islam based on the oneness of God (Tawhid), in conformity with the children's instincts.

- Inculcation of good behaviour among children through aiding their acquisition of Islamic values of good behaviour in the school environment.
- Acclimatising the children to the typical environment they are likely to meet at school and hence remove the sense of isolation they are likely to encounter within the school set up.
- Instilling in abundance the wealth of proverbs and parables on basic truths and knowledge that surround the children.
- Equipping the children with physical exercise, teaching them the sense of hygiene and then orienting the children on how to live by healthy principles.
- Encouraging the culture of imaginative thinking and enabling children's potential to grow and unfold through good care.
- Taking care of the needs of the children, pleasing them and educating them at the same time without overloading or spoiling them.
- Safeguarding the children from perils, guiding against early manifestations of unruly behaviours and also guiding then in coping with childhood problems in correct ways (MoE, 1996).

2.4.3 Curriculum and daily activities

In this section, a description is provided of the newest edition of the Saudi kindergarten curriculum, and a typical school day's activities in a Saudi kindergarten classroom.

In the early 1980s, a group of educators from the Arab Gulf Programme for Development (AGFUND) established the first kindergarten curriculum in Saudi Arabia (MoE, 2004). The most recent restructuring of the kindergarten curriculum, the 7th edition, was published in 2004 (MoE, 2004).

The kindergarten curriculum in Saudi Arabia is styled as a child-centred curriculum, which includes several themes, such as family, friends, libraries and books, and health and safety (MoE, 2004). The Saudi Arabian Ministry of Education provides a guidebook for kindergarten teachers. This manual suggests themes, activities, rhymes, and lessons plans, and gives teachers some sort of flexibility in terms of content. In order to show accountability, teachers are required to plan lessons in advance, and assess the lessons later. For each lesson, teachers must have activities that encourage children's reading and writing skills, and also help to develop their social and emotional skills. Teaching is geared towards a holistic development that includes physical education and even spiritual development (MoE, 2004). One of the basic ideas behind the Saudi kindergarten curriculum is teaching the children the traditional and cultural values of Saudi Arabia (MoE, 2008).

The Saudi kindergarten curriculum is divided into chapters, each of which explains and expounds on a theme. Each chapter starts off with an introduction that provides the ideas behind a specific topic. Then, the chapter explains ideas which teachers are expected to explain to children in the classroom. There are prescribed learning targets that children are expected to reach by the end of a theme. Below is a table with examples of concepts and expected learning outcomes within the theme of family.

Table 2-4: Saudi Kindergarten Curriculum: Family Theme

Family Theme
Examples of major concepts within the theme: - Each person belongs to a family. - Each family member plays a certain role. - Each family has a family history. - Some children live with their parents; others live with their extended family.
Examples of suggested learning outcomes within the theme: - Students are expected to: - Name their family members (parents, grand-parents etc.), - Describe different family members and their roles, - Know how to respectfully greet family members, - Learn the alphabet, - Be able to write some letters.
Examples of activities: 1- Circle time: - Teacher should present pictures or videos showing families in different settings and cultures. - Teacher should invite a mother with a new-born baby to talk about the newborn. - Teacher shows slides or pictures of family members performing different tasks (for example, a picture of a grandmother baking traditional bread, mother feeding her baby, or father fixing a car). 2- Lessons in Reading and Writing: - Teacher should teach the alphabet. - Teacher should tell students to complete their worksheets. 3- Corners Time: - Library corner: teacher should tell students stories about themselves and their family. - Science and discoveries corner: teacher should place several objects in a sack and ask the students to use their sense of touch to name the objects. - Cognitive corner: sorting objects and tracing cards. - House corner: Teacher should include clothes and fabrics for role-playing, like scarves, purses, sunglasses, and traditional Saudi outfits for boys and girls. - Art corner: students should be helped to create a photo collage showing the concept of family. - Construction corner: students should use plastic objects or toys to represent family members.

It can be seen from the above that the activities suggested for circle time reflect traditional gender roles. Saudi education reflects normative thinking on gender and socializes children into traditional roles through the images it presents of familial roles and practices.

In addition to suggesting themes' content and activities, the government curriculum addresses the classroom environment and it suggests different classroom layouts. Kindergarten classrooms are supposed to include "corners" such as a construction corner, drama or play corner, literacy and numeracy corner, science and discovery corner, art corner, household corner, and theme corner. The guidebook allows teachers to make changes to the classroom environment depending on the monthly theme.

The kindergarten school day often follows a routine, starting with learning the date of the day, Quran recitation, rhymes, and then a teacher-planned lesson (MoE, 2004). The lessons are supposed to promote interaction between the teacher and the students. However, learning by rote continues to be a basic feature of the Saudi educational system (Rugh, 2002). This shows the important influence of cultural assumptions and beliefs in the application of the curriculum (Rogoff, 2003).

Given all that has been mentioned so far about EYE in Saudi Arabia, there seems to be some evidence to indicate that the government has paid less attention to early years education and has not taken critical ways to solve the problem of low enrolment of children in kindergartens. Furthermore, it appears that the Ministry has not encouraged and motivated parents to register their children in kindergarten or emphasised the importance of this stage in terms of preparing children for the school environment and equipping them with fundamental knowledge. Besides, the kindergarten curriculum is outdated and needs to be improved to take advantage of, and benefit from the developments in developed countries. It should meet the needs of children in this technological era and raise the level of knowledge and creativity. In the next section, MoE projects and initiatives to reform the educational system in the Kingdom are discussed.

2.5 ICT in Saudi Schools

The ultimate objectives of the Saudi educational policy are to guarantee that education becomes more efficient, to meet the religious, social, and economic needs of the Kingdom and to continue to eliminate illiteracy among Saudi adults (Alqassem et al., 2016). However, these broad objectives of education do not mention anything about the use of ICT in education. In order to formally address the need for an appropriate policy on the integration of ICT into the education system, in 2007, the MoE launched the first stage of a national project for Public Education Development, known as Tatweer, with a budget of SR8 billion (approximately £1.6 billion). The project was designed to reform the educational system in the Kingdom, including improving the school environment, developing school activities, improving curricula, the introduction of ICT in the teaching and learning process, and improving teacher competence in ICT (Alharbi, 2019). Furthermore, the MoE equipped libraries at schools to provide electronic learning resources and encourage the integrating of ICT into the teaching and learning process, to create richer learning environments (MoE, 2008). However, the introduction of ICT in the teaching and learning process was limited to the secondary school stage. Fifty secondary schools were chosen across the Kingdom to participate in this project. These schools, designated as 'Smart Schools', were transformed from centres of traditional education to become learning environments, equipped with modern educational technology, with proactive educational leaders and specially-trained teachers, whose mission was to facilitate and direct learning processes (Alyami, 2014). In these schools, each classroom was equipped with similar ICT resources, such as laptop, projector, smartboard, and an internet connection. Nevertheless, several Saudi researchers criticized this project, because the implementation took place only at a few chosen schools across the country

(Alghamdi & Higgins, 2015) and because, despite the provision of some ICT resources in the chosen schools, teachers and students were not given any prior training on these resources (Almasoodi, 2013). Also, Alyami (2014) argued that the maintenance of these technologies was extremely costly; accordingly, the second stage of the project was established to solve the first stage's issues and challenges and offer more developmental plans.

In 2011, the second stage of the Tatweer project started, to last for another six years with a fund of SR9 billion (£1.8 billion). This stage included a number of plans for schools, students, teachers, headteachers and local education authorities, with the aim of developing an effective public education system. For example, Alenezi (2015) indicated that about 1700 teachers were trained on changing the dominant traditional teaching method (e.g. teacher-centred, didactic) into teaching with the use of ICT. In this stage, secondary schools implemented the project with their own resources and were not supplied with advanced technology, as in the first stage of Tatweer (Alyami, 2014). Alshanqiti (2018) described the second stage as divided into three phases. Firstly, the design phase began in 2011. The aim of this phase was to devise a theoretical framework for the project, to limit any expected problems and solve any challenges. The second phase, in 2012 and 2013, was the application phase, in which the theoretical plan designed in the first stage was to be implemented in 210 schools across the country. In the third phase, called the generalising phase, the implementation of the project was to be rolled out to all public schools, including kindergartens.

Although this massive project was intended to develop the quality of education in the Kingdom to meet the requirements of the 21st century, there has been much criticism of the two stages of the Tatweer project by Saudi researchers (Al-Essa, 2009; Al Shibani, 2015; Elyas & Al-Ghamdi, 2018). Alshmrany and Wilkinson (2017) stated that the two stages of the project ignored the integration of ICT into the primary education stage. Besides, Saudi early childhood studies did not mention that the project was implemented at that stage, except Hammed's (2014) study, which indicated that the introduction of ICT as a learning corner in the classroom formally began in 2010. This step was an initiative from Jeddah General Directorate of Education, and it was approved by the Ministry of Education to improve the quality of early childhood education. Some researchers, such as Al-Dayel (2009), Hammed (2014), and Alasimi (2018), found kindergarten teachers' use of ICT within their teaching is based upon their individual efforts, without a holistic policy and pedagogical guidelines. Also, they indicated that computers tend to be used in practice as a teaching tool, rather than directly used by children. For example, Alasimi (2018) found over 67 per cent of kindergarten teachers were using technology as a presentation tool for teaching. She also found that the majority of kindergarten teachers did not let children play games with technology (58.8%) or use the internet to search for information (70%).

Dr Ahmed Al-Essa, one of the most famous critics of this national project, argued that one reason for the limited results from the project was the absence of teachers' involvement in the development of the project before it was started, and the lack of sufficient teacher training on how to effectively implement the project (Al-Essa, 2009). Similarly, Al-Shibani (2015) in a study on the Tatweer project, found that the voice of

Saudi teachers had been ignored, and they felt like agents, not partners, in the project. This is a serious shortcoming, since there is evidence that the participation of teachers in the design of educational reforms plays a pivotal role in the implementing and success of these reforms, as many researchers agree that the teacher is the most influential factor in the school setting (Hargreaves & Fullan, 2012; Allmnakrah & Evers, 2019). Connected with this, teacher training for achieving change is vital for implementing curriculum reform, adopting new teaching approaches, and employing educational technologies.

According to Al-Essa (2009), the absence of such measures, contributing to the project's failure, two years after it was rolled out, could be ascribed to the lack of political vision and will. A few years later, however, in 2016, the Saudi government announced an ambitious new vision and development plan covering all sectors of the country, including education. This plan, known as Vision 2030, and its implications for education, are discussed in section 2.6.

The evidence presented in this section suggests that the projects devoted to the application of technology integration in education were late, focused on secondary education, overlooked teacher participation in planning and did not train them to implement before starting educational practices. Although the budget of the education sector and projects of integrating ICT in education were massive, the education system is almost stagnating as a result of outdated policy and reliance on ineffective teaching methods.

2.6 Education and Saudi Vision 2030

In April 2016, the Saudi Council of Ministers tasked the Council of Economic and Development Affairs (CEDA) to launch an ambitious plan, known as the Saudi Economic Vision 2030, to introduce the kingdom's long-term goals for diversifying the economy and reducing dependence on oil. The plan emphasises the link between education and a competitive economy. The crown prince of Saudi Arabia, Mohammed bin Salman (MBS) officially announced this vision, which focuses on a variety of economic and education reforms, cultural and entertainment projects, as well as business and investment endeavours (CEDA, 2016). This vision "*is built around three themes: a vibrant society, a thriving economy, and an ambitious nation*" (CEDA, 2016:13). According to the Saudi Economic Vision 2030, education is a key pillar in contributing to economic growth (see Figure 2.1), and the word "education" is repeated more than 29 times in the vision's document.

The vision includes many educational goals, as Prince MBS stated:

> "Among our commitments … an education that contributes to economic growth. In the year 2030, we aim to have at least five Saudi universities among the top 200 universities in international rankings. We shall help our students achieve results above international averages in global education indicators. To this end, we will prepare a modern curriculum focused on rigorous standards in literacy, numeracy, skills and character development. We will track progress and publish a sophisticated range of education outcomes, showing year-on-year improvements". (CEDA, 2016:40)

> "We 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". (CEDA, 2016:36)

"We will build a centralized student database tracking students from early childhood through to K-12 and beyond into tertiary education (higher and vocational) in order to improve education planning, monitoring, evaluation, and outcomes". (CEDA, 2016:41)

"We want to deepen the participation of parents in the education process, to help them develop their children's characters and talents so that they can contribute fully to society. Families will also be encouraged to adopt a planning culture, to plan carefully for their future and the futures of their children. We intend to embed positive moral beliefs in our children's characters from an early age by reshaping our academic and educational system". (CEDA, 2016:28)

"Teachers will receive training to raise their awareness of the importance of communicating with parents and equip them with effective methods to do so successfully". (CEDA, 2016:33)

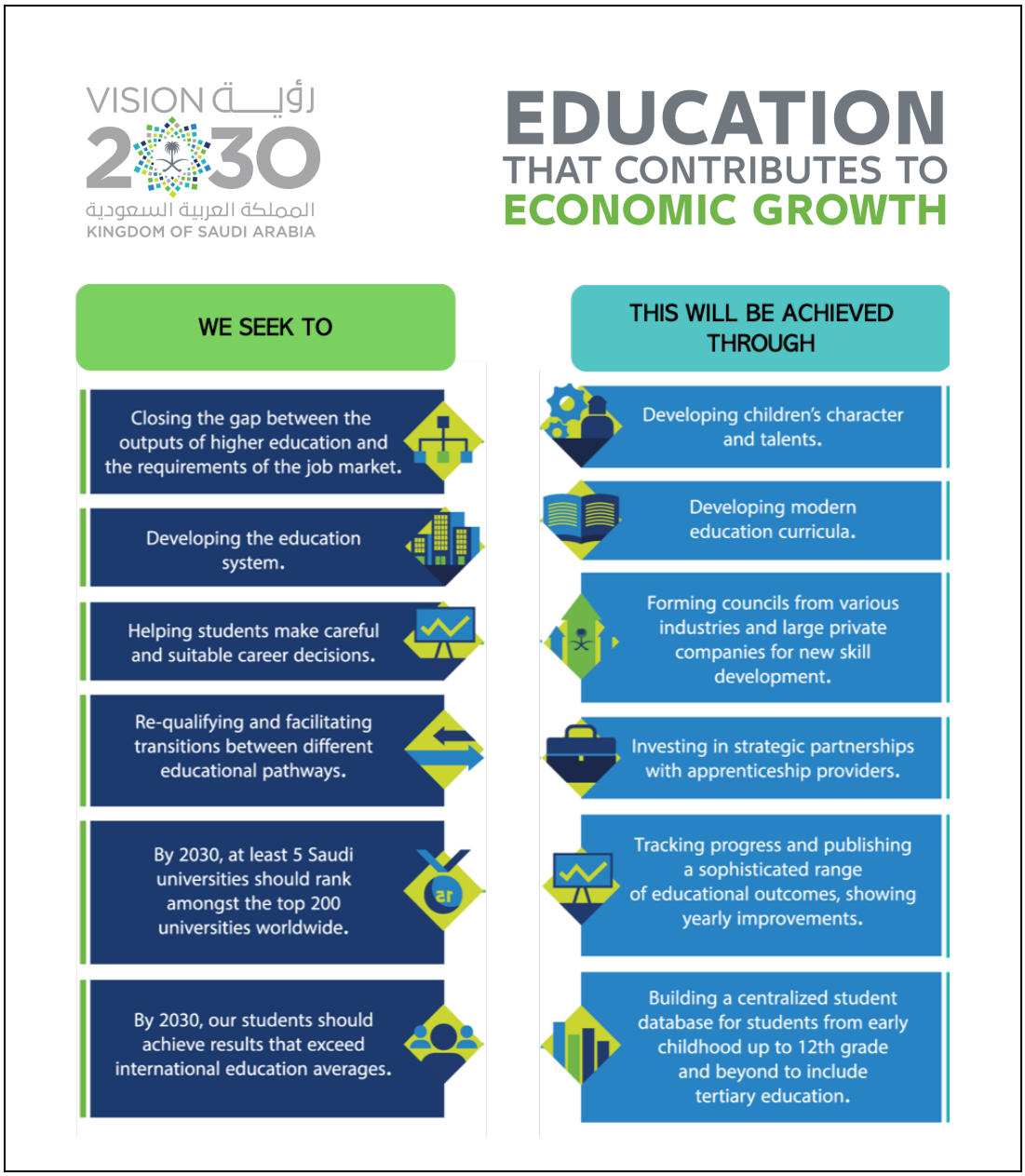

Figure 2-1: Extract from Vision 2030, showing focus on education.

These quotations from the vision show the government's intention to lead education to excellence by enhancing higher education, preparing a modern education curriculum, tracking the progress of education outcomes, supporting teacher training, developing early childhood education, involving children and their families in the educational reform and recognising the importance of collaboration and a teamwork

culture. Allmnakrah and Evers (2019) suggested that the vision showed a recognition that there is an urgent need in Saudi Arabia for educational reform, especially in the area of teacher development, in order to prevent the perpetuation of the method of rote learning. Considering that it has already been recognised that the previous education initiatives have produced little results, the Prince's comments suggest that there is a renewed commitment by the decision-makers to fund the professional development of teachers and to implement policy changes through fostering the vision to promote the lifelong learning of students, which is fundamental to the successful implementation of kingdom's economic reforms.

The government has allocated a substantial share of its budget to achieving its educational goals. Since the Vision was announced in 2016, the Kingdom has allocated nearly 40 billion pounds annually to the education sector (see Table 2.5). For example, in 2016, a total of SAR 192 billion (GBP 39.4 billion) was earmarked for general education, higher education and training, accounting for 23% of the total budget (MoF, 2015). Furthermore, the Kingdom of Saudi Arabia has one of the highest levels of spending on education, surpassing some developed countries. For instance, in 2017, most of the European Union countries, including Germany and United Kingdom spent an average of 4-5 per cent of their Gross Domestic Product (GDP) on education (Eurostat, 2019), whereas Saudi Arabia has spent above 6 per cent of GDP per year on education from 2016 to 2020 (MoF, 2020).

Table 2-5: Annual allocations to education under Vision 2030.

	Years				
	2016	2017	2018	2019	2020
The Education sector budget (SAR billion: GBP billion)	192: 39.4	200: 41	195: 40	192: 39.4	193: 39.6
Percentage of the Kingdom's total budget	23%	22.5%	20%	17.5%	19%

Source: (MoF, 2020)

The MoE started to reshape the education sector under Vision 2030 in order to achieve the vision's goals based on the three themes (see Figure 2.2). In June 2016, the National Transformation Programme (NTP) was started, to achieve Saudi Vision 2030 and to recognise the challenges encountered by government organisations in the economic and development sectors. The programme sets strategic objectives based on the Vision, addresses expected challenges up to 2020, and offers interim indicators that measure achievement. As part of the programme, the MoE was assigned some strategic objectives to be fulfilled by the year 2020, such as increasing the average number of annual professional development hours completed by teachers from 10 hours to 18 hours, increasing the average number of annual professional development hours completed by headteachers from 5 hours to 20 hours, and increasing the enrolment rate for kindergartens from 13 to 27.2 per cent.

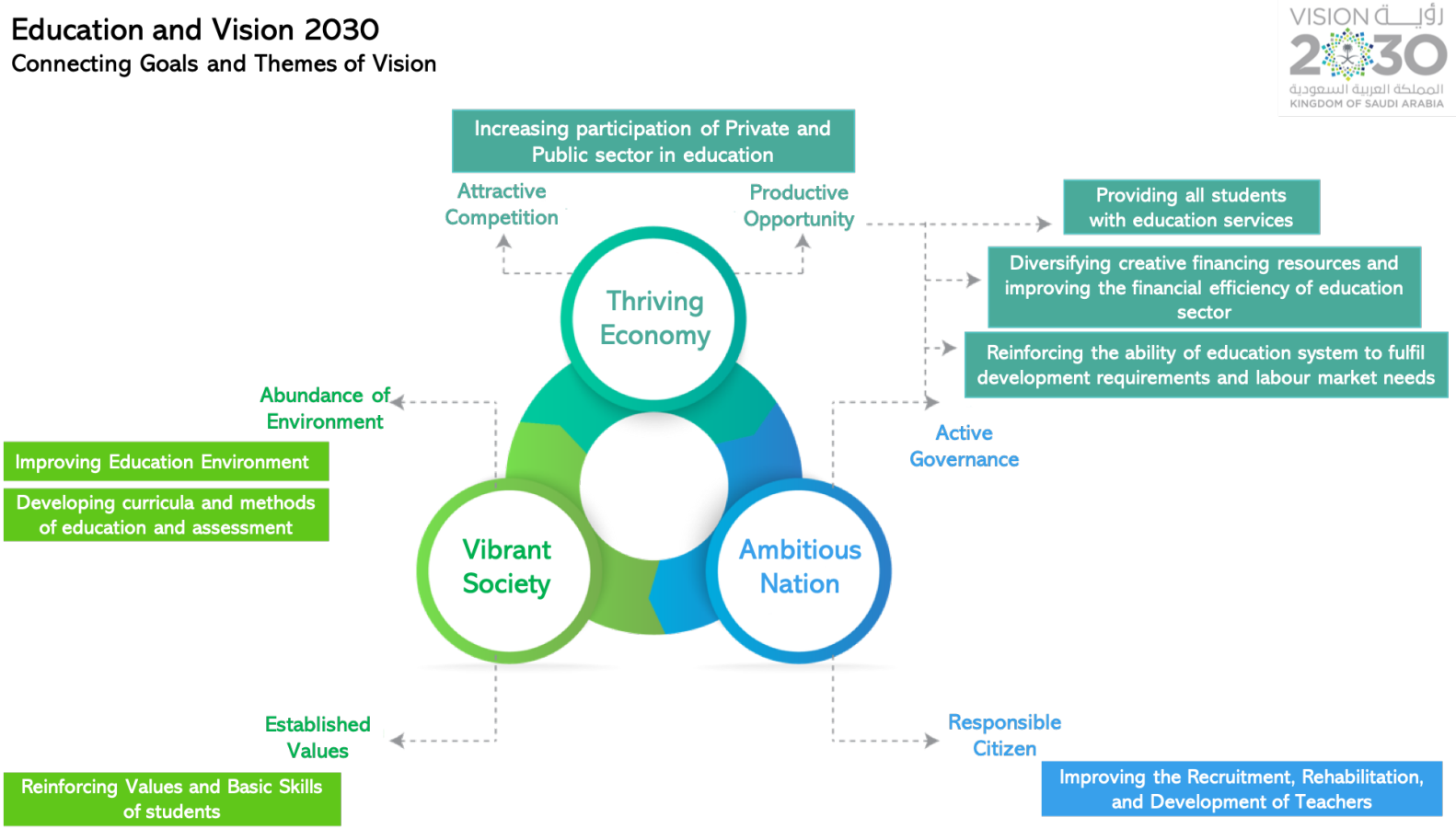

Figure 2-2: The inter-related themes of Vision 2030

Source: (CEDA, 2016)

Arguably the aspects of this vision most pertinent to the current study were that it included the following: developing the EYE sector, improving the educational environment, creating opportunities for teacher training, and developing curricula and teaching methods.

Regarding the EYE sector, the MoE has made intensive efforts to establish regulations and policies for kindergartens, enabling kindergarten staff to recognise their specific duties and responsibilities and to exercise their roles, with confidence (Alshanqiti, 2018). Since 2016, the ministry has introduced five guidance books for kindergartens, such as the *Organisational guide for nursery and kindergarten*, the *Procedural guide for nursery and kindergarten*, both published in 2016, with second editions in 2018, and the *Teacher guide for the Self-learning Curriculum in kindergarten* (MoE, 2018d). The objectives of these guides are to raise awareness of the importance of organisational management, set out the organisational structure of the kindergarten, identify and maintain a record of the specific roles and responsibilities of kindergarten members, enhance the collaboration among headteachers and teachers with families and the community, and keep up with the national and international developments in the EYE sector (Tatweer, 2017). For example, some of the responsibilities of kindergarten management, which are mentioned in the *Teacher's Guide* (MoE, 2018d), are creating the general conditions in the kindergarten, shaping the general pattern of work, distributing the daily tasks of employees, arranging the daily programme, organising exchange of roles between teachers in the classroom, as well as liaising with the educational authority.

The MoE, in consideration of the different demands of young learners and in its commitment to improving performance and developing job plans, is working to build an institutional structure conducive to a system of young children's schooling that prepares learners for higher education stages and in accordance with the statement in the Organizational Guide to the Ministry issued by the Council of Ministers (Decision No. 511 of 06-05-2019). The general objective of the General Department of Early Childhood, which is part of the General Education Agency, is to strive towards ensuring high quality education for children from three years of age to their third year of primary school and to track the quality of the EYE programme by authorized criteria to prepare children to enter primary school (MoE, 2019c).

With the above aims in mind, a group of initiatives has been set for early childhood education: one of these is the development and nationwide expansion of kindergartens, including projects and programmes aiming to provide equitable, quality and inclusive education for all, and increase opportunities for lifelong learning for all. Total enrolments at kindergarten schools will be the key performance indicator for this objective. The target is to increase children's enrolment from 17% to 95% by the year 2030. Besides, the MoE announced that the enrolment rate for kindergartens in 2018 was 17%; 320,000 children, and the target for 2020 is to reach 30% of the total number of 545,000 children, which means enrolling 225,000 children during this period (see Figure: 2.3). It is important to note that, according to the National Transformation Programme (NTP) 2016, the target enrolment rate in kindergartens was 27.2% in 2020. The ministry's raising of the target to 30 per cent may be a reflection of the initial signs of progress.

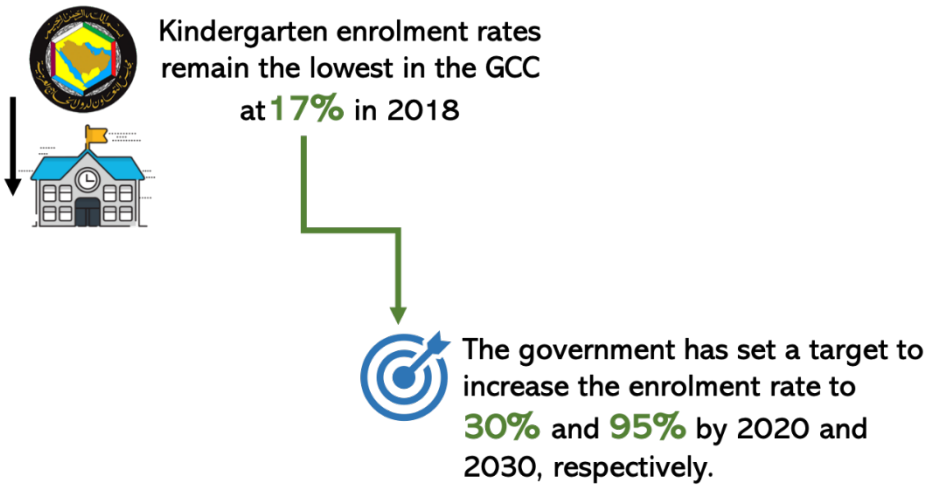

Figure 2-3: Current and targeted rates for kindergarten enrolment

To achieve this initiative, the ratio of teachers to children in kindergarten was decreased from 1:12, in the first edition of the *Teacher's guide* (MoE, 2016b) to 1:15 in the second edition (MoE, 2018d). In addition, to support early childhood expansion, the Ministry planned to open and operate 650 new public kindergartens and provide promotional tracks and facilities for private investors to open at least 1000 kindergartens. This is expected to create important opportunities, such as providing a large number of educational functions for the kindergarten stage and others. This will be achieved through Tatweer Building Company (a government company owned by Tatweer Holding Company, which is owned by the Public Investment Fund) which offers many programmes in cooperation with the Department of Kindergartens in the MoE (see Figure 2.4).

 **Build new KGs** Build new 650 public kindergartens across the Kingdom.	 **Kanaf program** For licensing and qualifying early childhood buildings.	 **Land lease to operators** Public land lease to kindergarten operator.
 **Build attached KGs** Free space in a public school operated publicly or rented out to private operator for the purpose of operating a kindergarten.	 **Developer model** Land lease to the developer, multiple land plots grouped together and tendered as a package.	 **Employer model** A partnership between government, employers and private sector to offer subsidized kindergartens for employee children.

Figure 2-4: Early childhood expansion programmes to achieve the Saudi Vision 2030

An initiative has also been launched for the utilization of human, material and financial resources to support the achievement of the ministry's enrolment targets by assigning female teachers to teach boys in early primary school levels by the academic year 2020/2021. In 2018, the Ministry of Education announced a project of combining the kindergarten stage (after the abolition of KG1) and the first three grades of primary school in public schools, to become one stage of five years, called the early childhood stage. This stage will be supervised by only female teachers, while the boys' primary stage will be limited to the fourth, fifth and sixth primary grades and supervised by male teachers. The Minister of Education, Dr Ahmed Al-Essa, announced that the academic year 2020/2021 is the date set for full implementation of this project. In early

2019, the first public school that included both the kindergarten and early primary school levels opened in the city of Tabuk.

Nada al-Ismail, the Director-General of Early Childhood at the MOE, said that the results of local and international tests for boys and girls in primary schools in Saudi Arabia showed a significant difference in the results between boys and girls (YaHalaShow, 2019). Al-Mansour (2019) argued that female teachers are more approachable and less intimidating for young boys at that stage than their male counterparts, and they will give them a more fruitful learning experience. As a result, the Ministry decided that female teachers should be assigned the task of teaching in the early primary school grades to bridge the gap young boys used to encounter after moving from kindergarten to primary school. Furthermore, through this project, the MoE aims to assure that every child has access to quality education, enhance the efficiency of the educational system, increase space utilization efficiency and take full benefit of public-school buildings. Notably, there are about 184 private schools in the Kingdom, which already employ female teachers to teach boys in the early primary school grades; the first private school applying this strategy was established in Riyadh in 1975 (YaHalaShow, 2019).

For the first time, in the current academic year 2019/2020, this project was partially implemented through female teachers teaching young boys, in separate classes from young girls, in 1460 public schools across the Kingdom. Moreover, the ministry set up 3,313 kindergarten classes to accommodate 83,000 children, to increase children's

enrolment rate in kindergartens from 17% to 21%. Figure 2.5 shows the statistics of early childhood schools in Saudi Arabia for the current academic year 2019/2020.

1,460 Early education schools	**3,313** Classrooms for 83,000 kindergarten students	**3,483** Classrooms for 81,000 early childhood education students
13.5% of young male students will be taught by women	**21%** Enrolment rate for kindergarten	**$533 million** Saved from the education budget in space alone

Figure 2-5: Statistics of early childhood schools for the academic year 2019/2020

Source: (Al-Mansour, 2019).

Another set of projects is planned to support achieving ministry objectives, such as establishing a television channel for children to support the MoE's visual media projects, developing regulations and rules for early childhood, building the capacity of a group of experts in early childhood, opening schools (kindergartens - early childhood), and conducting studies and research that support early childhood initiatives and projects (MoE, 2019c).

The government's future plans for education, especially the expansion of early childhood schools, include enriching schools with modern infrastructure including technology, as well as increasing professional training for teachers to develop their skills and knowledge in teaching methods. Also, the future of ICT in Saudi Arabia is promising, since raising ICT awareness and supporting ICT usage in all aspects of daily life, including education, is now a national project, rather than an educational one only.

This is on the rationale that Vision 2030 cannot be successful without cooperation in the digital economy, digital technology and artificial intelligence (CEDA, 2016).

2.7 Summary

This chapter has introduced Saudi Arabia and especially its education system, in order to delineate the background and context of the present study. It was shown that Saudi Arabia is a conservative Arab Islamic country where the modern infrastructure made possible by oil revenues exists alongside traditional cultural norms rooted in Islam. Over the years there has been exponential quantitative development in the education system (although formal provision for girls has only existed since 1960) and attempts to make qualitative improvements, while retaining the Islamic principles on which Saudi education is founded. EYE, the focus of this study, was shown to have low enrolment, except at KG3, although the government is seeking to promote education for young children. Kindergarten is the only co-educational stage of education in the Kingdom, and is taught only by female teachers. A child-centred curriculum, based on a number of themes, is prescribed by the Ministry of Education. The chapter discussed recent attempts at reform in education, including the Tatweer project, in which a major focus was a shift from traditional teaching to the integration of ICT. However, it seems that the kindergarten stage was given little attention in Tatweer; moreover, the project failed due to lack of teacher involvement and training.

Thus, the current situation of ICT in EYE is that there is an absence of clear policy, many kindergartens lack ICT resources, and where computers are available, they are little used. Use is mainly as a presentational tool for teachers, rather than as a learning resource for direct use by children themselves. More recently, education has been made

one of the cornerstones of the national development plan, Vision 2030. One of the aims of the vision is the development of early childhood education, with ambitious targets for enrolment and plans for restructuring the early childhood education system. It is against this background that the present study was carried out, and the aims of Vision 2030 provide an important context and framework for the recommendations made in the concluding chapter (see section 8.4). The next chapter will present a review of international and national literature in the main areas of the study.

Chapter 3

Literature Review

Chapter outline

Chapter 3 Literature Review

3.1 Introduction

This chapter presents a review of literature in the main areas of the study, with three main purposes: to clarify key concepts and theories used in the thesis; to assess recent knowledge and thinking in these areas; and to identify shortcomings and gaps in extant research, where this study can contribute. This chapter is presented in three main sections. It begins with a discussion of the role of ICT in early years education (EYE) outlining historical developments and reviewing the long-standing debate on the potential benefits and risks of computer use with this age group. This is followed by a consideration of the relationship between ICT use and three main learning theories: behaviourism, cognitivism and constructivism, which imply different rationales for, and modes of, computer use. The third section turns the focus on the role of the kindergarten teacher in promoting, facilitating or constraining computer integration into EYE, including stages of ICT and the importance of teachers' pedagogy, and the factors that influence teachers' attitudes and practices in this respect. Based on these three sections, research gaps are then identified, in order to provide a rationale for the focus and methods of the study.

3.2 ICT and Early Years Education (EYE)

Over the last four decades, developments in ICT have been accompanied by growing interest in the implications for EYE. This section provides a historical overview of the main stages of development in the integration of ICT into EYE, together with the accompanying long-standing debate on the use of these technologies, with specific

reference to claims and evidence as to the potential benefits and risks to the cognitive, social, emotional and physical development of young children.

3.2.1 The history of ICT in EYE

Information Communication Technology (ICT) has been used in Early Years Education (EYE) for approximately 40 years around the world and has shown extensive growth during this time. According to Parmar (2014), three stages can be identified in the historical growth of ICT use in the field of EYE, and these are now outlined.

The early deployment of ICT in EYE can be traced to the 1980s. This stage was characterized by the proliferation of new technologies. Several ICT applications were employed to manipulate, store, recover, transfer and/or gain information, including electronic devices such as telephones, tape recorders, audio and video, television receivers, and networked desktop computers (Barnes & Hill, 1983).

A range of educational computer software became available for early childhood education (ECE), and hence, it became imperative to offer appropriate direction to early educators so as to help them in recognizing the most suitable applications to be used with children. Seymour Papert (1980) was a pioneer in recognizing the idea that young children can learn by controlling computers to construct what he called “powerful ideas” (more details about his work are discussed later in section 3.3.1).

In the latter part of the 1980s to the early 1990s, it became evident that even though computers were part of the educational environment as dominant ICT tools, there were still difficulties in identifying how computers could be utilized to expand learning

amongst young children, and the importance of choosing the relevant software for encouraging learning. Consequently, bodies like the National Association for the Education of Young Children (NAEYC, 1996) in the USA, and Developmentally Appropriate Technology in Early Childhood (DATEC, 2000), in the UK presented position statements which offered directives for early childhood teachers regarding how they could assess the way technology affected children and how computers and their software could be used in developmentally suitable ways.

The start of the 21st century marked the second stage of ICT in EYE. By this time, computers and educational software were widely accepted in EYE and believed to help learning (Saude et al., 2005). Other technologies such as laptops, interactive whiteboards, smart electronic toys, digital audio players (DAPs), and digital cameras were introduced (Siraj-Blatchford & Siraj-Blatchford, 2006) as well as the Internet. In the UK, a history of child-centred practice in EYE was said to favour experimental use of these new technologies (Brooker, 2003). The integration of such technologies was said to be essential in order to reflect social realities (Price, 2009) and to prepare children for a knowledge-driven society (Siraj-Blatchford & Siraj-Blatchford, 2000-2001).

The third stage of ICT in EYE (2010 to the present) is characterized by growing interest in exploring how the new smart technologies can be integrated effectively into EYE to encourage literacy development, mathematics, science and problem-solving (Beschorner & Hutchison, 2013; Neumann & Neumann, 2014; Wang et al., 2016; Herodotou, 2018) and enrich communication and creative collaboration (Flewitt et al., 2015). The development of portable, small, lightweight, and easy-to-use touchscreen

technologies, such as tablet and smartphones, allows young children to become familiar with these technologies at home before they go to school. For example, 41% of children 3 - 4 years old in the UK have been found to use tablets, 21% have their own tablets, and 1% have their own smartphones. The percentage is also increasing in children between the ages of five and seven, of whom 49% use tablets, 35% have their own tablets, and 5% have their own smartphones (Ofcom, 2017).

Likewise, this phase witnessed an explosion in applications (apps) that are claimed to be educational for young children. Notably, most of these apps use touchscreen technologies and can be easily downloaded via the Internet. Accordingly, there are over 180,000 apps designed specifically for educational purposes in the Apple store (Apple, 2019). CBeebies apps are a popular example of these educational apps that are widely available. CBeebies apps give the child the opportunity to explore, play and enjoy a fun learning experience with their favourite CBeebies characters. For instance, the CBeebies *Go Explore* app draws on the Early Years curriculum and helps children to build up their skills and understanding before entry to school (CBeebies, 2019). Figure 3.1 shows screenshots of fun games that cover a range of different topics such as providing health awareness, exploring different geographical habitats, learning shapes and planning a party. Some CBeebies apps are designed to support child-adult dialogic interaction (to be discussed in section 3.3.1).

Among Arabic educational apps, *Lamsa* is an edutainment app that has a Finnish framework in the field of early childhood education. “Lamsa” means “touch” in Arabic; the content suits children 2-8-year-olds. This app offers a variety of educational activities such as interactive stories, puzzles, colouring, songs, videos and the Arabic

version of “Sesame Street”. The app is available for a free trial for a period of time, then requires a subscription payment plan (Lamsaworld, 2019). In 2017, Google play announced Lamsa as the number one app for families and children in the Middle East and North Africa (MENA) and recorded over four million downloads (Google play, 2019).

One recent form of ICT use in the field of EYE is the use of multimedia-based digital storybooks for kindergarten children. These digital storybooks can be accessed on touchscreen technologies and use multimedia elements, such as text, pictures, audio, animation, and video, and can provide reinforcement to increase children’s motivation (Smeets & Bus, 2013; Prasetya & Hirashima, 2018).

Figure 3-1: Screenshots of CBeebies’ “Go Explore” app

Emphasis has been placed on the key role of the teacher's knowledge and attitudes toward ICT, for creating successful learning experiences with these technologies (O'Hara, 2004; O'Rourke & Harrison, 2004; Ertmer et al., 2012). According to Wang et al. (2012), teachers need to develop their knowledge to select the appropriate technologies for relevant content in the classroom, to reach digitally fluent students. However, a number of researchers argue that there is still insufficient research on the pedagogical objectives of integrating newer technologies, or what circumstances and resources might be needed to enable technology to contribute to improved teaching and learning (Plowman & Stephen, 2005; Masoumi, 2015; Ruggiero & Mong, 2015).

3.2.2 The debates on ICT in EYE

The use of ICT in EYE has been a matter of long-standing debate, between advocates of its potential to facilitate constructivist learning, and those who fear that over-use of technology has damaging cognitive, social, physical, emotional, and neurological effects. In the early phase of ICT introduction, concerns were expressed that use of desktop computers was developmentally unsuitable for young children, and could impede emotional, social and physical growth (Brady & Hill, 1984). However, Lipinksi et al. (1986) claimed that once the novelty wore off, classroom activities returned to normal and computer use was accompanied by much verbal collaboration and communication.

As ICT came more into mainstream use with educators, learners, and EYE, many researchers encouraged its use, because they argued that the integration of technology was advantageous for children's development and learning. These advantages are reflected in many aspects, such as communication and collaboration, personality, language, and emergent literacy, positive attitudes toward learning, creativity,

mathematical thinking, as well as problem-solving (Hatzigianni & Margetts, 2012; Neumann & Neumann, 2014). Nevertheless, there has been a resurgence of concerns about the integration of technology in the early years setting. It has been claimed that technology use leads to poor concentration, isolated lives, impaired language development, and lack of exercise (Cordes & Miller, 2000; Healy, 2000). Such concerns led Sigman (2011) to argue that computers should not be used in schools with children under nine years old. A more moderate stance is taken by the American Academy of Pediatrics (2011) which advises no more than 2 hours of screen time a day and not before the age of two years. In fact, in this digital era children interact with a variety of forms of technology in their everyday lives, and they become technology users without any formal instruction. In the USA, the National Association for the Education of Young Children and the Fred Rogers Center mentioned that new technologies could be employed for learning with guidance and responsive interactions, rather than being taken away from young children's lives (NAEYC & Fred Rogers Center, 2012). Additionally, Plumb and Kautz (2015) report that the general view in many Western countries such as the United Kingdom, Sweden, Australia, and New Zealand, is that there is a place for developmentally appropriate use of ICT in EYE as part a wide range of teaching structures.

3.2.3 Benefits and risks of computers for young children's learning and development

Early childhood educators who are interested in the use of computers have fiercely debated whether computer use inhibits or enhances young children's cognitive, social, emotional and physical learning and development. Several studies have been conducted

to examine the benefits and the drawbacks in these respects, involved in using computers in teaching preschool children. For example, Plowman et al. (2012) recommend that using technology in the classroom can have many motivational benefits for young children, as it develops learning readiness, increases self-esteem and confidence, allows self-directed learning, and supports persistence. On the contrary, House (2012) argued that ICT technologies are detrimental for young children's development and learning and suggested that these technologies should be kept out of the early childhood setting. Cuban (2001:67) indicated that the new technologies remain no more than a "benign addition", complementing existing resources but without a change in practices.

These issues were among those explored in the research. Teachers' beliefs and experiences regarding technology impacts in these areas are likely to influence their practice and related evidence could have implications for policy. The study findings in this regard will be presented and discussed in Chapter Six. Accordingly, this section will discuss evidence related to these contentious views, based on young children's developmental areas: cognitive, social, emotional and physical, before establishing the researcher's position. It should be pointed out that a greater focus is placed on the cognitive and social aspects, reflecting both the greater volume of research in these areas, and their greater relevance to this study.

3.2.3.1 Cognitive Development

A number of researchers have reported positive findings about the impact of computers on children's cognitive development. The research study by Huffstetter et al (2010) found that a computer reading programme, known as Headsprout Early Reading, supports young children to speak out loud, which significantly contributes to improving the oral language skills of preschool children. Jung and McMullen (2012) also found in their case study that the use of computers in the classroom can promote the development of preschool children with limited language capability. Similarly, a Swedish case study by Masoumi (2015) argues that using digital technologies (e.g. iPad) enhances the language learning of immigrant children, some of them due to language difficulties, otherwise tend to remain silent and are less engaged in preschool practices. One of the outcomes of this study found that these young children significantly engaged in practices in different ways after using technologies in the classroom. Furthermore, to investigate the use of the computer in kindergarten classes in Greece, Nikolopoulou (2014) conducted a study which found that one of the main reasons for using the computer in kindergarten classes was to develop kindergarten children's language skills.

In contrast, there is a body of literature that questions the value of computers for children's language development. For example, McCarrick and Li (2007) concluded that the use of computers with preschool children does not significantly hinder or help language use. They also found that computers offered an equally rich environment for young children's language development. However, Klerfelt (2007) found that the presence of adults with young children has positive effects on the way they interact with the computer.

Another concern is presented by some researchers who showed that there is an association between technology and language delay issues in young children. For instance, Chonchaiya and Pruksananonda (2008) examined language delay in Thai children (aged 15-48 months) and found that children who began watching TV before 12 months, and who spent more than 2 hours a day watching TV, were six times more likely to have language delays. Additionally, Tomopoulos et al. (2010) also indicate that content and duration of media (television, videos/DVDs, movies, and games) exposure in 6-month-old infants were associated with poorer language development at 14 months. Recently, a number of Canadian researchers showed that there is a significant association between mobile media device use and parent-reported expressive speech delay in 18-month-old children (Heuvel et al., 2019).

Further, a Korean study conducted by Lee et al. (2018) investigated the influence of media (including television, smartphone, desktop PC, and tablet PC) exposure on language development in children (n=208, aged 3 to 5). The findings of this study indicated that media exposure negatively influenced children's language development, especially three-year-old children, and the negative influence was larger with smartphones than other media devices. However, it should be noted that most of these previous studies focused on the negative impacts of technology on infants' and toddlers' language development. This may explain the warning issued by the American Academy of Pediatrics (2011) which advises no more than 2 hours of screen time a day and not before the age of two years. Furthermore, Courage and Howe (2010) concluded that it is not only the technology that influences language development in young children, but also the content of what they see on television plays an important part in accelerating or decelerating language development.

A positive association was found by many researchers between the use of computer technology and children's literacy development (Voogt & McKenney, 2007; Yurt & Cevher-Kalburan, 2011; Beschorner & Hutchison, 2013; Herodotou, 2018). To find out the influence of computer technology on African American children's literacy achievement, Judge (2005) conducted a study which found that if children had access to computers in kindergartens as well as at home, it greatly enhanced their achievement. The findings of this study also acknowledged that kindergarten children who used literacy software regularly had higher academic accomplishment levels at the following stages of education. Nevertheless, it is important to note that the use of computers does not always promote educational achievement. As Plowman and McPake (2013:30) indicate, some products available for young children:

> "... are often based on mundane educational tasks disguised as entertainment. The so-called interactivity may well provide some initial motivation for learning, but it rarely continues beyond the first few encounters and may even get in the way of the educational potential".

A study was conducted by Voogt and McKenney (2007) in the Netherlands to evaluate the ability of computers to encourage the developing reading and writing skills in 4–5-year-old children. They found that the use of computers assisted literacy and communication skills. This notion is also supported by Burnett (2010) who suggests that technology can encourage writing in early years settings by acting as an incentive and offering ideas for writing activities. On the contrary, Zimmerman and Christakis (2005) indicate that early TV exposure in young children, those less than 3 years old, was associated with detrimental effects on cognitive development, such as reading at age seven. Also, in a similar study, Sigman (2011) argues that early exposure to

computers and a long time spent watching the computer screen are strongly related to a significant decrease in reading time. Early exposure may have detrimental effects on children's maths and reading, which leads to delay in educational achievement.

The emergence of electronic books via touchscreen tablet opened a new door to improve the development of children's literacy. For example, in a study by Neumann (2014) on Australian preschool children aged 3–5 years, children with greater access to tablets were found to have higher letter sound and name writing skills. Reich et al. (2016) published a review comparing the effects of traditional and electronic books on young children's reading skills. They concluded that well-designed electronic books can help children learn equally well and, in some cases, better than traditional books, as children focus their attention on animations, sounds, and games. Furthermore, Bus and collaborators conducted a group of studies on the potential benefits of electronic books on kindergarteners' cognitive development. They suggested that electronic books can be more efficient than traditional books in teaching pre-reading and vocabulary skills to kindergarten children, particularly those at risk for reading delay, for example, second language learners and those from families of low socioeconomic status (De Jong & Bus, 2004; Smeets & Bus, 2012; Smeets & Bus, 2014). On the other hand, Plowman and McPake (2013:30) warned that using technology does not guarantee the development of children's literacy, as they describe that:

> "Technological interactivity is meagre compared to human interaction: existing technology cannot adapt itself to an early reader in the same way as a more capable partner sharing a reading experience can. An electronic book that reads the words out one at a time or asks children to point to a picture with the stylus and then says "well done" cannot simulate the experience of adult-child conversations".

While most of the evidence presented on cognitive development has been in the language and literacy area, a British qualitative research finding by O'Hara (2008) also demonstrates that the use of technology with young children (aged 4-5 years) can show a surprising level of creativity and knowledge. More recently, in a Chinese survey study, Dong (2018a) found that the use of ICT could be beneficial for young children in different aspects such as language development, creativity, literacy, and problem-solving skills. Other literature is more favourable regarding the role of ICT in improving children's cognitive development. Computer technology captures the attention of kindergarten children (Kara & Cagiltay, 2017), improves their numeracy skills (Alkhawaldeh et al., 2017), enhances their creative thinking (Al-Zu'bi et al., 2017), extends their knowledge and understanding of the world (Plowman et al., 2012), and enriches their intelligence (Vernadakis et al., 2005).

In contrast, opponents of early computer use have expressed fears that other activities important for young children, such as construction blocks and puzzles, tangible objects (sand, clay, and water), the art corner or the socio-dramatic corner would be replaced by computers (Elkind, 1996; Healy, 2000). Nevertheless, Wolfe and Flewitt (2010) note that technology provides children with elements of control and choice which are often unavailable to them through traditional activities. Additionally, Epstein (2015:7) goes further and suggests that:

> "Technology should be used in moderation to supplement, not replace, hands-on learning with real materials that provide a full range of physical, sensory, intellectual, and social experiences".

There are also authors on EYE who suggest that computers may prove a distraction to children, and they have questioned computer use with young children in terms of pedagogy, assuming that computers do not match the cognitive abilities and needs of young children (Cordes & Miller, 2000). It has been argued by others that the appropriate use of computers is too difficult and intellectually demanding for young children (Greenfield & Yan, 2006; McCarrick & Li, 2007). Nonetheless, the views of the previous researchers predated the appearance of tablet computers, (e.g. the iPad launched in 2010). Touchscreen technology has a far easier user interface and a considerable number of apps specifically created for young children. Also, Wood et al. (2008:223) believe that computer technology offers a diverse enrichment of the curriculum as well as being an available information resource:

> "Specific advantages for children included the motivational appeal of the computer; its speed, colour, and dynamic presentation; opportunity for individualized instruction and independent learning; and the ability to do something and see an immediate effect".

To conclude this section, researchers have found evidence of a number of the positive and negative impacts of using computers on young children's cognitive development. On the one hand, the proponents have found evidence that computer use is beneficial in developing the language skills of children. The computer could be used effectively to improve the speech skills of children, especially those with limited language capability and immigrants. It has contributed to improving children's literacy and numeracy skills. It supported children who were struggling with reading, particularly second language learners and those with low socioeconomic status backgrounds. Proponents found that computers are easy to use and attractive to children. Also, they

claimed that the computer enhances creative thinking of children, extends their knowledge, and enriches their intelligence. On the other hand, authors have expressed concern that technology with inappropriate content could negatively influence children's language development. They were concerned that long time spent on the computer could have a detrimental impact on reading time. They have also expressed fears that the computer may replace other activities that are important for children. The researcher believes that the use of computer technology with children in this technological era is very important, but it is necessary to take into account the selection of content suitable for the child, as well as to determine what constants a reasonable duration of computer use.

3.2.3.2 Social Development

Numerous studies have attempted to explain the effects of computers on children's social development. Heft and Swaminathan (2002) reported that developmentally appropriate computer software will stimulate children's social as well as emotional development, together with keeping them occupied in mutual learning, for instance developing ideas and resolving issues as a group. This is consistent with the study of Clarke and Abbott (2016), which showed that computers increased the collaboration among children through sharing new knowledge and skills, and helping each other, and enhanced the early development of peer assessment.

Another major claim is that peer interaction is encouraged through computers as it provides opportunities for peer teaching, stimulates children to learn from each other, and supports the development of language. Lim (2012) conducted a three-months study

with 28 children aged 5 and 6 years and investigated their social behaviour in the computer corner in the classroom. He found that children learned useful information and engaged in learning through active interaction with their peers. The author also observed that the collaborative learning of children in the computer corner was greater than that which occurred in the other corners in the classroom. Similarly, the study of Sandvik et al. (2012) on five children aged 5 years demonstrated that touchscreen technologies can serve as a catalyst for social engagement and interaction. The authors found that the portability of tablet computers provides opportunities for children to help each other in classroom activities by cooperating, sharing and participating. In a similar study, Beschorner and Hutchison (2013) argue that the mobility of the iPad supports socialization by allowing children to see the screens of others easily and manipulate the touchscreen in groups.

Furthermore, a number of researchers have studied the impact of the computer on the social interaction of children with autism and found beneficial effects (Gal et al., 2016; Esposito et al., 2017). Additionally, Hsin et al. (2014) made a review of research publications, between 2003 and 2013, on the influence of technologies on young children's learning, from which they found evidence that young children's use of technologies supports their social development in three views. First, the wide range of technologies available enriched children's cooperation and interaction with peers. Second, use of technologies at home assisted adult-child interaction and supported family relationships. Third, technology was associated with the development of multiculturalism in young children.

However, some researchers have been concerned that the computer may pose a threat to young children's social development (Cordes & Miller, 2000; House, 2012; Plowman & McPake, 2013). The increasing availability and use of a wide range of technologies in children's bedrooms in this digital era, it has been suggested, could be taking children away from necessary social interaction to involve them in a solitary screen-based world. For example, Wood et al. (2008:216) argue that:

> "Use of computer technology was seen as inhibiting opportunities for social development by limiting social interaction (particularly among children with less developed social skills) and by having too much interaction with an inanimate object".

According to Alkhawaldeh et al. (2017) computer use could lead to children's poor social relationships and isolation. Rikkers et al. (2016) go further and suggest that frequent computer use may increase children's social isolation, resulting in mental health issues such as loneliness and depression. Furthermore, time spent using computers can displace time used for family interactions. For example, Plowman et al. (2010:65), express concern that *"opportunities for interactions with family members that promote emotional development are reduced"*.

However, Plowman and collaborators later found that children obtained the most benefit from using technology when they had strong guided interaction from adults in order to facilitate conversations and social behaviours (Plowman et al, 2012).

To conclude, it is noticeable that the previous authors expressed concern about computer impact on children's social development, especially in cases of children's

overuse of the computer at home. Conversely, some studies offer a more positive picture, suggesting that these fears about computer usage isolating children are unfounded or not persuasive (Haugland, 2005; O'Hara, 2008; Grey, 2011). For instance, Lim (2012) indicates that the use of computers in early childhood settings does not promote isolation, but encourages young children's social interaction with peers in developmentally meaningful ways.

3.2.3.3 Emotional Development

Many researchers have addressed the potential impacts of computers on children's emotional development. A study by Hatzigianni and Margetts (2012) indicated that computer use can enhance a child's self-esteem, through providing the experience of successful engagement, especially for those who have access to computers at home and preschool. Similarly, several research studies noted that the use of computers can boost children's independence and sense of control over their learning, which promotes self-esteem, self-confidence, and motivation (Can-Yasar et al., 2012; Howland et al., 2013; Drigas & Kokkalia, 2014). On the other hand, some early researchers argued that the emotional and social comfort of a child can be upheld by peers and teachers in a way that the computer is unable to do (Fein et al., 1987; Lepper & Gurtner, 1989).

It is noticeable that the authors expressing concern about computer impact on children's emotional development were mostly early writers, expressing their fears in the period when PCs first became widely available and constituted a new phenomenon in education. The more recent studies cited suggest some emotional benefits of using the

computer with children, arguing that it enhances a child's self-esteem, self-confidence, and motivation.

3.2.3.4 Physical Development

Several research studies have investigated the impact of using computers on children's physical development. Supporters of using computers with young children contend that working on computers can increase the manual dexterity of young children (Haugland, 2000) and improve eye-hand coordination and children's fine motor skills (Li & Atkins, 2004). Along these lines, a study that was conducted by Bedford et al. (2016:7) found that:

> "Children who scroll touchscreen devices earlier may develop fine motor control earlier is the first indication of how our current generation are adapting to their new media environment and setting the foundation for a life spent interacting with such devices".

According to Zachopoulou et al. (2004), technology can have a positive effect on children's physical health and development; for example, digital games, television programming, children's music, and videos can encourage children in dancing and movement. There is evidence of beneficial impact for children with particular problems, such as hyperactivity. For example, Green (1995) argues that children with hyperactivity seem to sustain attention with computers because they receive instant gratification, which includes frequent visual and auditory reinforcement. Similarly, Bikic et al. (2015) found that the cognitive computer program "ACTIVATE™" has the potential to promote a more mainstream neural development in young children with

Attention Deficit Hyperactivity Disorder (ADHD) and thus reduce cognitive dysfunctions and symptoms.

Despite the positive evidence that computer use can support children's physical development, opponents of early computer use have expressed great concerns that potential health hazards such as obesity, repetitive strain injuries, eyestrain and radiation exposure have come to the surface as a result of using computers (Cordes & Miller, 2000). Theodoto (2010) indicated harmful effects of the computer on children's development, in forms of health problems, for example, headaches, tiredness, blurry vision, and musculoskeletal dysfunction. However, Morgan and Siraj-Blatchford (2009:39) argued that the evidence regarding these health hazards remains unclear. Pending further evidence, they suggested limiting young children's computer expose to reduce any potential dangers. They advised:

> "It is therefore advised that the regular use of any computer application by a child should be relatively short, a maximum duration of no more than 10 to 20 minutes for three years olds, extending to no more than 40 minutes by the age of eight. These are only guidelines and clearly, if a child or group of children is totally engaged in an activity and the completion of this requires a longer period at the computer this should be allowed, but it would not be desirable to encourage children to do this regularly".

Another concern presented by some researchers is that technological activities could replace physical activity in the natural environment, and children might use computers purely for entertainment and not for learning (Nikolopoulou and Gialamas, 2015a). However, this argument was focused on desktop computers and did not include a wide range of new technologies that can be used effectively in natural environments (Siraj-

Blatchford & Siraj-Blatchford, 2006). Furthermore, Ntuli and Kyei-Blankson (2010) argue that technology offers children unique opportunities that can not be provided in the natural world. Supporting the above views, Plowman et al. (2010) mention that parents should take reasonable precautions to reduce the length of time their children use technology and achieve a balance of indoor and outdoor, sedentary and active activities.

The evidence available reveals that the potential physical effect of computers for young children, both positive and negative, is a matter of ongoing debate in the literature. Supporters of using computers with young children offer evidence that computers can improve their manual dexterity, eye-hand coordination and, fine motor skills. There is evidence that computer use may be beneficial for children with hyperactivity, as it provides them with instant gratification and fosters visual and auditory skills. However, some commentators have said that computer use may displace physical activity, which in turn may lead to various health problems such as obesity, repetitive strain injuries, and musculoskeletal dysfunction. They were concerned about impacts of radiation and damage to vision. However, LCD panel screens that have largely replaced CRT monitors cause much lower levels of eye fatigue (Kyrnin, 2018). Most of the previous concerns are related to the length of time children use technology.

As this section has shown, developments in ICT and accompanying initiatives to integrate these technologies into EYE have sparked debate on whether computers are any more that a 'benign addition' and how their use may impact on children's development. Advocates of computer use cite evidence of benefits to children's

numerical, language and literacy skills, valuable interaction with teachers and peers promoting social skills, self-confidence and motivation, manual dexterity and neural development. In contrast, sceptics express concerns that computer use may over-tax young children's abilities and replace other necessary activities and interactions, resulting in reduced language development, social isolation, and a variety of health problems, from eye-strain to obesity. Evidence is mixed, and impacts seem to depend on factors such as the child's age, content of the material, extent of exposure and adult impact. This suggests that there is a need for guidance on what would constitute appropriate and beneficial use of ICT. Such guidance may come from learning theories.

3.3 ICT and Learning Theories

Learning theories offer different understandings on how knowledge is acquired or constructed, which have different implications for the ways in which ICT can be beneficially integrated into teaching and learning. This section provides an overview of behaviourist, cognitive and constructivist learning theories and their relevance to ICT. It considers the affordances of ICT that can promote learning and introduces a number of conceptual models that provide insight into the factors needed for successful integration.

3.3.1 Learning theories

The growth of learning theories considered here started in the first half of the twentieth century. In many parts of the world, psychologists have tried to understand how

learning takes place and find out mechanisms and general laws that can lead to evidence-based learning theory (Wood, D., 1998). Progressively, theories of how children think and learn have developed because of new research discoveries or theoretical assumptions expressing different understandings of learning and teaching in educational settings. Such theories give a pedagogical foundation to understanding what teaching strategies educators can offer to provide ideal learning (Harasim, 2017). The conflicting views on the nature of learning and human development are divided into three main areas: behaviourism, cognitivism and constructivism (Yilmaz, 2011). These three theoretical perspectives have strongly influenced the use of ICTs in classrooms and their integration into education. This section highlights the three broad learning theories, behaviourism, cognitivism and constructivism, as they are more relevant to EYE.

Behaviourism

Behaviourism is based on Skinner's (1968) stimulus and response theory. The learner is viewed as controlled by stimuli to respond in the way that is expected by the teacher. According to Ertmer and Newby (2013), this view of learning suggests that the learner is not responsible for his/her learning, but learning is organised by the teacher, who conveys knowledge, evaluates and supports the learner's response. In this behaviourist perspective, the teacher is responsible for preparing learning resources and creating the learning environment that elicits the required behaviours, while children mostly are placed in passive situations such as watching, listening, answering questions and doing what they have been instructed to do (Selwyn, 2011).

The first emergence of the use of technology in education occurred in the behavioural school, and much of the earliest work with computers was coloured by the views of behaviourists (Harasim, 2012). It appeared when Skinner constructed his teaching machine in 1958. In Skinner's machine, individual instruction was offered in book form and the machine housed, showed and offered programmed instruction (Skinner, Burrhus, 1958). Programmed learning, the first real instruction technology, reflected Skinner's idea of operant conditioning. The main idea behind programmed learning is to influence the behaviour of the student by reinforcing the required responses (Jonassen et al., 2003). Some technological approaches designed based on the behaviourist learning theory and employed in classroom practice include computer-assisted instruction (CAI), computer-based tutoring systems, drill-and-practice software, and integrated learning systems (Selwyn, 2011).

Based on stimulus-response learning, today's various computer-based educational software and apps are used to deliver knowledge and information to children in order for them to achieve educational objectives through raising questions and offering rewards if their answers are correct (Harasim, 2012). Oladunjoye (2013) provided an example of technology was based on behaviourist principles in the preschool classroom. He observed that when children use educational apps, they are given fast positive or negative instant feedback to answers given or actions done, or that shows if the action is to be terminated. It is important to conclude that the behaviourist learning theory continues through the decades to support the design and development of instructional technology since the first teaching machines. Nevertheless, Schunk (2012) argued that behavioural beliefs cannot sufficiently explain the achievement of higher-

level skills or those that need a greater depth of processing such as critical thinking, problem-solving, and language development.

Cognitivism

In the late 1950s, cognitive learning theory emerged as a response criticism of behaviourism. The cognitive theory aimed to emphasise the acquisition of valuable knowledge by helping learners to use mental processes in organising and linking new information to existing knowledge in memory (Ertmer & Newby, 2013). Whereas behaviourists had viewed the human mind as a closed black box, cognitivists assrted the important role of the mind in processing information and understanding the world (Harasim, 2012). In this cognitive perspective, learning is seen as an active process involving the acquisition or revision of information and the learner is viewed as a very active participant in the learning process (Ertmer & Newby, 2013).

The use of Information Technology (IT) had a powerful impact on the emergence of cognitive learning theory, particularly, the invention of computers and their uses in education. The human mind was seen as a computer which can process information and the learner was seen as an information processor like a computer (Harasim, 2012). In addition, there is a range of technologies influenced by cognitivist learning theories, such as Intelligent Tutoring Systems (ITS) and artificial intelligence (AI), which offer a didactic, content- specific instructional pedagogy based on personalised learning (Harasim, 2012). Gertner and Van Lehn (2000) argue that the basic principles of the design of several ITS can be explained as computer-based ‘coached problem-solving’.

The computerized system often supports learners to build new knowledge by offering limited hints that require them to obtain most of the solution on their own. These systems often give students an opportunity to be flexible in the order in which actions are implemented and sometimes allow them to skip steps if necessary (Selwyn, 2011). However, compared to the programmed learning technologies that relied on the behaviourist theory, learners using ITC in ways inspired by cognitive theory are viewed as learning by 'doing', rather than by being instructed.

Constructivism

The psychologists Piaget and Vygotsky developed the learning theory of constructivism from the extensive study of cognitive development. Constructivists asserted that learners evolve knowledge through active involvement in their learning (Harasim, 2012). However, they differed in their emphases; Piaget believed that cognitive development is a product of the mind acquired through observation and experimentation, while Vygotsky saw it as a social process acquired through interaction with more knowledgeable members of the culture (Remmel, 2008). Due to their differences in explanations of cognitive development, these two theoretical viewpoints are commonly categorised as cognitive constructivism and social constructivism. "Cognitive" constructivism refers to Piaget's work whereas "social" constructivism refers to Vygotsky's work.

Constructivists disagree with the belief of cognitivists and behaviourists that knowledge is independent of the mind and can be imposed on the learner. Holzer (1994) explained that the basic idea of constructivism is that knowledge must be constructed by the learner and not supplied by the teacher. The teacher's role is to create a

supportive environment that helps learners to extend their learning. In the constructivist perspective, Ertmer and Newby (2013) claimed learners construct personal understandings of the world based on individual experiences and interactions, rather than knowledge being delivered into their minds from the external world.

Learning in Piaget's perspective is a process of discovery and knowledge and persistent interactions between the individual and the environment (Piaget, 1955). The cognitive development theory of Piaget consisted of two elements, ages and stages, which support expectations of what children can and cannot understand at different ages. This theory is considered as the major foundation for cognitive constructivist approaches to teaching and learning (Rummel, 2008). Piaget's theoretical explanations about the nature of children's thinking and their interaction with the environment have significant direct impacts on teachers' roles and classroom practice (Wood, 1998). From this theoretical viewpoint, the role of the teacher generally is to prepare the learning environment, manage classroom experiences, observe what children can do and support them to reach challenges with minimum intervention (Beecher et al., 2015).

The major theme of Vygotsky's (1978) theoretical framework is that social interaction plays a fundamental role in the development of cognition. He believed that the life long process of development depends on social interaction and that social learning leads to cognitive development. Vygotsky (1978:57), the founder of social constructivism, reported that: "Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people (interpsychological) and then inside the child (intrapsychological)". In other words, when adult-child dialogue occurs, children's minds are constantly being shaped as ideas and knowledge arising through contact with others are internalized as part of the child's

own cognitive process. According to Vygotsky (1978), humans use cultural tools, such as speech and writing, to mediate their social environments. From this perspective, learning is understood as the product of complicated interactions between many factors within an environment, where values and cultures are shared with other social members and enriched by the societies, rather than being only an internal cognitive process. Initially, children develop these tools solely to perform social functions, for example, when communicating needs.

Perhaps the work of Seymour Papert, who was one of Piaget's students and collaborators, provides the most prominent example of technology-based constructivist learning. Papert was influenced by Piaget and developed the notion of 'constructionism', which is defined as an extension of the constructive approach that is based on the idea of learning that occurs through the exploratory construction of objects that are themselves then able to do something. By building an object and then manipulating it to do something, he reasoned, learners are able to learn from the process of thinking about how to get something else to think (Selwyn, 2011). Papert published the book, *Mindstorms: Computers, Children and Powerful Ideas*, and demonstrated that the use of computers for self-directed learning could result in the construction of what he called 'Microworlds' (Papert, 1980). Selwyn (2011:75) defines microworlds as a kind of learning environment that is created "as learners build things and naturally encounter problems that require creative solutions".

According to Loveless (2011), Vygotsky's sociocultural theory has supported the role of ICTs in planning learning environments and the building of knowledge. A variety of

evidence is found in the literature (mentioned earlier in sections 3.2.3.1 and 3.2.3.2) about the potential role of computers in supporting young children's cognitive and social development. It was demonstrated that the use of computers can enhance literacy, language skills, creativity, motivation, and cooperation and interaction with peers.

Using ICT as a tool for interaction has been broadly recognised and used as a strategic tool to assist young children and teachers in being teamwork, as it offers them with a system to help in the construction of their understanding, teaching, learning, and collaboration to overcome tasks in real life situations (Lemon & Finger, 2013; Parette et al., 2013). In this regard, Gilakjani et al. (2013:59) suggest that:

> "Technology as part of a learning theory is more than a tool; it becomes the framework for the methodology. For those who are looking for ways to enhance their constructivist approach to instruction, technology provides the ability to support all of the central themes of this theory".

An example of the combination of constructivist learning theory and technology can be found in educational apps that provide students with open-ended contexts, templates, or structures that allow them to create learning artefacts, e.g., images, videos, or texts (Goodwin & Highfield, 2012). Many of these apps can be operated jointly by a child with an adult to support dialogic learning. For instance, CBeebies apps provide children with entertainment, creative activities, stories, games, and songs, with ideas for follow-up activities that have the potential to consolidate new areas of learning.

From the discussion above, the researcher's position is that cognitive constructivism and social constructivism are both vital for the learning process in learners who have different learning potentials. Both Vygotsky and Piaget emphasize the importance of

interaction with others in improving learning. One of the central ideas of social constructivism is that interaction with peers and adults (e.g. parents and teachers) and the use of computers (at school or home) can be of great importance in helping children to construct knowledge and improve their mental performance.

The preceding discussion has suggested that this integration of various forms and uses of ICT into EYE can be supported by all three of the presented learning theories, and in particular, that it is consistent with the principles of cognitive and social constructivism advocated in this thesis. The anticipated benefits arising from specific features of ICT, termed "affordances", which can be exploited for educational purposes, are the subject of the next sub-section.

3.3.2 Educational affordances of ICT

In an attempt to provide a framework for evaluation of the pedagogical benefits of ICT and organisational implications, Conole and Dyke (2004) elaborate the concept of affordances first suggested by Gibson (1979) and further described by Salomon (1993). Affordances are (mainly functional) perceived and actual properties of a thing, that determine its potential uses (Salomon, 1997). Affordances may have positive (enabling) or negative (constraining) effects; moreover, they are not simply inherent in artefacts but emerge from their interaction with the individual and the environment (Conole & Dyke, 2004).

Among the affordances of ICT are the accessibility of vast amounts of information via various gateways, portals, websites, networks and online communities (Castells, 1996). However, Conole and Dyke (2004) indicate that this brings the risk of information

overload and need for selectivity. Boud (1993) suggests that ICT offers diversity of experience for the learners across social, economic and cultural contexts. Such exposure to the experience of others is an important facilitator of effective learning. This affordance does, however, raise questions about the authenticity of such "virtual" experience (Conole & Dyke, 2004). These affordances are reinforced by the support for communication and collaboration through facilities such as mailing lists, discussion forums and chat rooms, which support social constructivist learning (Vygotsky, 1978). Engagement may, however, be superficial, when learners' attention is "spread too thinly across communities" (Conole & Dyke, 2004:117). The immediacy with which information can be exchanged, moreover, has drawbacks as well as advantages, increasing work pressure as users expect immediate response (Conole & Dyke, 2004). Another affordance of ICT is the speed of change; both technology and information content are constantly being updated. This can pose the risk of lack of reflection; on the other hand, Conole and Dyke (2004) identify reflection as a potential affordance of asynchronous technologies, since communication can be extended over a longer time-frame. A benefit afforded by the network structure of the web and the availability of search engines is the potential to offer multi-modal and non-linear learning strategies and pathways tailored to individual preferences. However, this potential may be under-utilised, given the prevalence of unitised, linear e-learning packages based on behaviourist principles. At the same time, ICT enables teacher surveillance through monitoring tools, although this affordance may be open to abuse (Land & Bayne, 2001). Other more negatively-perceived affordances are monopolisation by particular products as the price of interoperability, and risk caused by the possibility of unintended consequences and vulnerability to viruses, or equipment failure (Conole & Dyke, 2004).

Conole and Dyke (2004) propose this taxonomy as a basis for discussion. They do not claim these are the only affordances of ICT, not do they address the mapping of particular affordances to specific technologies. However, they suggest that, by making the potential benefits and drawbacks of ICT more explicit, the "affordances" framework facilitates thinking about the appropriate uses and limitations of technologies, which can guide practitioners in using them to fulfil educational goals.

From an early years perspective, the affordances of contemporary ICT can be interactivity and instant feedback; provisionality (the undo feature) and multimedia. Many ICT forms for young children incorporate an interactivity mechanism whereby a picture or a sound indicates success or 'try again' and give immediate feedback (Carr, 2000). Electronic storybooks are an ICT form used by young children that exhibits interactive features which promote active learning rather than passivity (Reich et al., 2016). Moreover, these electronic books usually contain a combination of multimedia features, such as text, animated pictures and background sounds and music (Bus et al., 2015). Another significant affordance of ICT is provisionality. Some educational apps can give the child greater confidence to make creative attempts and offer a feature as simple as 'undo'. For example, the CBeebies *Get Creative* app allows a child to interact with a variety of open-ended activities such as painting, making music, creating stories and building (CBeebies, 2019).

ICT potentially offers accessibility of information, diversity of experience, support for communication and collaboration, rapid response to change, the possibility of individually-tailored learning strategies and pathways, and teacher monitoring. Whether such affordances are recognised and exploited will, however, depend on a number of personal and environmental factors. In an attempt to understand the factors

that constrain or support ICT acceptance and use, a number of conceptual models have been proposed, which are reviewed below.

3.3.3 Conceptual models for learning with ICT

Generally, the learning theories previously explored (see section 3.3.1) provide many valuable ideas for realisation of learning with and through ICT in educational settings. This section introduces conceptual models that are used to understand how ICT is adopted into teaching and learning. Agarwal (2000) defines the adoption of technology as the use or acceptance of new technology. From reviewing the literature, there are a significant number of conceptual models that have been used to understand users' adoption of new technologies, such as the Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Theory of Planned Behaviour (TPB), Social Cognitive Theory (SCT), and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Taherdoost, 2018). Among these models to explain technology adoption, the UTAUT model seems to be the one with the greatest utility and it is cited by many researchers in relevant literature (Blackwell et al., 2013; Ifenthaler & Schweinbenz, 2013; Brown et al., 2016). The UTAUT model explains what encourages kindergarten teachers to accept and use the computer in kindergarten classrooms and what barriers prevent teachers from using the computer (Blackwell et al., 2013). Venkatesh et al. (2003) created the UTAUT from eight existing models in an attempt to arrive at a more comprehensive understanding than was offered by any single model alone. UTAUT was developed with four core determinants of intention (including performance expectancy, effort expectancy, social influence and facilitating conditions) and four

moderators of key relationships (including gender, age, voluntariness of use, and experience with technology) as illustrated in Figure 3.2.

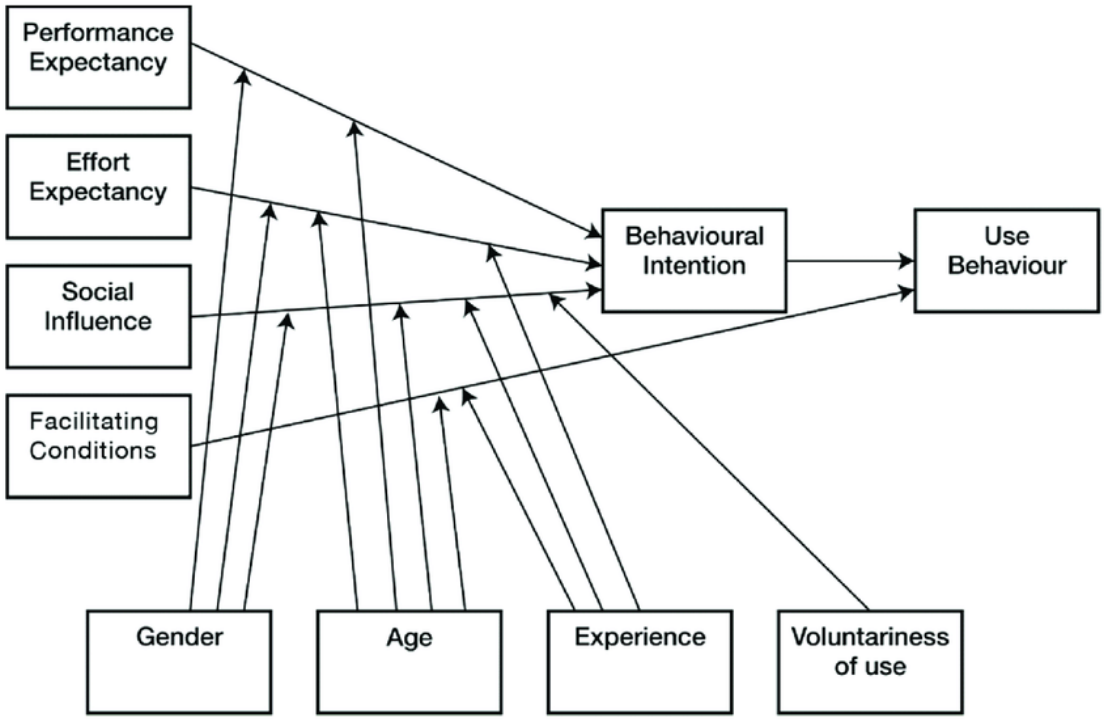

Figure 3-2: Unified theory of acceptance and use of technology (UTAUT) model as introduced by Venkatesh et al. (2003).

Performance expectancy is defined as "the degree to which an individual believes that using the system will help him or her to attain gains in job performance" (Venkatesh et al., 2003:447). Effort expectancy is defined as "the degree of ease associated with the use of the system" (Venkatesh et al., 2003:450). Social influence is defined as "the degree to which an individual perceives that important others believe he or she should use the new system" (Venkatesh et al., 2003:451). Facilitating conditions are defined as "the degree to which an individual believes that an organisational and technical infrastructure exists to support use of the system" (Venkatesh et al., 2003:453).

Venkatesh et al. (2003) stated that the UTAUT explains as much as 70% of user acceptance of the technology. Ifenthaler and Schweinbenz (2013) employed this model to address the limited research on the acceptance of technological innovations amongst teachers. In their study, they identified factors influencing teachers' acceptance of tablet technologies in school. Blackwell et al. (2013) indicated that there is a strong relationship between the UTAUT model and Ertmer's classification of barriers to technology integration (this classification will be discussed later in section 3.4.2). Blackwell et al. (2013) showed teachers feel limited by both their personal beliefs and the structural elements of their environment; thus the use of UTAUT supports understanding of teacher practices with technology in the classroom. The UTAUT model has a strong value and has been found to be the most relevant model to the current study. It is therefore applied in Chapter Seven, section 7.7, as a framework against which the findings of the study can be mapped.

In this literature review, ideas have been presented about why and when to use ICT, but it is still vital to look how ICT can be integrated effectively in early childhood settings to enhance young children's learning and what factors influence teachers' uses of the computer. The successful integration of computers in kindergarten classrooms relies very heavily on teachers, as it can often be shaped by their pedagogical beliefs and factors in the environment that surrounds them.

As the first part of this section showed, learning can be understood in a variety of ways: as a behaviour based on response to a stimulus; as an active process of organising knowledge and linking new information to existing schema, or as a process of discovery and construction facilitated by interaction with the environment and with other people. ICT has the potential to support learning from all of these perspectives, based on the

affordances detailed in section 3.3.2. However, conceptual models such as the UTAUT show that teachers' perceptions of such affordances and the subsequent acceptance and use of ICT are mediated by a number of individual, social and environmental factors. This understanding raises the question of the role played by the kindergarten teacher in accepting or rejecting technology, based on the factors identified. In the next section, kindergarten teachers' attitudes toward and relationship with computers in the classroom will be explored.

3.4 ICT and the Kindergarten Teacher

In this section, first, the literature regarding the role of kindergarten teachers in relation to computer use is explored. Following this, research about factors that influence the integration of ICT/Computers into classroom practice are identified. Finally, a critical review of literature regarding kindergarten teachers' perceptions and pedagogical beliefs about using computer technology is presented.

3.4.1 The teacher's role in computer use

According to a statement issued by the U.S. Department of Education (2003:55), "The new technology cannot make an impact on learning unless teachers help find creative new ways to exploit its power . . .". This notion is also supported by Kurt (2013) who argues that successful computer use depends on the role of the teacher, who must learn to use technology effectively in the classroom.

Ljung-Djärf et al. (2005) examined the methods that preschool teachers adopt for teaching computers in their classrooms. They gave examples of three types of classroom computer environments from the teacher's standpoint, namely, protective, supportive, and guiding. In the protective environment, computers are considered as a threat to other important activities (such as story time and role play); the supportive environment makes them an available option for teachers; and the guiding environment emphasises their importance as a preschool learning activity for students (Ljung-Djärf et al., 2005). Environments in which the teacher had received training in the educational use of technology and had a more favourable attitude toward using computers in the classroom were found to be the most supportive. In the three types of environment, teachers utilise their experience to interact with and guide their students. These methods of teaching were found to be a catalyst for expanding new dimensions of computer knowledge while teaching children directly.

In relation to the role of the teacher, many studies have examined the relation between ICT and teacher roles (Nir-Gal & Klein, 2004; Siraj-Blatchford & Siraj-Blatchford, 2006b; Stephen & Plowman, 2008). The outcomes showed that early years teachers could play a vital role in preparing children for this technological era and ensuring that they derive benefit from the new technologies. The teacher plays a key role because according to Ma et al. (2005:393), "Teachers' intention to use computer technology is critical to the success of the utilisation and implementation of computer technology". In addition, The National Association for the Education of Young Children and the Fred Rogers Center in the USA reported that the role of the teacher is critical through careful planning and implementation, reflection, and evaluation of how to introduce

any form of technology into the classroom (NAEYC & Fred Rogers Center, 2012). Furthermore, Nikolopoulou (2007:178) states, "Teachers' role is essential because, for example, they will select the appropriate software for their class, design appropriate learning activities, organise their class and intervene when needed". Roscorla (2013) suggested further roles for teachers, including deciding which technology tools are the most effective for showcasing learning through activities and appropriate for the individual child, the classroom context, and the content area.

The previous studies provided evidence that computer access and productivity in preschool classrooms still depend strongly on the teacher. This highlights the importance of understanding how teachers view computer technology, and whether they are able and willing to use this technology in classroom practice. Since teachers play a major role in making the ICT implementation more successful in educational systems, it is important to take into account teachers' acceptance of computer technology and the environment in which learning occurs. The issues and factors that influence teachers' perceptions and practices will now be discussed.

3.4.2 Stages of ICT adoption in teaching and learning

It is widely suggested that teachers' adoption and integration of ICT in their practices proceeds in stages (ACOT, 1995; Sandholtz, 1997; Somekh & Davis, 1997; Lemke & Coughlin, 1998; Somekh, 2008). However, the sequence of stages is not necessarily fixed (Dall'Alba & Sandberg, 2006; Orlando, 2009). Indeed, individual and contextual factors may lead teachers to move either forwards or backwards between stages.

An influential body of research on the various stages of teachers' ICT adoption is the Apple Classrooms of Tomorrow (ACOT, 1995) study. The ACOT research suggests that the successful application of ICT in education involves progression through a hierarchy of five stages, as shown in Figure 3.3.

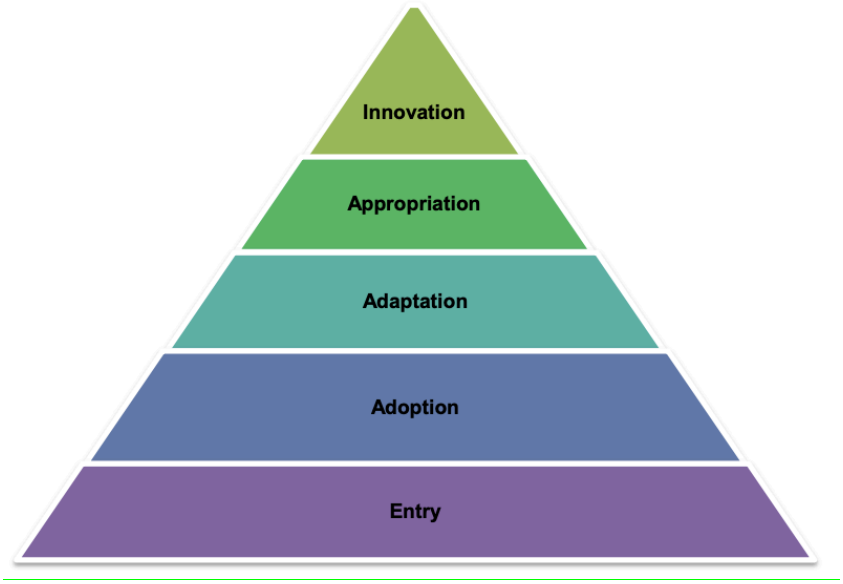

Figure 3-3: The ACOT model of technology application in education.

Entry is the initial exposure to technology while Adoption represents teachers' attempts to use it. Adaptation concerns the appropriate use of ICT and in the Appropriation stage, ICT becomes part of the learning context. The fifth stage, Innovation, represents changes in teaching methods and media to facilitate learning (Newhouse, 2002). According to ACOT (1995), teachers need to progress through all five stages, if ICT is not to be discarded or used inappropriately. The model provides a useful framework for assessing where teachers are in their adoption of ICT and related changes in learning practices.

3.4.3 Factors that Influence the Integration of ICT/Computers into Classrooms

When teachers propose to integrate ICT in their classroom practices, they face various difficulties (Bingimlas, 2009; Ihmeideh, 2009; Goktas et al., 2013). Thus, it is imperative to identify these difficulties and to discover how to overcome them. With that aim in mind, many researchers have identified the factors that influence teachers' uses of technology in educational contexts (Ertmer, 1999; Hew & Brush, 2007; Balanskat et al., 2006; Bingimlas, 2009; Khan et al., 2012; Marsh et al., 2017). For example, Ertmer (1999) suggested the most common classification of these factors and divided them into two groups: first-order factors that are external to the teacher and second-order factors that are internal to the teacher. The external factors include lack of support, lack of time, lack of access to hardware and software, and lack of teacher training, while the internal factors include teachers' willingness, beliefs, competences, and established classroom practices.

Hew and Brush (2007) published a review of research publications on the obstacles to integrating technology into K-12 learning environments over the ten years from 1995 and 2006 both in the USA as well as other countries. In their review, they analysed 48 empirical studies and found around 123 obstacles. They classified these obstacles into six main categories including four that comprised external factors (e.g., resources, institution, assessment, and subject culture) and two that comprised internal factors (e.g., teachers' knowledge and skills and teachers' attitudes and beliefs). The researchers concluded that the four most cited factors influencing the integration of technology were resources, teachers' knowledge and skills, institution, and teachers' attitudes and beliefs, represented in 40%, 23%, 14%, and 13% of the studies, respectively.

Another classification of factors was proposed by Balanskat et al. (2006), who grouped the factors into teacher-level factors, institution-level factors, and system-level factors. Ertmer's model has been followed by several researchers (Chen, W. et al., 2012; Goktas et al., 2013; Liu & Pange, 2015). However, Nikolopoulou and Gialamas (2015b:287) noted that it is possible that one factor could fall under either category; thus, there is not a single accepted classification of factors. They gave an example as regards this point, the lack of time, which could be considered "as a persistent barrier by teachers in terms of planning ways to use computers in the class, in terms of teacher training and development, or in terms of lack of time in schedule for children to use computers".

Although some researchers see the external factors as considerable hindrances to achieving the integration of technology (Pelgrum, 2001; O'Mahony, 2003), the majority believed the internal factors were the most significant challenge and more critical to the acceptance of teachers and their use of technology than the external factors (Ertmer, 1999; Newhouse, 2001; Dexter & Anderson, 2002; Zhao et al., 2002; Ertmer et al., 2012). This notion is also supported by Gray et al. (2010), who believe that access to technology resources and training opportunities have increased in recent years, leading to a reduction the external factors in this regard. It is worth noting, however, that this majority of studies cited were conducted before the advent of tablets and highly portable devices, making access more of an issue than it is today.

In the literature of the Saudi context, numerous studies identified some factors that hinder the integration of ICT at the three stages of schooling (primary, intermediate, and secondary). These obstacles are teacher beliefs and attitudes (Aldossry, 2011),

teachers' lack of knowledge and skills (Barri, 2013; Al-Harbi, 2014), lack of time (Al-Rashed, 2002; Al-Asmari, 2011; Aldossry, 2011; Al Mulhim, 2014), lack of training (Al-Rashed, 2002; Barri, 2013; Albugami & Ahmed, 2015), lack of equipment and resources (Aldossry, 2011; Hakami et al., 2013; Alkahtani, 2017)), lack of ICT policy (Oyaid, 2009; Albugami & Ahmed, 2015), lack of support (technical, funding, and administrative) (Almaghlouth, 2008; Al-Harbi, 2014; Albugami & Ahmed, 2015), resistance to change (Almaghlouth, 2008; Almalki & Williams, 2012; Al-Harbi, 2014; Al Mulhim, 2014), and lack of progressive evaluation (Hakami et al., 2013). Bingimlas (2009) stated that teacher reluctance or resistance to change their roles could be barriers to using technology in education. This reluctance of teachers may mean that they are unenthusiastic to use the computer in their classroom practices, which hinders the integration of technology in education. Al Mulhim (2014) stated the reasons for teachers' reluctance to using technology into the Saudi classroom are due to lack of technology experience for some teachers, lack of necessary technology equipment, the large number of students in the classroom, limited access to technology, and the widespread belief that technology screens cause eye fatigue in students (which was, indeed, true of early CRT screens, though not of more recent TFT screens) (Chen, M. & Lin, 2004).

Similarly, these obstacles were found in international early childhood settings, but through less research compared to those in other educational settings. That could be due to the long historical debate regarding the potential impacts of ICT in young children's development and the less attention paid to early childhood education by governments (Wood et al., 2008; Ihmeideh, 2009; Blackwell et al., 2014). Some of these studies on identifying the obstacles of the integration of technology are mentioned and summarised in Table 3.1 below. In the previous literature, classroom condition

constraints encompass several barriers such as a large number of children in the classroom, a limited number of classes, noise that disrupts the learning atmosphere, and lighting.

Table 3-1: Obstacles to ICT integration identified in previous studies.

	Studies							
Obstacles	Alasimi (2018)	Blackwell (2013)	Fenty and Anderson (2014)	Hammed (2014)	Ihmeideh (2009)	Liu and Pange (2015)	Nikolopoulou and Gialamas (2015b)	Wood et al. (2008)
Teacher Beliefs and Attitudes	**X**	**X**	**X**	**X**	**X**			**X**
Lack of Knowledge and Skills	**X**		**X**		**X**		**X**	**X**
Teacher Lack of Confidence			**X**				**X**	
Classroom Condition Constraints		**X**	**X**				**X**	**X**
Physical Environment Constraints			**X**		**X**			**X**
Lack of Time	**X**		**X**	**X**	**X**			**X**
Lack of Support				**X**	**X**	**X**	**X**	**X**
Lack of Equipment and Resources	**X**		**X**	**X**	**X**	**X**	**X**	**X**
Lack of Educational Software		**X**		**X**	**X**	**X**	**X**	
Lack of Training	**X**			**X**	**X**			**X**
Lack of Funding				**X**	**X**		**X**	**X**
IT Technical Problems	**X**	**X**	**X**	**X**	**X**		**X**	
Lack of ICT policy	**X**			**X**		**X**		**X**

In Saudi EYE settings, Hammed (2014) and Alasimi (2018) explored some obstacles that kindergarten teachers encountered with the integration of ICT in classroom practices. It is worth noting the scarcity of studies in Saudi early childhood education, due to the delay in the entry of technology in education in general, which first appeared in secondary schools in the 1990s (Oyaid, 2009), and the absence of a clear policy to support the integration of ICT in the EYE sector (Hammed, 2014: Alasimi, 2018). However, the study of Hammed (2014) assumed that issues identified in the western context are relevant to the Saudi context, as regards factors that influence teachers' integration of technology.

Dong (2018a) mentioned that the main reason for poor integration of technology into classrooms is related to teachers' intentions and capabilities. Moreover, Wang et al. (2008) found that teachers' perceptions were necessary to understanding their everyday work with technology. Ertmer (2005) indicates that teacher beliefs are the 'final frontier' for the integration of technology into schools, considering that obstacles such as access to resources, support, training and time had been overcome. In the same vein, Ertmer and Ottenbreit-Leftwich (2010:262) noted that "Teachers with more traditional beliefs will implement more traditional, or "low-level" technology applications, whereas teachers with more constructivist beliefs will implement more student-centered or "high-level" technology uses". As mentioned earlier, teachers' beliefs and attitudes can be one of the obstacles to integrating technology into the classroom environment. Therefore, teachers' perceptions and pedagogical beliefs about using computer technology will be discussed in the next section.

3.4.4 A wider perspective on ICT and change

The studies discussed earlier concern ICT in the EYE classroom. More widely, and at the national level, Michael Fullan's proposals have received wide attention. Fullan (2013) proposes four criteria for integrating technology and pedagogy: 1) new developments must be engaging for both students and teachers; 2) they must be efficient and easy to use; 3) the technology must be available to all, at any time; 4) learning experiences should be based on real-world problem-solving. He argues, however, that no current system meets these criteria. Citing Goldin and Katz (2008) for example, he notes that technological developments have outpaced developments in educational thinking and practice. This does not mean, however, that the solution is simply to put more technology in schools. A study by Hattie (2009) of the effect sizes (ES) of various instructional practices showed that technological strategies per se (such as web-based learning, effect size 0.18) had far lower correlations with achievement than aspects of the teachers' role, notably reciprocal teaching (involving teacher-student interactions) and feedback, with ES of 0.74 and 0.73, respectively. The implication is that technology in itself is not a panacea; what is more important is appropriate and effective pedagogy, highlighting the importance of teachers' training and skills.

In this respect, the innovative teaching and learning initiative (ITL, 2011) demonstrated the benefits of "innovative teaching", defined in terms of student-centred pedagogy, extending learning beyond the classroom (including problem-solving) and use of ICT to support specific learning goals. However, teachers engaged in effective, innovative practices were found to be relatively few and scattered across schools and systems. They were more frequent when teachers were engaged in professional development

activities involving active and direct engagement, for example conducting research or directly practising new methods. An example cited by Fullan (2013) is Ontario's student work study teachers (SWST) project in which experienced practitioners collaborated with hosting classroom teachers (from kindergarten to grade 6) to research student learning and activity in the classroom, including the role of teacher feedback and classroom conditions in supporting student learning. Participating teachers found this was an effective learning activity for them, which encouraged a rethinking of their practices and contributing to an improvement in the participating schools.

Regarding teachers' roles, Hattie's (2009) meta-analysis showed that the 'teacher as activator' (providing feedback to students, setting challenging goals and helping students access their own thinking) had an ES of 0.60, compared to 0.17 for 'teacher as facilitator' (involving student in problem-based learning, simulations and gaming, and providing individualized instruction). These findings lead Fullan (2013) to conclude the importance of the teacher as a change agent, who helps students to learn how to learn and monitor their learning, rather than simply trusting to students' self-discovery. To play this role, teachers need "knowledge and skills; a plan of action; strategies to overcome setbacks; a high sense of confidence; monitoring progress; a commitment to achieve; social and environmental support; and finally, freedom from control, or choice" (Hattie, 2009:251)

Taking all this into account, Fullan (2013) concludes that today's education needs the integration of three factors: focus on learning (pedagogy), technology, and whole-system change; none can succeed without the others. Technology can be a powerful

enabler of change in education, but on its own may have limited effectiveness; for the full potential to be realised, technology must be accompanied by expert pedagogy.

3.4.5 Kindergarten teachers' perceptions and pedagogical beliefs about using computer technology

The personality of the teacher, their belief system along with their education, teacher training, and experiences are some of the factors that shape their teaching approach. There are many previous studies, from both developed and developing countries, that focused on the perceptions and pedagogical beliefs of kindergarten teachers about the use of the computer in early childhood education and examined different aspects. These studies have been classified into two categories: studies that focused on the use of computers in relation to gaining cognitive skills, and studies that dealt with the positive perception of teachers towards computer technology in classroom practice. This current study will review many studies that have been conducted with reference to the most prominent features.

Some research studies have focused on computer use in relation to specific subject areas, particularly language learning (both first and second language) and literacy. For example, Ihmeideh (2010) examined kindergarten teacher' beliefs and practices about utilisation of technology in reading, writing, and teaching in Jordan. The study used two research methods, questionnaire and semi-structured interview, and the participants were 154 kindergarten teachers from both public and private kindergartens. According to the study outcomes, the beliefs of kindergarten teachers regarding the use of computer technology were in line with their perspectives of teaching practices, even

though teachers' opinions and perspectives of their practices were quite limited. The findings also revealed considerable variations between teachers related to the type of kindergarten with more favourable attitudes among those teachers of public kindergartens, and according to training, with more favourable responses among those who had attended computer training programmes, whereas there was no variance related to the area of certification. A limitation of the study was that the selection of the sample was limited to two governorates in Jordan, while the other governorates were not examined. Data collected from other governorates could lead to different results.

In the same Jordanian context, Alkhawaldeh et al. (2017) carried out a study to explore kindergarten teachers' perceptions about the role of the computer in supporting children's learning. Data were collected via semi-structured interviews with 30 kindergarten teachers. Findings indicated that teachers had a lack of understanding of the benefits and advantages of young children's computer use. However, some of them highlighted some potential advantages of computer use for young children, such as supporting literacy and numeracy, gaining of basic computer skills, the provision of a new means of self-expression, and improvement of school curricula.

In another study, Ismail et al. (2010) examined the perspectives of teachers of Arabic (the native language) and English (as a foreign language) regarding utilisation of technology in the school classroom in the United Arab Emirates (UAE). A mixed method was used in this study based on a questionnaire and a focus group interview. An essential finding of the study is that teachers agreed that technology had inevitably influenced their teaching practices, in ways that they thought would encourage student

learning. Another finding was that teachers were inclined towards further incorporation of technology in their classrooms to enhance language learning and teaching. In addition, it was found that teachers considered time and incentive factors as pre-conditions for further incorporation of technology.

Sandberg (2002) conducted a qualitative study in Sweden to investigate the views of preschool teachers about the use of computers and play. The data of the study was collected by interviews with 13 teachers. According to the data, most of these preschool teachers viewed the computer as a tool for learning and thought it has much potential as an instrument to aid children's learning. Another important finding was a perception that lack of time and resources impede the ability to use the computer for learning.

Using a questionnaire to survey 100 Turkish preschool teachers, Yurt and Cevher-Kalburanb (2011) investigated the thoughts and practices of preschool teachers regarding using computers in early childhood education. They revealed that computers were mostly utilised by early childhood teachers in music and literacy activities and aimed to enhance children's cognitive and language development. It was indicated that most of the participants (69.5%) used computers to assist the activities in daily schedules and they used computers once or twice in a week in their practices. Results also showed that teachers used computers in a variety of educational activities, such as maths, science, games, language, and art activities.

A case study was carried out in Sweden by Masoumi (2015) to identify the ways of ICT integration in three preschools. This case study involved interviews with and

observations of preschool teachers. The interviews were conducted with six preschool teachers (two teachers from each preschool). The results obtained from this study implied that ICT could enrich preschool practices by offering a variety of complementary opportunities to improve and change existing curricula. The study shows that most teachers saw ICTs as an object to enrich existing practices, a way to entertain young children, as a communication and documentation tool, and as a cultural mediator. Furthermore, the study unpacks the attitudes of teachers who considered ICT to be inappropriate for early childhood education. Nevertheless, this small-scale study only involved six preschool teachers.

Mertala (2017) conducted a Finnish study focusing on the relationships of preschool educators' general and ICT-related pedagogical beliefs and the foundations of educators' positive ICT pedagogical beliefs. The interview data were collected from 17 educators including four directors, two vice directors, eight teachers, and three nurses. Beliefs were examined in a twofold manner, as pedagogical goals and as pedagogical practices. Based on their general pedagogical beliefs, the educators valued the learning of socio-emotional skills over academic skills. However, in their ICT pedagogical beliefs, the educators expressed that the learning of academic skills, namely literacy and mathematics, is the core goal behind ICT use. A limitation was that the participants of the study did not represent the whole area of early years education, but they were all working with children who were about to enter primary school the following year, so did not reflect views on computer use with younger children.

There have been many studies reporting teachers' positive perception towards the suitability of computers as a learning tool for young children. From the relevant

literature, Hsiao (2003) in the United States argues that teachers' personal belief systems are a significant factor in the success of early childhood programmes. This signifies that teachers will incorporate the use of technology in their classroom teaching if they understand the potential of computer technology for improving children's learning.

Furthermore, Tsitouridou and Vryzas (2003) examined teachers' attitudes regarding use of computers in early childhood education in Greece. The sample of the survey were 107 early childhood teachers and the instrument used to carry out the survey was a questionnaire. The findings show that early childhood teachers had positive attitudes towards computers, but they had limited access to computers. The study found that teachers' attitudes seem to be influenced significantly by experience with computers, computer use at home and in-service training.

Similarly, Kabadayi (2006) conducted a study to assess the attitudes of preschool teachers towards the use of technology in classroom practices. The results obtained in this study showed that 75% of the teachers appreciated the importance of computers and use of educational technology in classrooms. However, the finding showed that teachers were not encouraged enough to overcome the difficulties in operating technological devices in the classroom.

Blackwell et al. (2014) conducted an online survey study to explore factors influencing early childhood teachers use of technology. The participants were 1234 early childhood teachers associated with the National Association for the Education of Young Children (NAEYC) in the United States. The survey results showed that attitudes about the value of technology on supporting children's learning have the most substantial impact on technology use, followed by confidence and support in using technology. The findings

indicated that teachers who received proper training on how to use technology to enhance student learning had better attitudes toward using technology tools in their teaching. They also found that more experienced teachers had negative attitudes but were more likely to use technology. The limitation of the study is that all study participants were NAEYC members, and thus the study neglected the perceptions of various populations of teachers.

Kara and Cagiltay (2017) conducted research investigating in-service preschool teachers' thoughts on usage of technology in Turkish early childhood settings. The sample consisted of 18 in-service preschool teachers working at both public and private preschools, and only semi-structured interviews were carried out to collect data. Results of the research showed that the majority of participants had positive views about appropriate technology use in the classroom environment. Results also showed that early childhood settings need to be provided with sufficient technologies. Furthermore, participants emphasised that they expected to be encouraged by the curriculum and some programmes to improve their technology use skills. Another finding was that teachers were aware of both the advantages and disadvantages of technology use.

Dong (2016) conducted a survey study examining Chinese preschool teachers' perceptions and pedagogical practices regarding children's use of ICT. In this study, a questionnaire was used to collect data from 316 teachers in an urban district of Shanghai. The findings show that the teachers were positive about the value of ICT for learning. However, they did not employ a variety of teaching strategies to support children's ICT use. Teachers demonstrated a strong need for effective ICT professional development to develop their understanding, knowledge and skills to integrate ICT into the classroom. However, the study was limited to participants from an urban area, where

ICT resources were available in preschools, and neglected suburban and rural areas, where access issues may be greater.

Nikolopoulou and Gialamas (2015a) investigated Greek kindergarten teachers' beliefs about ICT and play in early childhood education settings, as well as their confidence as regards the integration of ICT in the classroom. The data were collected using a questionnaire, and the participants were 190 kindergarten teachers. The results indicated that teachers strongly believed that ICT play is an effective mode of learning and developing children's technological competence. The findings from this study indicate that the majority of kindergarten teachers (80%) believed that ICT and play must be integrated into the early childhood curriculum and over 60% of teachers expressed confidence in their skills and knowledge for integrating ICT in the classroom.

In the Saudi context, Alshuwayer (1999) conducted a survey study on supervisors, head teachers and teachers in Riyadh to examine their attitudes towards using computers as an educational tool. The sample of the study was 684 participants, including 39 supervisors, 47 headteachers and 598 kindergarten teachers. The result of the study showed a positive attitude towards the importance of the introduction of computers in kindergarten. The results revealed that educational qualification and experience with computers have a substantial impact on the positive trend towards the introduction of computers in kindergartens. Since this study is the oldest in the Saudi early childhood context, some important recommendations were made, such as to accelerate the introduction of computers as an educational tool in kindergartens, the need to qualify kindergarten teachers in the field of the computer before service and designing programmes for kindergarten teachers in the field of computer use. Nevertheless, this study is limited because it was very early. Since that time, the world has witnessed a

massive technological revolution, and many different forms of technology have been integrated extensively in the educational context.

The study of Hammed (2014) investigated the status of ICT use in kindergarten settings and identified factors that influenced teachers' ICT practices. Mixed research methods including a questionnaire, semi-structured interview, observation and documentary analysis, were used in the study. The participants were teachers and head teachers from both private and public kindergartens in two settings, Jeddah, Saudi Arabia and Glasgow, Scotland. Results indicated that participants in both settings held positive perceptions of the importance of ICT integration. In the context of Saudi Arabia, much of the ICT integration was achieved in a teacher-centred (traditionalist) manner rather than supporting child-centred, constructivist approaches. Scotland was found to be more advanced in ICT integration than Saudi Arabia because it has a policy for the integration of technology into early childhood setting; nonetheless, in both contexts, there were similar factors that impacted teachers' integration of ICT, especially at both the teacher and the school levels. The results revealed that the integration practices were influenced by teachers' pedagogical beliefs and their relationship to teaching practices. Another finding was that pedagogical ICT training and the availability of an ICT corner within the playroom are important to the integration of technology. However, this study was constrained by the limitation that participating settings were purposively selected on the basis of their good reputation for ICT integration. A sample including settings with moderate or poor ICT infrastructure might have yielded valuable insights into the ways in which teachers' beliefs might interact with other factors to influence their practices.

A recent quantitative study by Alasimi (2018) examined Saudi early childhood teachers' attitudes toward the use of technology in kindergarten classrooms. This study was designed to examine the influence of age, experience with technology, personal use, and self-confidence on teachers' attitudes. Data were collected from an online survey with 304 teachers from 190 public and 114 private kindergartens in the Riyadh region. The overall result indicates that teachers generally held positive attitudes toward the use of technology in classrooms. Furthermore, there were no statistically significant differences in teachers' attitudes based on differences in their age and technology experiences in the classroom. Findings show that the confidence of teachers and the use of technology outside the classroom have the potential to impact and change their attitudes. The results also indicate there is a great need for availability and access to technology and the Internet in kindergarten classrooms. On-going professional development and pre-service training are also essential to enhance teachers' confidence and comfort in the use of technology.

In addition, there is evidence from the previous researches that teachers' perceptions and attitudes toward the use of computers are influenced by a number of factors such as teachers' experience of computers (Alshuwayer, 1999; Tsitouridou & Vryzas, 2003; Blackwell et al., 2014), and demographic characteristics, e.g. age, qualification, and teaching experience (Alshuwayer, 1999; Ihmeideh, 2009; Dong, 2014; Alenezi, 2018), teacher's confidence (Alasimi, 2018) , the use of technology outside the classroom (Tsitouridou and Vryzas, 2003; Alasimi, 2018), and training (Tsitouridou & Vryzas, 2003; Blackwell et al., 2014).

3.5 Academic gaps

A closer look at the literature on perceptions and pedagogical beliefs of kindergarten teachers about using computer technology in their classroom practices, however, reveals a number of gaps and shortcomings. Some studies have relied on the use of a strictly quantitative approach and selected the questionnaire survey as a research technique for collecting the data (Alshuwayer, 1999; Tsitouridou & Vryzas, 2003; Kabadayi, 2006; Yurt & Cevher-Kalburanb, 2011; Blackwell et al., 2014; Nikolopoulou & Gialamas, 2015a; Dong, 2016; Alasimi, 2018). Mostly, quantitative research does not give the researcher sufficient access to data related to the exploration of people's perceptions, feelings, and emotions or allow them to gain deep insight into a social phenomenon. In these quantitative studies, moreover, the samples were too small to generalise the findings (Alshuwayer, 1999; Tsitouridou & Vryzas, 2003; Yurt & Cevher-Kalburanb, 2011; Blackwell et al., 2014; Nikolopoulou & Gialamas, 2015a; Dong, 2016). Another shortcoming was found in three previous studies when the data was collected through online questionnaires; thus, these studies were limited to participants who had access to the Internet (Blackwell et al., 2014; Dong, 2016; Alasimi, 2018).

The relevant literature showed some qualitative studies (Sandberg, 2002; Masoumi, 2015; Alkhawaldeh et al., 2017; Kara & Cagiltay, 2017; Mertala, 2017) and mixed-method studies (Ihmeideh, 2010; Ismail et al., 2010; Hammed, 2014). In the relevant literature, the study of Masoumi (2015) was the only qualitative case study that employed both interviews and observations. These previous qualitative studies also suffered from certain weaknesses; for example, four studies relied on one instrument

(interviews) for data collection studies (Sandberg, 2002; Alkhawaldeh et al., 2017; Kara & Cagiltay, 2017; Mertala, 2017). It would have been helpful if observation had been used with interviews to provide in-depth information about the participants' external behaviour and internal beliefs and allow to illumination of further comments made during the interviews. Even the three mixed studies (Ihmeideh, 2010; Ismail et al., 2010; Hammed, 2014) found in the literature were not without any shortcomings, as the results of the studies cannot be generalised.

Through reviewing the aspects of the similarities and the differences between the previous studies, the researcher notes that the current study is consistent with the previous studies in the basic subject and general purpose, but they differ in four aspects, which represent the academic gaps addressed by this study, namely:

1- The findings about the use of technology of previous studies into kindergarten teachers' perceptions are useful and of interest here, but some of their findings are now out of date, since they reflect earlier technology; in particular they pre-date current form factors and modes of use. Over the last decade, technology has changed rapidly through the rise of diverse forms of technology which are portable, easy to use, with touchscreen interfaces, lightweight, and small, and the explosion in software and apps that can be used in the education field. This study, therefore, meets the need to explore whether or how these newer technologies are integrated into EYE, and how teachers view them.

2- Previous studies have often neglected the perceptions of teachers, who work in kindergartens in suburban and rural areas and in non-Western countries. Those may have different perceptions, based on cultural factors and the environments that surround

them. This study, conducted in a variety of settings in Saudi Arabia, contributes to fill this gap.

3- Previous studies have often neglected the perceptions of other EYE practitioners such as headteachers and stakeholders at the local education authority. It is possible that headteachers and stakeholders may provide further understanding and insights about the use of the computer in kindergartens. In this study, therefore, headteachers at the selected settings were included among the participants, as well as a representative from the kindergarten department at the local education authority.

4- The literature showed a shortage of Saudi studies about the use of technology in the EYE sector and insufficient evidence to identify teachers' perceptions toward the use of the computer in the kindergarten classroom. A case study approach would be likely to offer an opportunity to provide a means for understanding the research problem with greater clarity, illuminate hidden issues, and gather evidence about factors that impact the use of technology from participants' perspective, and accordingly, such an approach was adopted in this study (see Chapter Four for details).

3.6 Summary

Over a period of some 40 years, developments in digital technologies that have become more accessible and portable, have been accompanied by increasing integration of ICT into education. However, this trend has been controversial, especially with regard to EYE. While supporters have claimed beneficial effects on children's cognitive, social, emotional and physical development, sceptics have suggested potential risks in all these developmental domains, especially if children experience excessive exposure at too

young an age, or there is a lack of adult input to guide use and support learning. Thus, it is important for educators to understand what might be the most appropriate and beneficial ways to use ICT.

Learning theories such as behaviourism, cognitivism and constructivism offer different explanations of how learning occurs and, this implies different ways of using ICT in education. The integration of technology in ways consistent with these principles, particularly cognitive and social constructivism, which call for learners' interaction with the environment, and with teachers and peers - is enabled by specific affordances of ICT. These technologies provide access to information and to diverse experiences. They can support communication and collaboration with teachers and peers and they offer the possibility of learning strategies tailored to individual needs and preferences. Recognition and exploitation of these affordances, however, are influenced by a variety of personal and contextual factors, as represented in the UTAUT, for example.

Research has revealed that effective use of ICT in EYE depends on the attitudes and pedagogical knowledge and beliefs of the kindergarten teacher, who may create a restrictive or supportive environment for ICT. Teachers' attitudes and practices appear to pass through several stages, and their progression is influenced by external and internal factors such as classroom conditions, equipment, and teachers' knowledge of computers, confidence in using them, and pedagogical beliefs. It is suggested that technology in schools may not be particularly effective unless accompanied by expert pedagogy and system change (Fullan, 2013). Research evidence in a variety of contexts, including Saudi Arabia, have suggested that teachers' attitudes are generally positive, but ICT use can be constrained by factors such as class size, lack of time, and lack of training.

Existing research, while pointing to some fruitful avenues for discussion, suffers from a number of gaps and shortcomings. There is still a need for research in lesser-known cultural contexts, using qualitative case study methods to obtain a deeper understanding of kindergarten teachers' attitudes to use and experience ICT with this age group, and the factors influencing their views and practices. These are areas to which this study can contribute, and the methods adopted to pursue these aims are explained and justified in the next chapter.

Chapter 4

Research Methodology

Chapter outline

Chapter 4 Research Methodology

4.1 Introduction

The purpose of this chapter is to explain and justify the approaches and methods used in this study to address the research gaps identified in Chapter Three. It begins by recapitulating the research questions and showing how these led to the adoption of a constructionist ontology and interpretive epistemology to underpin the research. It is then explained how these led to the selection of a qualitative case study design, involving interviews and observation. Implementation issues, including sampling, development and piloting of instruments, and data collection procedures are detailed, followed by an account of the data analysis procedures. The chapter ends with reflections on how research quality criteria were met, and ethical issues addressed.

4.2 Research philosophy

Before discussing the philosophical stance, methodology choice and data collection strategies involved in this research, it may be helpful to repeat the research questions as a reminder of what the research sought to achieve. The main research question [MRQ] was: *What are the perceptions and pedagogical beliefs of kindergarten teachers towards using computer technology in classrooms?* This was addressed via six sub-research questions [SRQs], as follows:

SRQ1: What ICT resources are available in the kindergarten classroom?

SRQ2: What are kindergarten teachers' perceptions regarding the needs for better ICT resources in the classroom?

SRQ3: What are kindergarten teachers' perceptions regarding the future of computers in the classroom?

SRQ4: What are the positive and negative impacts of using the computer in the classroom?

SRQ5: How do kindergarten teachers use the computer in the classroom?

SRQ6: What are the opportunities and difficulties reported by kindergarten teachers in using computer technology in classrooms?

The aim of SRQ1 was to find out about the availability of ICT resources in three Makkah kindergartens and delineate the extent of teachers' use of ICT in their classroom practices. SRQ2 aimed to explore teachers' perceptions concerning what is needed to improve the current use of ICT and support the teachers to enable them to integrate ICT in EYE. SRQ3 sought to determine teachers' perceptions of the likelihood of future changes in ICT in EYE. SRQ4 looked at how teachers viewed the impact of using computers with kindergarten children in various aspects such as learning, health, psychological, and social. SRQ5 sought to explore participants' experience of using computers in kindergarten teaching. SRQ6 aimed to explore teachers' and headteachers' perceptions of obstacles that hinder the integration and use of computers in kindergartens.

It is vital to provide some consideration of philosophical issues before discussing the research methods, because, as Bryman (2012:19) explains,

> *...the practice of social research does not exist in a bubble, hermetically sealed off from the social science and the various intellectual allegiances that their practitioners hold''*

He clarifies that research methods are not neutral tools but are related to different views of the nature of the social world and how it can be examined. Furthermore, Grogan and

Simmons (2012) argued that researchers hold certain philosophical assumptions about the world in their research, even if these assumptions are not recognized or made clear. Methodology writers describe these philosophical assumptions or ways of thinking as paradigms. Guba and Lincoln (1994:105) defined a paradigm as a "basic belief system or world view that guides the investigator not only in choices of method but in ontologically and epistemologically fundamental ways".

In addition to this definition, Bryman (2012:714) described the paradigm as:

> *a cluster of beliefs and dictates that for scientists in a particular discipline influence what should be studied, how research should be done, and how results should be interpreted*

From the above definitions, it can be concluded that paradigms are very important in explaining the research structure, choosing a suitable methodology for conducting research and logically discussing the objectives of the research (Levers, 2013). In general, most researchers acknowledge that the research paradigm includes three main components: ontology, epistemology and methodology (Guba & Lincoln, 1994; Cohen et al., 2007; Bryman, 2012; Creswell, 2014). In the following paragraphs, ontology and epistemology are discussed in general terms, after which, the position of the present research is explained. The third component, methodology, is addressed in section 4.3.

4.2.1 Ontology

Neuman (2014:94) defines ontology as "an area of philosophy that deals with the nature of being, or what exists; the area of philosophy that asks what really is and what the fundamental categories of reality are". In other words, Walliman (2005) notes that

ontology describes our assumptions about the nature of reality; whether reality is objective or subjective. It is commonly held that there are two ontological positions, namely, objectivism and constructionism. According to Matthews and Ross (2010:24), objectivism is an ontological position that "asserts that the social phenomena that make up our social world have an existence of their own, apart from and independent of the social actors (humans) who are involved". The objectivist viewpoint comes from the approach often adopted by natural scientists who study the behaviour of the natural physical world of cells, nuclei, organisms, plants, atoms, and chemicals. In contrast, constructivism, as Matthews and Ross (2010:25) define it, is as "an ontological position which asserts that the social phenomena making up our social world are only real in the sense that they are constructed ideas which are continually being reviewed and reworked by those involved in them through social interaction and reflection".

4.2.2 Epistemology

The term, epistemology is derived from the Greek *episteme*, which means knowledge. Neuman (2014:95) defines epistemology as "an area of philosophy concerned with the creation of knowledge; focuses on how we know what we know or what are the most valid ways to reach truth". Epistemology is closely coupled with ontology, because the answers to these questions are based on the ontological assumptions about the nature of reality and, in turn, help to create them. Cohen et al. (2007) and Denzin and Lincoln (2011) perceive that epistemological assumptions often emerge from ontological assumptions. There are two major epistemological positions: positivism and interpretivism.

Positivists believe knowledge rests in a set of firm, unquestionable, undisputable truths (Grix, 2018). Matthews and Ross (2010) note that the positivist philosophy is derived

from natural science and deals with the testing of hypotheses generated from existing theory and knowledge. Therefore, the philosophy of positivism is deductive in nature as it tests theories. In the positivist approach, the researcher is independent of and has no impact on the data. The conception of positivism is directly related to the idea of the ontological position, objectivism (Creswell, 2014). The positivist philosophical approach is typically realised through a quantitative research approach (Žukauskas et al., 2018).

In contrast, interpretivism is defined by Neuman (2014:28) as an epistemological position that "prioritises people's subjective understandings and interpretations of social phenomena and their own actions". Knowledge here is based on the interpretation of meanings, formed from human experiences (Žukauskas et al., 2018). Using this philosophical approach, the researcher interprets people's views and thoughts, studies social phenomena, and works with the data gathered to generate theory (Denzin & Lincoln, 2011). This approach can be linked to the ontological position, constructivism. Creswell (2014) notes that this philosophical approach is generally realised through a qualitative research approach, as it is subjective and inductive and has a greater emphasis on people's thinking, views, and feelings.

4.2.3 The Position of the Present Research

In discussing the stance adopted in this research, it would be suitable to start with ontology, since the ontological aspect is the logical foundation of social research (Grix, 2018). The ontological position of this current research is that the phenomenon of ICT in Saudi EYE is complex and multifaceted and does not exist as an objective entity, independent of social actors, as it is people (such as practitioners) who construct and

experience it, each in her own way. Thus, the stance taken is constructionism; it assumes that reality is multiple, constructed from the experience of teachers and their social interactions and rejects the concept of a single reality. It is assumed that perceptions and experiences would differ from teacher to teacher, due to an array of individual and environmental factors, such as the teachers' experience and training.

The epistemological stance of this research is interpretivism, as it is assumed that knowledge about the phenomenon of ICT in Saudi EYE can best be obtained by engaging with teachers in order to explore this phenomenon through their eyes and interpret their experiences. Hence, teachers' perceptions and pedagogical beliefs are explored, in an attempt to discover how they understand, experience and practise ICT. In other words, this research is trying to understand the phenomenon of ICT in Saudi education by interpreting the perceptions, pedagogical beliefs and experience of ICT integration into teaching and learning of teachers, as social actors. In order to explore teachers' perceptions and pedagogical beliefs towards using computers in kindergarten classrooms, the researcher needed to be personally involved in the research process and interact with the kindergarten participants. Thus, the researcher was not independent, but sought to immerse herself in the world of the participants. This orientation is typical of the case study research model, as will be explained in the next section.

The ontological and epistemological positions stated above, together with the research questions, have implications for the research methodology. The aim in this research was not to test hypotheses or theory, or to produce law-like generalizations, but to explore the subjective constructions of social actors, at a particular time and place, derived from their perceptions and experience. Beliefs and perceptions cannot be

directly observed or measured and so the issues of interest in this research were not amenable to quantitative investigation. Instead, a more naturalistic approach was appropriate, with a focus on people (practitioners) within a natural setting (kindergartens), and using qualitative methods. Such an approach is widely used in the education field (Lincoln & Guba, 1985; Robson, 1993; Creswell, 2003).

4.3 Choice of Strategies and Methods

This section provides an account of the chosen research methodology and the rationale for the case study strategy employed in the current study. This is followed by a discussion on the design and categories of case studies, the exploratory case study chosen, and the strengths and weaknesses of case study. Then, the selected methods of data collection, interviews and observation, are discussed and justified with reference to their purposes, types, strengths and weaknesses.

4.3.1 The Research Methodology (Case study)

Research methodology is a plan of action or strategy that structures the choice and employment of certain approaches and links them to obtain the required findings (Crotty, 2003). According to Punch (2013), the approach that is employed in research is based on what the researcher is undertaking to explore or investigate. Furthermore, the choice of method is influenced by the researcher's theoretical perspective and also his or her attitude towards the ways in which the data will be used (Gray, 2014).

The chosen strategy for the current research is a qualitative case study design. A case study approach is adopted here in order to provide detailed examinations of a specific phenomenon, understand the situation, take account of context, providing a holistic

picture, and attempt to establish some guidance for further exploration (Creswell, 2013; Bryman, 2012). Yin (2014:16) defined case study as

> *"an empirical inquiry that investigates a contemporary phenomenon (the case) in depth and within its real-world context, especially when the boundaries between phenomenon and context are not clearly evident".*

Green and Thorogood (2018) also note that the case could be a person, people, place, or policy. In addition, the case study is carried out through an in-depth investigation that includes multiple evidence sources and is usually bounded by time, place or context (Creswell, 2014). Determining when to use a case study as opposed to some other research design depends upon what the researcher wants to know.

Merriam (1988:32) explains:

> *"The less control the researcher has over a contemporary set of events or if the variables are so embedded in the situation as to be impossible to identify ahead of time, case study is likely to be the best choice"*

The rationale for selecting a case study for the current research is multifaceted. First, the lack of research studies investigating the use of ICT in Saudi Arabian Early Years Education (EYE) makes a case study strategy appropriate, as the need is for generating new emergent understandings of this phenomenon and building knowledge rather than confirmation or evaluation (Merriam, 2009). Second, the purpose of the current research agrees with one of the main principles of any case study design, that is, providing deep concepts, rich insights, and clarifications within a particular context (Merriam, 2009; Creswell, 2012; Yin, 2014). Third, in the present study, the researcher is concerned with participants' perceptions of the use of computer technology as a

pedagogical tool and identifying the difficulties faced by the kindergarten teachers in integrating the use of computers in Makkah kindergartens. The case study approach is suitable to collect data regarding the feelings, experiences, and judgements of participants (Gillham, 2000; Algozzine & Hancock, 2017).

4.3.1.1 Design of the case study

Shaping the design of case studies is of paramount importance. According to Yin (2014), a case study can be designed around single or multiple cases in order to answer the research question. The researcher can adopt the single-case design when there are no other cases available for replication. Nevertheless, the disadvantage of a single-case design is its limitations in offering a generalizing conclusion, in particular when the events are rare. This issue can be overcome by triangulating the study with other approaches in order to confirm the validity of the process (Zainal, 2007).

A multiple case design means a study that includes more than a single case and it permits the evaluation of differences and the similarities within and between the cases (Baxter & Jack, 2008; Yin, 2014). The multiple-case design can be adopted with real-life situations that offer several evidence sources through replication rather than sampling logic. According to Yin (2014), generalisation of results from case studies (single or multiple) may be possible, based on theory rather than on populations. By replicating the case through pattern-matching, a technique linking numerous pieces of information from the same case to some theoretical proposition (Campbell, 1975), multiple-case design strengthens the results and increases the level of confidence in the robustness of the approach.

In this study, a multiple case design was adopted. Three cases were selected; three kindergartens within the Makkah region of Saudi Arabia. The aim of choosing three settings was to explore a greater number and range of experiences and gain insight into the role of context, while still allowing deep engagement with each individual case.

4.3.1.2 Categories of case study

Various researchers have suggested typologies of case study (Stenhouse, 1985; Stake, 1995; Sturman, 1999; Merriam, Sharan B., 2009; Merriam, 1988). Stenhouse (1985) identifies four broad types of case study: action research case study, ethnographic case study; evaluative case study; and educational case study. Later, Sturman (1999) supported Stenhouse's four types, with the additional comment that, whereas action research case study and ethnographic case study are usually single site studies, educational case study and evaluative case study may include either single or multiple sites. Based on Stenhouse's classification (1985), the current case study would fall within the evaluative category, whereby *"a single case or collection of cases is studied in depth with the purpose of providing educational actors or decision makers (administrators, teachers, parents, pupils, etc.) with information that will help them to judge the merit and worth of policies, programmes or institutions"(Stenhouse, 1985:50).*

From another perspective, Stake (1995) identifies three types of case study: the intrinsic (when the researcher examines the case for its own sake), the instrumental (when the researcher chooses particular situations in order to examine a specific pattern of behaviour) and the collective (when the researcher obtains data from different sources of evidence). Unlike intrinsic case studies, which are intended to solve the specific

problems of an individual case, Stake claims that instrumental and collective case studies may permit the generalization of outcomes to a bigger population, although as noted above, in Yin's view, any generalization possible from case study is to theory, rather than population. In Stake's (1995) terms, this study would be considered collective, this category being similar to what Yin (2014) calls multiple case study. However, contrary to Stake's (1995) claim, the researcher makes no claim to generalization at the population level, due to the small sample and context specific nature of case study (the issue of generalizability is discussed further, below, under 'strengths and limitations of case study').

Case studies can also be categorized in terms of their outcomes. On this basis, Yin (2014) discussed three categories, namely, exploratory, descriptive, and explanatory. First, the exploratory case study explores any phenomenon that has no clear, or single, sets of outcomes. These studies are frequently used in a research context that is not clearly specified (i.e. which lacks detailed initial research, or specifically formulated research questions or hypotheses) and/or where a research environment limits the choice of methodology. Therefore, an exploratory case study is frequently employed as an initial step for an explanatory case study approach (Streb, 2009). A pilot study is considered as an example of an exploratory case study and is crucial in determining the protocol that will be used (McDonough & McDonough, 2014; Yin, 2014).

Second, explanatory case studies are employed to explain phenomena and causal relationships and to develop theory. Explanatory case studies are used when the phenomenon is too complicated for either survey or experimental studies. In such

explanatory studies, a detailed description of the facts of a case is offered, together with a discussion of alternative explanations that are congruent with the facts (Streb, 2010).

Third, descriptive case studies describe phenomena as well as the real-life situation in which they occurred. Descriptive case studies are very focused and detailed, as they carefully assess a case based on a descriptive theory, with questions or propositions being carefully scrutinised. Descriptive case studies are powerful in their own way as they add significantly to the rigor of the finished study. They can help set the boundaries of the case, and potentially raise abstract interpretations of data and theory development (Tobin, 2010).

Yin's (2014) classification is similar to Merriam (2009) who also identifies three types of case study in terms of the nature of the final product or the intent of the research: descriptive (narrative accounts); evaluative (explaining and judging); and interpretative (developing conceptual categories inductively in order to examine initial assumptions).

In the present research, an exploratory case study approach was adopted as the aim was to explore in depth an issue and context on which there existed little detailed prior research. By undertaking an exploratory case study, the researcher was able to explore participants' perceptions towards the use of computer technology as a pedagogical tool and the difficulties they faced in integration of computers, an issue on which there was a lack of previous research in the Saudi context.

4.3.1.3 Strengths and Limitations of The Case Study Method

There are always some strengths and limitations in any kind of research design. The features of a particular design influence the rationale for choosing it as the most suitable plan for addressing the research problem. One strength of the case study is that it can facilitate in-depth research and collection of detailed data about a specific case or particular phenomenon. This allows the researcher to understand all the different aspects of the phenomenon that is being investigated and may also help in understanding the relationship between causes and outcomes (Stjelja, 2013). Another advantage mentioned for case study research is that its data is robust in representation of "reality" in a particular context (Curtis et al., 2014).

Case studies provide high conceptual validity and allow new research questions, hypotheses and emergent theories to be tested (Flyvbjerg, 2011). In order to provide a complete picture of an issue, case studies allow data to be collected from multiple methods as opposed to providing information that is available from one method, e.g. surveys (Neale et al., 2006). Furthermore, Yin (2014) notes that the use of multiple sources of evidence allows triangulation of findings, which is a major strength of the case study approach.

Nevertheless, the case study approach also has its limitations. In particular, this approach has commonly been criticized for the difficulty of generalization from one case to another (Stake, 2006). Moreover, case studies are said to provide little understanding of how widespread a phenomenon is across a population, criticized on the basis that their statistical significance is often unknown or imprecise, and accused

of selection bias that may overstate or understate relationships (Flyvbjerg, 2011; Stjelja, 2013).

In addition, case studies are often accused of lack of rigour. Yin (2014:21) notes that "too many times, the case study investigator has been sloppy, and has allowed equivocal evidence or biased views to influence the direction of the findings and conclusions". Lastly, it should also be noted that case studies involve an intense data collection process, which can involve a large amount of documentation (Yin, 2014). For these reasons, case studies can be time consuming to undertake (Neale et al. 2006).

In this study, however, these limitations were considered to be outweighed by the advantages offered by case study for providing insights into a hitherto poorly understood phenomenon in an under-researched context.

4.3.2 Data collection methods

A case study includes collection of in-depth and detailed data, and it involves multiple sources of evidence. Yin (2014) identifies six main sources of evidence: documentation, archival records, interviews, direct observation, participant observation, and physical artefacts. It is not necessary for case study research to use all of these sources; however, it is better to employ multiple sources of data to produce a trustworthy case study.

Kaasila and Lauriala (2010:857) stated that *"the use of different data gathering methods is an indication of triangulation; i.e. method triangulation, as well as triangulation of data sources, and which may be used to confirm the results"*. In case studies, data collection is vital for improving the trustworthiness of the study. There is no single

source of evidence that is superior to the others, as each source has its own strengths and weaknesses. In the present research, two strategies of data collection have been used: interviews and observation.

4.3.2.1 Interviews

Interviews are frequently employed in qualitative research (Bryman, 2012). They are seen as an attractive and flexible method for collecting qualitative data, as the verbal interaction and the inquiry process can vary to suit the research context. According to Yin (2009), interview is one of the essential evidence sources in case study research.

Possible disadvantages of interviewing are that it could be time consuming, depending on interviewees' co-operation and time available, produce a large volume of raw data, and could be costly, as especially if the researcher has to travel overseas (Cohen et al., 2007; Matthews & Ross, 2010). However, in this study, the small number of interviews conducted (six with kindergarten teachers, three with head teachers and one with the director of MKD) mitigated these disadvantages. Sarantakos (2013) points out interviewing may be less convenient for respondents and less suitable when sensitive issues are discussed. In addition, it may be less impersonal, since the interviewer knows some personal details of the respondent. Other problems with interviewing are that the presence of interviewer may bias responses and not all interviewees are equally articulate and perceptive (Creswell, 2012). Nevertheless, careful preparation and planning and piloting of the interview schedule could minimise those issues.

Following the decision to conduct interviews, it was necessary to consider what structure would best serve the research purposes. The three main types of interviews

are unstructured, semi-structured and structured interview. In unstructured interviews, the researcher has only a list of issues to be discussed, without any sequence or limitation, and usually it is informal. The semi-structured interview utilizes a list of questions in general form, but the researcher is not committed to the sequence of questions and has the flexibility to ask further questions depending on interviewees' replies. Finally, structured interviews are more formal, where all respondents are asked the same questions in the same sequence (Bryman, 2012; Creswell, 2012).

Structured interviews were rejected in the current study as being too rigid and not providing the depth required for complementing the qualitative case study, because they are designed to produce information using a set of predetermined direct questions that require direct answers. Berg and Lune (2012) stated that the interviewer and interviewees would have limited freedom in structured interviews. Although unstructured interviews can extract relevant data, there is a risk of deviation from the focus of the study. Moreover, in order to add to existing knowledge through making comparisons and contrasts, a degree of consistency was required, necessitating some assurance that identified areas would be covered (Merriam, S. & Tisdell, 2016). At the same time, it was desired to retain some flexibility, e.g. to explain or repeat questions on the spot, and probe emerging issues. Therefore, in order to balance consistency and flexibility, face to face semi-structured interviews were adopted to serve the exploratory nature of the case study research by allowing the researcher to gather as much information as possible when interacting with respondents, in line with the interpretive paradigm and the inductive approach adopted. According to Bryman (2012), in a semi-structured interview "*the interviewer has usually some latitude to ask further questions in response to what are seen as significant replies*". (Bryman, 2012: 212). Gray (2014)

similarly notes the semi-structured interview allows the interviewer to probe for more detailed answers where the interviewee is asked to explain what they have said.

According to Matthews and Ross (2010) this type of interview is useful in exploratory research, where there has been a limited research in the area or where the researcher is exploring a perspective on the research topic. Both these purposes corresponded with the rationale for selecting an exploratory case study for the current research.

To conclude, it was decided that semi-structured interview would be adopted in this study, as it would allow exploration of various issues concerning the study. This technique enabled the researcher to engage in dialogue with kindergarten teachers to elicit their perceptions towards the use of computers whilst ensuring the research questions were addressed.

4.3.2.2 Observation

One of the drawbacks of the interview procedure is that individuals tend to bias the information they offer about themselves (Brown, 2001; Borg et al, 2007). This problem can be mitigated by collecting data using the observational method (Kerlinger, 2000). Cohen added that observational data enables researchers "… *to discover things that participants might not freely talk about in interview situations, to move beyond perception-based data (e.g. opinions in interviews) and to access personal knowledge*" (Cohen et at., 2007: 396).

According to Merriam (2009), observation is the best method to employ when a situation, activity, or event can be observed first-hand, when a new perspective is required, or when participants are not able or willing to discuss the topic under study.

In the view of Patton (2014), the main benefits of observation are to describe the activities that took place in that setting, the people who participated in those activities, the setting that was observed, and the meanings of what was observed from perspectives of those observed. The descriptions should be accurate, realistic, and comprehensive, without being cluttered by irrelevant trivia and minutiae.

Yin (2014) noted that visiting the field to collect data through other evidence, e.g. interviews, creates opportunities for observation. Gillham (2000) stated that while interviewing is a powerful technique for acquiring understanding of the insights and perceptions of the interviewee, it can also be used in a complementary manner with other techniques offering in-depth and detailed evidence regarding participants' inner values and beliefs. Whilst values and beliefs cannot be observed directly, they can perhaps be inferred from participants' observed behaviour. Observation offers an opportunity to see whether participants behaviour is consistent with declared values and beliefs, and to gain some insight into the context in which actions take place. In this current research, therefore, observation was employed as a complement to interviewing, to provide evidence of participants' external behaviour. Furthermore, observation was employed as an exploratory and supportive source of evidence that might help the researcher to interpret comments made during interviews.

Plowright (2011) classified observational research into four types. The full observer is the researcher who hides from the group and participants do not realize that they are being observed (for example, the researcher behind a one-way mirror). The participant-as-observer is part of the social life of participants and documents and records what is happening for research purposes. The observer-as-participant, like the participant-as-

observer, is known as a researcher to the group, but perhaps has less extensive contact with the group. The full participant is the observer who acts as a participant in the group that is being observed and conceals his or her observer role from the other participants, so as not to disrupt the natural activity of the group.

In terms of Plowright's (2011) classification, the researcher selected the model of observer-as-participant. In this model, the research is typically carried out in a naturalistic setting (in this case, a kindergarten classroom), and the participants are aware that they are being observed. Nonetheless, the researcher remains relatively separated, with the researcher role predominating over that of participant. This model is beneficial because the chance of reactivity (untypical behaviour of participants due to being studied, Bryman, 2008) is less as compared to the participant acting as full participant or participant-as-observer. Furthermore, if the observer is an "outsider" in the setting, he/she will not be influenced by participants' past histories, and will not be pressurised to depart from the observer role, although reactivity is not entirely eliminated. Moreover, the researcher's "outsider" status will demand effort and more time in familiarization with the situation and negotiating access to participants (Plowright, 2011).

Matthews and Ross (2010) and Sarantakos (2013) identify several advantages of observation such as it takes place in the natural setting, can provide a very rich data, offer data when respondents are unwilling to provide information, and is relatively inexpensive and less complicated. With all their advantages, observations are, however, not without their limitations, as they cannot study opinions and attitudes directly, are relatively time-consuming and laborious, cannot offer inductive generalizations of the

findings, and researchers can become bored and lose objectivity (Matthews & Ross, 2010: Sarantakos, 2013).

To conclude, it was decided that observation would be adopted in this current research as it allows the research to take place in the natural setting. Here, the researcher sought to obtain a clear insight into how computer technology is used as a pedagogical tool in practice. The most suitable and effective strategy was to observe directly a number of lessons in which kindergarten teachers planned to use computer technology and to identify the obstacles that influenced the integration of this technology in their practices in kindergarten settings.

In conclusion, this section has explained and justified the decision to adopt a qualitative approach; specifically, exploratory multiple case studies, to collect information on Saudi kindergarten teachers' perceptions and experiences of the use of ICT in their teaching. Three cases were selected as detailed below (section 4.4.2), to provide a wide range of data and enable consideration of contextual factors. Semi-structured interviews were selected as an appropriate means of exploring participants' declared beliefs and their interpretations of their experience. In addition to interviews, in order to mitigate possible bias and provide a better understanding of context, observation of teachers' practice in their classrooms was selected as a complementary method. The implementation of the study is discussed in the next section.

4.4 Implementation

This section provides an explanation of how the methods discussed above were implemented, beginning with procedures for gaining access and the selection of settings and participants. The development, translation and piloting of data collection instruments (interview schedules for teachers and headteachers, and an observation checklist) are also discussed. An account is then given of the main study procedures.

4.4.1 Gaining Access

In conformity with the policies of the education authorities in the Kingdom of Saudi Arabia, any kind of research in schools needs permission from the Ministry of Education or the relevant educational authority. Accordingly, the researcher obtained an initial letter of permission from the Saudi Cultural Bureau in London, addressed to the General Department of Education in Makkah, to facilitate her access to kindergarten schools. The researcher contacted the General Department of Education in Makkah to inform them of the aims and objectives of the study and provide interview questions and details of elements to be observed. Then, the General Department of Education in Makkah issued a letter of approval for the research task. A letter was obtained from the researcher's supervisor, Dr. Peter Williams, to the researcher's sponsor, in support of her request for authorization to conduct the research work.

When the approval of access was obtained, as well as the supervisor's letter, both were submitted along with the proposed interview schedule and observation checklist, and a detailed time plan for the fieldwork activities, via the Saudi students' portal website, to apply for formal permission from the sponsor (Najran University, where the researcher is employed as a lecturer in the Department of Education) to travel home in order to

start the empirical research. The criterion for permission was that the research should be conducted in an early childhood setting. The Department of Education authorised the researcher to conduct the fieldwork within three months.

The processes of gaining access to the field took more than two months, due to the involvement of several parties: the researcher, the supervisors, the General Department of Education in Makkah, the university ethical committee, the Saudi Cultural Bureau in London, Najran University, and the Department of Education in Najran University. As a final step, consistent with the Saudi university regulations, Najran University assigned an academic member from the same department to supervise the researcher, in order to issue a progress report for the Saudi Cultural Bureau in London.

4.4.2 Sampling (Selection of Case Study Settings and Participants)

Settings:

The holy city of Makkah was selected as the location for undertaking the field study because it is the researcher's home city, and her knowledge of the city assisted communication with stakeholders and the identification of locations of kindergartens. According to the Bureau of Statistics of General Department of Education in Makkah (2017), there are 148 kindergarten schools in the Makkah city, including 56 public kindergartens, 82 private kindergartens, and 10 international kindergartens, distributed over five districts (north, south, east, west and central) serving more than 15,886 kindergarten children. Approximately 1420 female kindergarten teachers serve the needs of these children. All kindergarten schools are supervised by Makkah Kindergarten Department (MKD) in Makkah General Directorate of Education

(MGDE). Some of these kindergartens are attached to another schools, whereas others are stand-alone settings (BSMDE, 2017).

In order to capture a range of attitudes and circumstances, research settings had to be kindergarten schools selected according to specific criteria. The Department of Kindergarten in MGDE provided the researcher with a list of kindergarten headteachers in Makkah, with their email contact details. However, the private kindergarten sector was not involved in this study, as it appears that there are wide differences between private and public kindergartens. Moreover, international kindergartens were not included either, because most of them do not follow the Saudi curriculum.

In order to reduce the level of bias in the study, the researcher adopted the following procedures and criteria for sampling:

1- The researcher emailed kindergarten headteachers, explained the purpose of the study and invited them to participate in the study. Fifteen kindergartens expressed their willingness to participate in the study.

2- The researcher prepared an online questionnaire consisting of open and closed questions about headteachers' views regard the use of computers in their kindergarten, teachers' use of computer in the classroom practices, and the availability of computers in their settings. Nine of the fifteen kindergartens responded to the questionnaire.

3- After analysing the questionnaire, the researcher classified the kindergartens in terms of the level of computer use into three categories and selected three kindergartens (one from each level): one that exhibited resistance to use of computers (KA); one in which computers were accepted but used to a limited extent (KB), and one in which computers were used extensively (KC). The selected kindergartens, moreover, were located in

different districts, and differed in situation and size, as shown in Table 4.1. By selecting kindergartens from three categories, the researcher sought to overcome the limitation of Hammed's (2014) study, which had purposely selected only kindergartens with a good reputation for ICT adoption.

Table 4-1: Characteristics of selected kindergartens.

Kindergarten	Location	Type	Children	Teachers	Classes
A	East	Stand-alone	55	6	3
B	Centre	Attached to a secondary school	189	17	8
C	South	Attached to a primary school	340	27	12

Participants:

According to the nature of the study as a qualitative case study (see section 4.3.1), the sample did not involve a large number of participants compared to the quantitative studies. As Merriam and Tisdell (2016:96) point out, this is because "generalization in a statistical sense is not a goal of qualitative research". Qualitative researchers employ a variety of different sampling procedures such as accidental sampling, purposive sampling, theoretical sampling, quota sampling, and snowball sampling (Bryman, 2012: Sarantakos, 2013). The participants in this study were chosen using a purposive sampling strategy. The purpose in this case was to select teachers from different kindergarten settings with varying acceptance of computers (see selection of settings, above) who were expected to have the knowledge and experience needed to enable them to answer the interview questions and reflect the situation of computer use in their schools. According to Merriam and Tisdell (2016), purposive sampling increases the

diversity of samples and allows the researcher to explore different properties and understand and gain insight.

The main group of participants, selected to participate in both interviews and observations, was classroom teachers employed in public kindergartens in Makkah city. The researcher conducted a short initial discussion with kindergarten teachers, with the support of headteachers, regarding the purpose of the research and invited them to participate in the study. Then, a total of six classroom teachers were selected, two teachers from each school. The selection strategy seems to be consistent with Masoumi study's (2015), which selected two teachers from each of three Swedish preschools that varied in terms of size, pedagogical orientation and availability of ICT resources. Nevertheless, it is acknowledged that there is a possibility of self-selection bias, in that teachers with an interest in ICT may be more likely to volunteer. Within each kindergarten, in-depth study was carried out by semi-structured interview and observation with classroom teachers about their perceptions, practices and experience related to using computer technology.

In addition, the headteacher of each kindergarten was interviewed, as head teachers are in a position to provide information on such aspects as school policy, budget, availability of training and support for computer use, and community (parents') attitudes towards exposure of children to computers in the kindergarten. Some of the main responsibilities of the kindergarten headteacher, as stated in *the organizational guide for kindergarten and nursery* (MoE, 2016b), are to visit teachers in the classroom from time to time and observe their activities with the children, and to contribute to develop the performance of teachers and identify training programmes for them. Kindergarten headteachers are required to have four years experience in teaching and at least two years experience as the deputy headteacher, so they were expected to have

a range of valuable experience and insights to contribute to the study. The distribution of participants (designated with codes, to preserve anonymity) is shown in Table 4.2.

Table 4-2: Research participants.

Kindergarten	Teachers	Head teachers
A	A1 and A2	AH
B	B1 and B2	BH
C	C1 and C2	CH

In addition to the participants from the kindergartens, it was also planned to interview the director of the kindergarten department of MGDE, to obtain a policy-maker perspective on the issues raised by teachers and headteachers.

4.4.3 Interview Forms and Observation Sheet

4.4.3.1 Interview Schedules

Two interview schedules were developed, one for teachers and one for headteachers, to reflect their different roles in the kindergarten and, accordingly, their different experience and knowledge. The teachers' schedule contained five parts. The first elicited general information about the participants, including the level(s) taught. The second contained four questions exploring their perceptions of the availability of computers in their classrooms and in the school as a whole, and their use. Part Three concerned teachers' pedagogical beliefs and experience in relation to computers, including advantages and disadvantages for teachers and pupils. It also gave teachers an opportunity to explain their views of the situations and purposes for which they might prefer to use computers or traditional methods. Part Four asked about teachers'

motivations for using the computer, and any perceived obstacles that hindered their doing so, as well as their needs, support received and training undertaken in relation to computer integration. In the last section, teachers were invited to express their views on the future for computer technology in kindergarten schools, and what they hoped for in this regard. The last question provided an opportunity for teachers to add any further suggestions or comments the wished to make (see Appendix A).

The headteacher's schedule contained the same five broad sections as the teachers' and was similar in content except for modifications to reflect headteachers' role, as stated above. For example, since Saudi headteachers have a purely administrative role, they were not asked about level(s) taught. In Part Two, they were asked to comment on teachers' use of computers. Parts Three and Four were modified to elicit headteachers' perceptions and preferences regarding their teachers' use of computers and/or (in Part Three) traditional methods. Lastly, in Part Five, they were asked, not only about the likely future of computers in EYE but also their priorities for developing educational uses of computers, and their view of the roles of other stakeholders in this regard (see Appendix B).

No interview schedule was developed in advance for the interview with director of kindergarten department in MGDE since this was to be based on outcomes of interviews with teachers and headteachers.

4.4.3.2 The Observation Checklist

The checklist developed to guide and record observations consisted of four elements. The first was a table in which basic details of the observation location, time and context

could be entered. The second, also in tabular form, contained a list of items referring to the classroom environment, followed by either a range of qualitative descriptions (e.g. temperature could be described as hot, mild or cold) or tick boxes to indicate availability or non-availability of facilities concerned: computer, library and various "corners". A third table was designed for recording evaluations of the teacher's use of computer and other resources. The last element was a space in which to draw the classroom layout (see Appendix C).

4.4.4 Translation and Piloting of Interviews and Observation

Interview schedules and the observation checklist were first formulated in English and reviewed by the research supervisors. Both the research instruments had to be translated from English into Arabic, since the setting of the study was Saudi Arabia. The researcher then asked three of her colleagues who are bilingual in English and Arabic (two of them have PhDs and one is a PhD student in the University of Hull) to check the research instruments in terms of language and structure, to make sure that the Arabic version was equivalent to the original version of the interview schedules (Appendices A and B) and observation checklist (Appendix C). The researcher sent all of the Arabic versions to a staff member in the Department of Arabic Language at the University of Umm Al-Qura, to proof-read the instruments and to comment on whether they were completely understandable and clear. The data collection instruments were given to two experts (one was a professor in Kindergarten Major and the other was a kindergarten head teacher) to check them before the pilot study. Feedback on the wording, arrangement, and relevance was gathered from them.

Conducting a pilot study was a vital step before starting the interviews and observations for the main study. The pilot study can be a very useful part of the research, before carrying out the main study. It can be useful to evaluate whether the intended methods and procedures are appropriate for the study being performed (Anderson & Arsenault, 2005). Yin (2014) defined the pilot case study as "preliminary case study aimed at developing, testing, or refining the planned research questions and procedures that will later be used in the formal case study" (Yin, 2014:240).

A pilot study should not be performed on individuals who might form part of the sample that would become part of the full research. One reason for this is that the research questions or the methods of data collection may change as a result of the pilot study. Therefore, the researcher may need to revisit and amend the main research question (Plowright, 2011). Borg et al. (2007) states that the pilot study offers additional knowledge which helps to enhance the study, such as:

- It enables a response and feedback that causes significant enhancements in the research.
- It reduces mistakes, because the unexpected issues exposed by the pilot are improved when the actual research is reformed.
- It offers thoughts, techniques and hints that could not have been anticipated without the pilot study.

According to Wiersma and Stephen (2009), there are four main advantages of the pilot study. A pilot study can do the following:

- Propose additional items if needed.
- Remove items that provide little or no information.

- Determine any ambiguities, misunderstandings, and insufficient or useless items.
- Discover difficulties with the necessary instructions and guidelines.

Therefore, the main purpose of the pilot study is to ensure that the main research poses no problems or limitations and the research methods are applied appropriately

After formulating and checking the instruments, and their translation into Arabic, the researcher undertook a pilot study in January 2017. The pilot study was conducted in the city of Makkah in Saudi Arabia with two kindergarten teachers and a headteacher who were not part of the main study. For ethical reasons, the participants were contacted by the researcher, and informed of the purpose of the pilot study, and their consent to participate in the study was obtained before commencing the interview and observation session. The researcher spent five days in the selected kindergarten. The first three days were spent on interviewing the teachers and headteacher, while the last two days were spent observing the kindergarten teachers in the classroom. All interviews with the three participants were conducted face-to-face in the headteacher's office and recorded (with permission) on a digital audio recorder, each one taking approximately 30-40 minutes. The interviews were then transcribed to check the quality of the device used for recording. Notes were also taken during the interview sessions. The observations were conducted in the classrooms. During observations, the researcher requested permission to use a camera to get a living picture of the classroom environment, and to show details that could not be written. This was achieved after obtaining permission from the kindergarten headteacher, who reminded the researcher to not take any photographs of the female employees (it is not allowed in Saudi girls' schools to take photographs or record videos of women). On the final day, a group discussion was

conducted between the researcher, the kindergarten teachers, and the headteacher to avoid any unexpected shortcomings in the main study.

The researcher learnt valuable lessons from the pilot study. This study helped to improve the structure of the main study more logically. It was decided in the main study to carry out initial and final observations (two for each teacher, in each phase), thereby increasing the number of observation sessions. Besides, the pilot observation visit led to some elements being added to the classroom environment section in the observation sheet (for example, ICT resources corner and cognitive skills corner). In addition, the original format for evaluating the use of computers in teaching in the observation sheet was based on the answers of yes or no. It was changed after piloting to show the duration of the observed activity, as illustrated below.

Evaluation of the use of computers in teaching/as an educational tool

Original format:

The teacher use the computer in teaching	Yes		No	
The teacher use the other ICT resources in teaching	Yes		No	
The teacher use traditional methods in teaching	Yes		No	
Children interacting with computers	Yes		No	
Children use computers	Yes		No	

Revised format:

The teacher use the computer in teaching	Duration	
The teacher use the other ICT resources in teaching	Duration	
The teacher use traditional methods in teaching	Duration	
Children interacting with computers	Duration	
Children use computers	Duration	

Figure 4-1: Example of format revision based on the pilot study.

Regarding the interviews, the reflections of the pilot interviewee led to reformulation of one question in the interviews. The question, "Which do you prefer to use traditional methods or computers in kindergarten education? Why?" was revised and split into two questions: "In what classroom situations and for what purposes would you prefer to use traditional methods?" and "In what classroom situations and for what purposes would you prefer to use computers?". All notes from the pilot study were taken into account and greatly added to the confidence in the quality of observations and the interviews and improved the time management during the main study.

4.4.5 The Main Study

During data collection, there were two different settings where data were collected: the first settings were at the participating three kindergartens where classroom observations were conducted, and six teachers and three headteachers were interviewed; while the other setting was at MGDE premises where the director of the kindergarten department was interviewed. The fieldwork activities were carried out in the first semester of the 2017-2018 academic year, specifically from the beginning of October to the end of December. In these activities, data was collected through four successive stages (as shown in Figure 4.2).

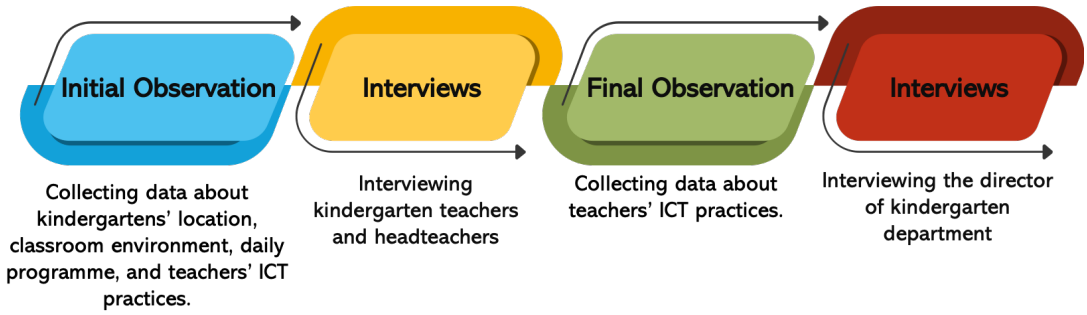

Figure 4-2: The four stages of data collection procedure.

The researcher made a preliminary visit to each kindergarten a week before the start of the data collection to hand the institutional consent form to the headteacher (see Appendix D), to understand and observe the organisation, and to meet and communicate with the participants. Also, this visit allowed the teacher and children to become comfortable with the researcher's presence. During these preliminary visits, the time and location of the classroom observation in the next week were confirmed with teachers and arrangements made for interviews in the week after that.

After the preliminary visits, the first stage of data collection, which was the initial observation, started in which data was collected about kindergartens' location, kindergartens' organisational structure, classroom environment, daily programme, types of ICT resources available, and teachers' ICT practices. During this stage, the researcher conducted the first and second observations for each of the six classroom teachers, i.e. 12 sessions in all. The first classroom observation was conducted at the circle session, while the second classroom observation was conducted at the last meeting session. Some photos of the classroom environment (e.g. equipment and furniture layout) were taken to show details that could not be written; however, no photos were taken of people. The researcher noted the data in the observation worksheet and she later wrote field reports based upon these sheets.

Before the interviewing process, the researcher provided the kindergarten participants with a brief description of how the interviews would be structured. Besides, for ethical reasons, detailed statements containing information about the research were distributed to teachers (see Appendix E) and headteachers (see Appendix F). After they had had time to reflect on the topics, all the kindergarten participants were asked to sign a

consent form to confirm their participation in the study. All interviews with kindergarten participants, six teachers and three headteachers, were conducted face-to-face in private rooms and recorded, with the participants' permission, on a small digital recorder, each interview taking approximately one hour. Also, notes were taken during the interview sessions to report any non-verbal communication considered relevant. The data obtained from this stage of the research was in the form of tape recordings and interview notes, as transcripts were made of all recordings.

In the final observation stage, the researcher conducted the third and fourth observations for each classroom teacher. Similarly to the initial observation stage, the third classroom observation was conducted at the circle session, while the fourth classroom observation was conducted at the last meeting session. As before, notes were made and photographs taken. Following the observation, the researcher ended the visit and thanked the teachers and headteachers for their cooperation in participating in the current study. The data collected from the 24 observations (four with each teacher) will be presented in Chapter Five.

The last stage of the fieldwork was the interview with the director of the kindergarten department at MGDE. Arranging the interview went smoothly; she was cooperative with research in general and the present study specifically. The interview questions with the director focused on some issues raised by the interviewed kindergarten teachers and headteachers. The interview was conducted in the director's office at MGDE and recorded, with her permission, and took about thirty minutes. Finally, the researcher finished the interview and thanked the director for her cooperation in participating in the current study. Table 4.3 below presents the timetable of fieldwork activities

followed in the current study. The data collected from interviewing teachers, headteachers, and the director will be presented in Chapter Six.

Table 4-3: Timetable of fieldwork activities followed in the current study.

		Weeks	Tasks
2017	October	1st - 5th	Preliminary visit to KA.
		8th - 12th	Initial observation; 1st and 2nd observations for teachers A1 & A2.
		15th - 19th	Interviews with teachers A1 & A2 and headteacher (HA).
		22nd - 26th	Preliminary visit to KB.
		29th - Nov 2nd	Initial observation; 1st and 2nd observations for teachers B1 & B2.
	November	5th - 9th	Interviews with teachers B1 & B2 and headteacher (HB).
		12th - 16th	Preliminary visit to KC.
		19th - 23rd	Initial observation; 1st and 2nd observations for teachers C1 & C2.
		26th - 30th	Interviews with teachers C1 & C2 and headteacher (HC).
	December	3rd - 7th	Final observation; 3rd and 4th observations for teachers A1 & A2.
		10th - 14th	Final observation; 3rd and 4th observations for teachers B1 & B2.
		17th - 21st	Final observation; 3rd and 4th observations for teachers C1 & C2.
		24th - 28th	Interview with the director of kindergarten department in MGDE.

4.5 Data Analysis Procedures

Bogdan and Biklen (2007) defined data analysis in qualitative research as the process of systematically examining and classification the interview transcripts, observation notes, and other non-textual materials that the researcher collects to understand the phenomenon. Patton (2014) argued that this process includes understanding a tremendous amount of data by decreasing the amount of raw information, followed by classifying significant patterns, and finally extracting meaning from data and subsequently forming a logical chain of evidence. Besides, Flick (2014) identified

several aims of qualitative data analysis, such as describing the phenomenon in greater detail, identifying the conditions on which differences are based, and developing a theory of the phenomenon under research from the analysis of empirical material.

One of the features of qualitative research is that there is no single specific approach for analysing the data of the study. Thus, there are many approaches to qualitative data analysis, such as thematic analysis, template analysis, narrative analysis, content analysis, discourse analysis, and ground theory method (Saunders et al., 2016). Thematic analysis is often seen as a general approach to qualitative data analysis, and Braun and Clarke (2006: 78) refer to it as a 'foundational method for qualitative analysis'. Creswell (2014) suggests that a case study (which includes a detailed description of the individuals or setting) may be most suitably analysed in the form of themes. In the same vein, according to Braun and Clarke (2006), thematic analysis is appropriate for analysing questions/responses related to individuals' views and perceptions or people's experiences. As the current study explores Saudi kindergarten teachers' perceptions and experiences of the use of ICT in their teaching, thematic analysis was adopted for analysing the gathered data based on the triangulation of different methods and sources.

Before embarking on the analysis process, the researcher had to decide whether or not to employ one of the electronic methods, which exist to facilitate the management of data. These methods enable the researcher to code text (while working at the computer) into analytic categories, and to retrieve the coded text. A clear benefit of such methods is the ability to treat large amounts of data at high speed (Bryman, 2008). However, Krippendorf (2018) explains that electronic analysis may support a tendency to quantify

findings and can produce decontextualization and fragmentation of data. Sometimes, the same word may be used with various meanings or, conversely, the same idea expressed in various forms.

Furthermore, Easterby-Smith et al. (2015) argue that qualitative research entailing a relatively small sample may be better understood and analysed by manual methods. Besides, electronic analysis does not replace the critical thinking and analysis of the analyst. Due to these drawbacks of electronic analysis, the researcher decided to analyse the data manually, as the study involved a small number of participants and interviews and she also wished to be closer and deeply engaged with the data. For the second data source (observation), the data consisted of field notes, which were also coded and manually analysed. According to Brophy et al. (2008:136), data collected from less structured observation "can be coded and analysed in the same way as the texts of interview transcripts — carefully relating the codes to the evaluation aims and objectives".

Yin (2014) suggests that the initial analysis of the data is an essential step in the overall interpretation of the case studies. Thus, the data analysis in this study was begun at the same time as the data was collected: it was recorded and then transcribed soon after, while it was fresh in mind. The early analysis was carried out during transcription, listening to the recorded interviews and reading the observation notes. Potential themes, related to the purposes of the research, were obtained from these transcripts at the time. This step of the process was valuable in familiarising the researcher with the data to a deeper level and guaranteed higher quality of following interpretation and the

extraction of important conclusions. The process of data analysis was based on the stages of data analysis suggested by Creswell (2014).

Stage One: Organise and prepare the data for analysis

The data analysis process began by listening to audio records and transcribing interviews and typing up field notes and then sorting and organising them into different folders to be ready for the following stage.

Stage Two: Read or look at all the data

The researcher read the transcripts several times to have an initial general idea before starting the coding process. This process was based on a thorough review of the collected data from interviews and observations, which assisted in making sense of the data that aided the next step, particularly bearing in mind the large amount of gathered data. At this stage, the researcher also started recording general ideas and thoughts about the data and wrote notes in the margins of transcripts.

Stage Three: Start coding all of the data

Coding followed a combination of deductive (or top-down) and inductive (or bottom-up) approaches. The former involves the use of a number of provisional codes, identified a prior from the literature and research questions, subject to verification from the data. Consideration of the relevant literature allowed the researcher to identify four main categories of the theme: ICT resources, the impact of computers, approaches, and obstacles to using the computer, and an evaluation of those themes for fit was made during the data analysis process. In addition, interesting and relevant themes were developed inductively from the data and were introduced as sub-themes that were

related to the research questions and linked to the four main themes (see Figure 4.3). Under the first theme, ICT resources, there were three sub-themes, namely, current ICT resources, the need of teachers for better ICT resourcing, and perceptions of new ICT development. These three sub-themes addressed three sub-research questions, SRQ1, SRQ2, and SRQ3, respectively. The second theme, impact of computers, contained two sub-themes, namely, learning/educational issues and health, psychological and social issues, and represented SRQ4. The third theme, approaches, included three sub-themes: approaches for using computers in teaching children, pedagogical approach of the teachers and developmental aspects considered by teachers, and represented SRQ5. The last theme, obstacles to using computers, contained three sub-themes; teacher personality factors, internal and external environment factors, and represented SRQ6.

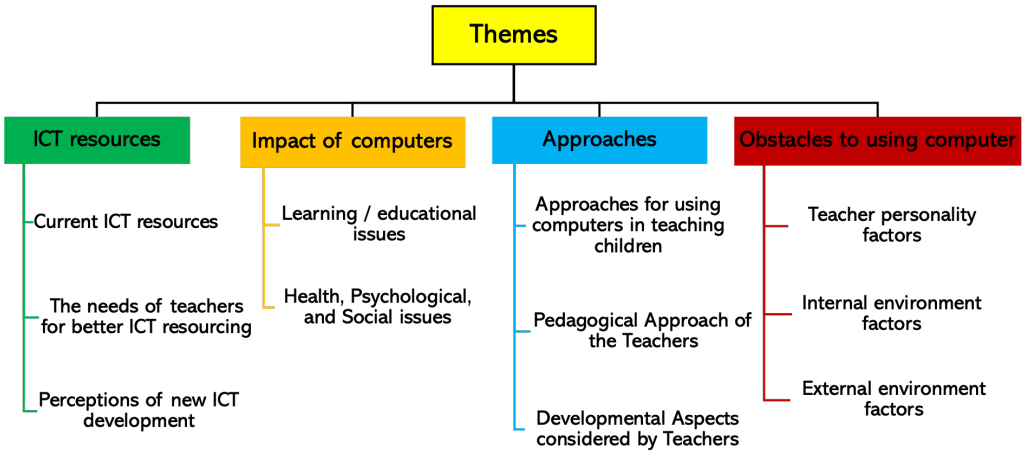

Figure 4-3: The four main themes and some sub-themes derived from the data analysis.

Stage Four: Defining themes and presenting the analysis findings:

The researcher identified the importance of every theme and sub-theme and classified which data referred to those themes. This is in order to perform a narrative presentation

for understanding the contribution of every theme. Thus, it was necessary to present more detail in the findings chapter for each theme. The relationships between themes and sub-themes were recognised by ensuring that each sub-theme was related to its main theme. Furthermore, the themes and sub-themes were systemically ordered, and thus the most important sub-themes come first, allowing the narrative flow to indicate the study underpinnings and answer the research questions. For instance, it was important to begin the analysis with the theme of ICT resources because identifying the availability of ICT resources in participating kindergartens gave a greater understanding of the practice. The 'obstacles to using computers' theme came last because moving from the high level to what was occurring in classrooms, allowed unpacking of initial thoughts proposed in the previous themes. For example, it was difficult to recognise the training factor as a critical issue preventing teachers' use of ICT, before understanding what teachers were doing in their classrooms, and how.

Stage Five: Interpretation in qualitative research

The researcher confirmed themes' development according to the data from interviews and observations; it was possible to provide insights into the research that supported answering the research questions and accomplish the aims of this research. This was achieved by discussing and interpreting the findings in the light of relevant literature.

4.6 Research Quality Criteria

Lincoln and Guba (1985) and Guba and Lincoln (1994) suggest that it is essential to specify terms and ways of establishing and evaluating the quality of qualitative research. They propose trustworthiness as an alternative criterion to validity and reliability for evaluating qualitative research. This is because validity and reliability originated in the

natural sciences, and are associated with positivism. They are problematic in qualitative, interpretive research, which does not offer a single, absolute "truth". The trustworthiness of any qualitative research can be enhanced by four criteria: credibility, transferability, dependability, and confirmability.

Credibility

According to Bryman (2012: 390) "the significance of this stress on multiple accounts of social reality is especially evident in the trustworthiness criterion of credibility". There are several strategies to ensure the credibility of qualitative research. The first strategy is **prolonged engagement** in data collection, meaning that the researcher spends sufficient time in participating settings to understand the environment and culture (Merriam & Tisdell, 2016), and develop relationships with participants to get their understanding of a phenomenon of interest (Lincoln & Guba, 1985).

The second strategy is **extended observation** (which is quite similar to prolonged engagement). Again, it implies that the researcher spends sufficient time in participating settings to observe and identify those characteristics and elements in the situation that are relevant to the problem. Lincoln and Guba (1985) suggested that prolonged engagement offers scope, while extended observation offers depth.

The third strategy is **triangulation**, where the researcher uses more than one method or source of data while studying a phenomenon (Denzin & Lincoln, 2011). Willis (2007) goes further to assert that triangulation can also be done across sources of information, across settings, across researchers, across theories, and across studies. Denzin (1978:302) suggests the rationale for this strategy is that "the flaws of one method are often the strengths of another, and by combining methods, observers can achieve the best of each, while overcoming their unique deficiencies".

The fourth strategy is **member checking** (often referred to as respondent validation), where the participants are provided with research findings to confirm the researcher has accurately understood their social world (Bryman, 2012). Also, this strategy assures that the research is carried out according to the principles of good practice and helps to counteract the possibility of research bias (Guba, E. & Lincoln, 1989).

To ensure the credibility of the current research, the researcher made a preliminary visit the participating kindergartens in advance of the data collection, to understand and observe the organisation, meet and communicate with the participants. The researcher spent thirteen weeks carrying out the fieldwork. This time was sufficient to develop relationships and build trust with kindergarten participants. Besides, the extended observations improved credibility by enabling the contextual factors to be closely and deeply considered. The use of semi-structured interviews and observations enabled the triangulation of data collection methods. Moreover, triangulation of sources was also used in the involvement of three settings, and interviews with three sets of participants: kindergarten teachers, kindergarten headteachers and the director of MKD in MGDE, giving a more comprehensive range of perspectives and knowledge about the use of ICT in Saudi EYE practices. In this research, member checking was also used; in the case of the interviews, interviewees were shown transcripts of their interviews and they were allowed to make corrections, additions, or retractions to reach a high level of accuracy. With the observations, the reflective report following each observed activity was discussed with the teachers concerned. In general, participants did not challenge or expand upon the researcher's interpretations; they agreed with the researcher's understanding.

Transferability

According to Denscombe (2014), qualitative research tends to be conducted with a number of cases or a group, so this raises the question of how generalisable the findings are to other cases. However, Merriam (1988) argues that qualitative research looks for a unique interpretation of events, rather than generalization. Thus, qualitative researchers have produced an analogue to generalization, namely, transferability, which refers to providing a **thick description** of the research questions, context, design, interpretations and findings, to provide others with the opportunity to judge the appropriateness of transferring the study conclusions to another setting (Saunders et al., 2016)

In this exploratory research, the researcher did not aim to offer any generalizations, due to the small sample. An explanation has been given of the wide cultural and historical dynamics in Saudi Arabia, with a focus on the system of education (see Chapter Two). This research also shed important light on the educational reforms in Saudi EYE sector under the Kingdom's ambitious Vision 2030. This information will assist readers inside and outside Saudi Arabia make an informed judgement on the extent of similarity and difference between the research context and the one to which transfer is being considered, in order to reach a decision as to the transferability of the research conclusions.

Dependability

Lincoln and Guba (1985) indicate that dependability is the parallel criterion to reliability in quantitative research and it is closely related to credibility. Saunders et al. (2016:206) suggested that dependability can be enhanced by "recording all of the

changes to produce a reliable/ dependable account of the emerging research focus that may be understood and evaluated by others". Dependability can be established through an inquiry audit (often called an external audit), which is conducted by an external auditor, who investigates the process and the product of the research inquiry (Creswell, 2014; Denscombe, 2014).

To achieve dependability in this research, the research supervisors played a significant part in the auditing strategy. Full records were kept in all stages of the research, and all phases were implemented under their supervision, from selecting the research questions, through methodology to the findings. The supervisors were able to access to all research materials, and they checked and confirmed that suitable research procedures were followed carefully.

Confirmability

According to Given (2008), confirmability is often equated with objectivity and reliability in quantitative research. Denscombe (2014:300) defined confirmability as an issue of objectivity which concerns "the extent to which qualitative research can produce findings that are free from the influence of the researcher(s) who conducted the enquiry".

The audit (supervision) strategy (described above) also achieved confirmability of the research, as it ensured that the researcher did not try to use data to support prior assumptions or maintain a particular theory. This strategy provided an opportunity for discussing alternative interpretations and analysis in the event of any disagreement over validation or interpretations. Furthermore, the use of triangulation of data collection

methods and sources also increased the confirmability of the findings, since it provided varied data. In addition, the researcher has, throughout the thesis, reflected on her position and role in the research, and made explicit the rationale for decisions made and interpretations reached.

4.7 Ethical considerations

In conducting any research that involves people interacting with each other, efforts need to be achieved to confirm participants are handled fairly (Bryman, 2012). O'Hara et al. (2012) indicate that the researcher must treat any participants with respect in the ways of conducting the research and communicating the outcomes. In this regard, ethical issues are given considerable attention in educational research. Ethics is "*a set of rules by which individuals and societies maintain moral standards in their lives*" (Matthews and Ross, 2010:71). According to the Economic and Social Research Council (2015:43):

> *"Research ethics refers to the moral principles guiding research, from its inception through to completion and publication of results and beyond for example the curation of data and physical samples after the research has been published"*

Several research organizations, such as the British Educational Research Association (BERA) the American Educational Research Association (AERA) and universities, have formal guidelines on research ethics for their members. They have formulated codes of responsibilities, which should guide the ethical conduct of research (Al-Jadidi, 2012).

Creswell (2014) outlines that ethical issues appears at different stages of the research process, from the preparation stages (for instance site selection and obtaining access and acceptance), through to the presenting and publication of findings (for instance, accuracy, honesty, transparency and scientific impartiality). According to Wallen and Fraenkel (2001), there are three ethical principles that the researcher should take into account: the confidentiality of research data, the protection of participants, and the avoidance of deception of research participants. Similarly, Matthews and Ross (2010) identified the most important ethical considerations as informed consent, confidentiality, anonymity, honesty, data protection and no risk or harm caused.

The researcher was cognizant of these ethical issues when she carried out the current research. She had first to request ethical approval from the Faculty of Arts, Culture and Education Ethics Committee at the University of Hull in order to carry out the research. This process involved completing an application form that describes the aims of the research, the principal research questions, the data collection procedures, and who are the participants and how they are to be selected. A copy of this ethical approval form appears in Appendix G.

In the Saudi context, the first contact with Makkah General Directorate of Education (MGDE) was made on the researcher's behalf by the cultural attaché of the Saudi Cultural Bureau in London, who requested permission to conduct the study in public kindergarten schools and asking for its full cooperation in assisting the researcher in her fieldwork activities (see Appendix H, Arabic version). The MGDE approved all the data collection procedures after considering the ethical approach of the research (see Appendix I, Arabic version). Furthermore, the researcher's own professional status as

a lecturer in Early Childhood Studies at the University of Najran confirmed to the MGDE that the research was valuable, interesting and should go ahead.

Informed consent from the participants was sought for their involvement. The researcher confirmed that these participants understood the purpose of the research and the process in which they would be engaged prior to the start of the research. The researcher informed the participants that they had the right to withdraw at any time without giving a reason. On this basis, participants understood and consented to their participation.

Confidentiality and anonymity were taken into consideration in this study. The researcher did not identify the kindergartens and the participants that were involved in the study. The researcher gave the participants protection against the possibility of being exposed to situations, which might affect their jobs. In order to preserve anonymity, the kindergartens and the participants are represented in this thesis by letters (See Table 4.2 p. 132).

All the gathered data were stored and password protected in the researcher's personal computer to prevent unauthorized access to the data. It was made clear to participants that data would be used only for research purposes, and that when it was no longer required for the research, it would be destroyed. Apart from the researcher, sole access to these data, was available only to the research supervisors, for auditing purposes.

4.8 Summary

This chapter has explained the approaches and methods used to explore issues around the use of computers in teaching and learning in Saudi EYE. A constructionist, interpretive approach was adopted, on the assumption that these are multi-faceted issues perceived differently by social actors according to their individual experience and context. They were explored via case studies of three kindergartens in the Makkah city, selected to reflect different levels of ICT resourcing, acceptance and use. Data were collected via observation of teachers' practices (four observations for each of six teachers, two in each setting). In addition, semi-structured interviews were conducted with the six teachers, the three kindergartens' headteachers, and the director of the kindergarten department in MGDE (the latter concerning issues raised by the kindergarten visits). Detailed descriptions have been given of the development and piloting of instruments, as well as their administration in the main study. It was explained how the data were subjected to thematic analysis, performed manually. Steps taken to meet the quality criteria of credibility, transferability, dependability and confirmability were explained. Lastly, ethical considerations were addressed, including voluntary, informed consent, confidentiality and anonymity, and data protection. The outcomes of the procedures described are presented in the two following chapters: observation findings in Chapter Five, and interview findings in Chapter Six.

Chapter 5

Observation Findings

Chapter outline

Chapter 5 Observation Findings

5.1 Introduction

The researcher conducted the observational (initial and final) study in Oct and Dec 2017 following the procedure described in Chapter Four, Research Methodology (section 4.4.5). This chapter reports and presents summaries of the observation findings from the three kindergartens.

The chapter begins by presenting the background and the organisational structure of kindergartens and describing kindergartens' learning environment, classroom designs and daily programme. It subsequently explores types of ICT resources available in kindergarten settings and the ways teachers used ICT resources in their classroom practice.

5.2 Kindergartens' Profile: Detailed features

The kindergartens have certain common features, but they also have distinctive merits. These characteristics of each background may play an important role in determining the influence of ICT integration in the setting.

5.2.1 Kindergarten A (KA)

KA is a stand-alone public kindergarten founded in 2014 as a rented single floor building of simple construction. The researcher made an enquiry to the General Authority for Statistics regarding the social classes in Makkah districts where the study kindergartens are located, but this information was not available. Based on the researcher's judgement and local knowledge as a Makkah resident, this kindergarten is

situated in a middle-class rural area in the eastern region of Makkah, around 40 km from the city centre. At the time of this study in 2017, the kindergarten had six teachers and three classes with about 55 children in only two grades: KG2 and KG3. In the absence of a separate dining room, the classrooms were used for having meals.

5.2.2 Kindergarten B (KB)

KB is a public kindergarten founded in 1975 and attached to a secondary school. Based on the researcher's knowledge, it is located in a middle-class residential area in the central region of Makkah, about 6 km from the city centre. At the time of the fieldwork, the kindergarten had about 189 children in eight classrooms and 17 teachers. The KB building consisted of three storeys and the classrooms were on the first and second storeys while the library was on the third storey. This kindergarten lacked a specific room for children to have meals, so the classrooms were used for that purpose.

5.2.3 Kindergarten C (KC)

KC is a public kindergarten established in 1980 and attached to a primary school. Based on the researcher's knowledge, it is situated in one of the most prosperous neighbourhoods in the southern region and located 20 km from the city centre of Makkah. KC is one of the largest kindergartens in the city and has 340 children, 27 teachers, and 12 classrooms spread over two floors. This kindergarten has a first aid room and a dedicated place for having meals. According to the headteacher, the majority of children come from a high-class background, and their parents are highly educated. KC was chosen by the Makkah General Directorate of Education (MGDE) to be an applied kindergarten that supports other kindergartens in administrative and technical aspects (see Chapter 2, p.21). Some classrooms in KC are fitted with a one-

way mirror that allows teachers and children to be observed without their knowledge and avoids distraction or disruption of classroom activities.

5.3 Kindergartens' organisational structure

The organisational structure of the three kindergartens consisted of administrative staff including headteacher (HT), deputy headteacher (DHT) and administrative assistant, teaching staff (teachers) and support services staff (learning resource officer). However, there were slight differences in structure. For instance, the KA had no DHT, administrative assistant or learning resources officer, so one of the teachers was assigned by the HT to perform the tasks of DHT, with reduced the teaching hours. Moreover, the simplicity of the KA did not require the presence of a learning resource officer. Table 5:1 presents the demographic variables and the number of the kindergartens' staff. In general, the distribution and number of kindergarten staff depend on the number of children and the size of the kindergarten. This was clearly noticed in KC, as it had the largest number of children (340), which inevitably led to an increase in the number of classrooms and the number of teaching and administrative staff reached 42 employees. During the researcher's fieldwork, it was observed that there were two teachers in the classroom in all three kindergarten settings. Both teachers are main and usually they worked in different shifts in a day, as they followed the *Teacher's guide* (see Chapter 2, p.37). An exception was KA, where one of the teachers (A1) was alone in the classroom during the first visit and her colleague was attending a training course. Information on the study participants' personal and educational backgrounds was collected from the interviews and is discussed later, in the next chapter.

Table 5-1: Kindergartens' Demographic Features and Number of Staff.

Kindergarten	Headteacher	D. Headteacher	Administrative assistant	Officer of learning resources	Teachers
KA	1	-	0	-	6
KB	1	1	2	1	17
KC	1	1	13	1	27

5.4 Kindergartens' learning environment

From many observations, this section provides descriptive information about the learning environment characteristics, the floor design of the classroom and the philosophy behind such layouts. The descriptions and plans of the classroom in both KA and KC are discussed in detail. Next, there is an exploration of the basic daily schedule in the kindergarten setting.

5.4.1 The organisation of the classrooms

In all kindergartens, children were organised in the classrooms according to their different age levels. Kindergarten grade one (KG1) was for children aged 3-4 years, KG2 was for those aged 4-5 years, and KG3 was for those aged 5-6 years. Table 5:2 (see below) shows information of levels and numbers of the kindergartens' classrooms. KA had no classes available for young children aged 3-4 years, whereas KB and KC both had classes for all three age groups of kindergarten children. Five of six teacher participants were responsible for KG3 classrooms, whereas one teacher (A2) taught a KG2 class. Furthermore, it was noticed in KB and KC that the number of classrooms was distributed equally across all age groups.

Table 5-2: Levels and numbers of the kindergartens' classrooms.

Kindergarten	Classrooms	KG1	KG2	KG3
KA	3	0	2	1
KB	8	2	3	3
KC	12	4	4	4

5.4.2 Description of the kindergarten classroom layout

It is important to carefully organise equipment and materials in the kindergarten classroom so that children can use them easily and effectively. Based on the KSA national curriculum, the teacher is responsible for structuring the class in an organised manner and creating an attractive environment that supports teaching and learning. Through the researcher's visits, it was found that there were several similarities between KA and KB, such as the number of children in the classrooms, the size of the classrooms, the number of learning corners in the classrooms, and the social class of the families served. Here in this section, KA is selected for comparison with KC, due to significant differences observed between these two kindergartens in various aspects such as kindergarten location, the number of classes, and the number of children and staff. The researcher describes the classrooms layouts in these two settings and analyses how such significant differences may have an impact on teachers' ICT practices and children's engagement.

The floor layout for KA's classroom is displayed in Figure 5.1. This figure represents the classroom run by teacher A2 and her colleague in KA. The size of this classroom is around 42 square metres, and the total number of enrolled children is twenty, an allocation of 2.1 square metres, per child. During the observations, the number of

children attending did not exceed twelve and their seating arrangement was a semicircle. On entering the classroom, the researcher gained the impression of a family and enjoyable atmosphere, but the place seemed relatively narrow and crowded. The lighting was of medium brightness, and there was a partial blackout across the windows. The observed classroom followed the curriculum in KSA in dividing the learning environment into seven corners, including the construction corner, the cognitive skills corner, the discovery corner, the art and crafts corner, the library corner, the planning corner, and the house corner. A2 stated that most of these corners remain in the same places during the academic year so that children feel comfortable and get accustomed to the educational environment. However, the house corner and the planning corner were changeable based on the curriculum units. The teacher A2 observed children as they moved between corners and recorded their behaviour and abilities in a small notebook. Such teacher assessment of children is a requirement of the national KSA curriculum, as mentioned in the teacher's guide (MoE, 2018d).

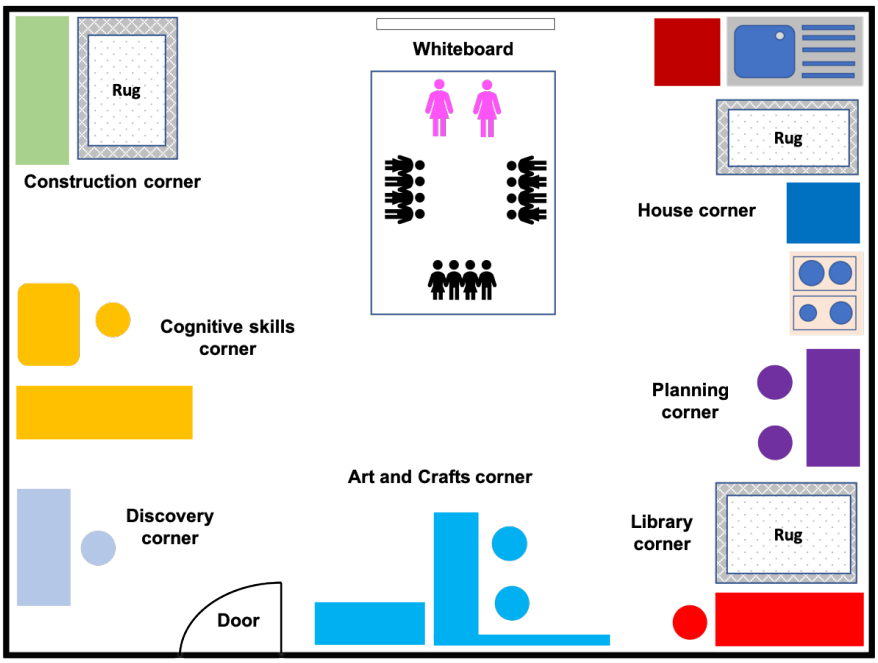

Figure 5-1: Kindergarten A (KA): teacher A2's classroom layout.

In the case of KC, the observed classroom was managed by teacher C1 with her colleague. The floor layout of this class is shown in Figure 5.2. The classroom had an area of approximately 80 square metres. This classroom was a moderate temperature, well-ventilated, and excellently furnished. The number of children on the class list was thirty (giving 2.6 square metres of space per child), and the number of children present during the observation days was twenty-five.

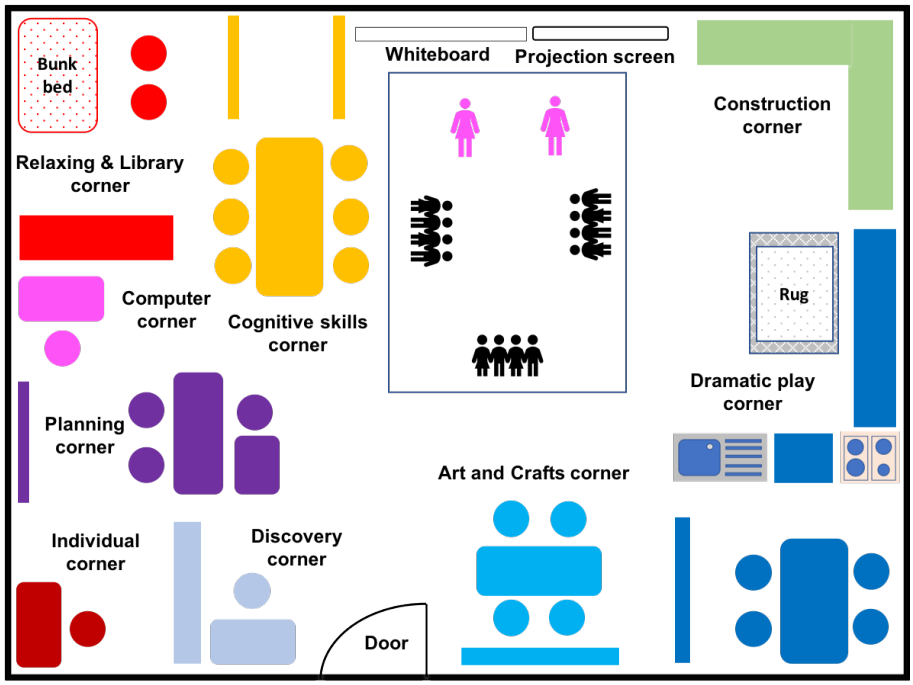

Figure 5-2: Kindergarten C (KC): teacher C1's classroom layout.

KC's classroom included many types of learning corners such as the relaxing and library corner, the computer corner, the cognitive skills corner, the planning corner, the individual corner, the discovery corner, the art and crafts corner, the dramatic play corner, and the construction corner. Each corner had a variety of materials and equipment that were labelled in both Arabic and English languages. There was a sheet for tracking children's progress in each learning corner, with all the children's names

listed on it. Teacher C1 used this sheet to measure the skills shown by the child during corner activity. An example of one of the items recorded on this sheet was that playing with other children: he/she has the ability to maintain an ongoing friendship with at least one child. A bunk bed was available in the relaxing and library corner and some soft elements for relaxation distributed around the corners.

Through many fieldwork observations, the researcher noticed similarities and differences between KA and KC in classroom environments. It was noted that both classrooms had materials that were child-sized, colourful, attractive, robust, and safe for vigorous and repeated use. Each corner had a coloured symbol that described the corner and a sign, computer-generated or teacher-produced, such as a shape (e.g. star or circle) or icon (e.g. boy or girl) indicating the number of children who could be present in the corner at the same time. For example, the symbol of the discovery corner in both classrooms was a magnifying glass and the maximum capacity of this corner was one child.

During classroom observations, it was noted that teachers adopted the self-learning curriculum (discussed in Chapter Two) in the learning corners by creating an environment to stimulate children's desire and enthusiasm for learning and raise their curiosity for discovery. The teachers had the flexibility to add or remove learning corner materials based on the children's individual needs and interests. Also, teachers gave children the freedom to choose in which learning corner to start their activities as individuals or as groups, as well as the sensory tool to be dealt with, before moving to the next corner when they had finished. These corners encouraged peer interaction and cooperation through a varied range of activities.

There were several important differences between the KA classroom and the KC classroom. It was observed that the area of the KC classroom was much larger than that of the KA classroom. Besides, the KC classroom contained more features than the KA classroom, such as the individual corner and the computer corner. The individual corner was a quiet corner where the teacher prepared individual activities for the child to enhance some skills such as listening from the recorder and writing letters and numbers in the sand tray (see Figure 5.3). In the computer corner, children learned the basic skills of operating the computer, used educational games and a drawing and colouring program, and typed letters or their name on the Word page. In teacher C1's classroom, the children raced to the computer corner to get the available seats and use the computer. It was also noted that this corner was never empty of children, throughout the time allocated for the learning corners.

Figure 5-3: The individual corner in the KC classroom.

Most of the learning corners in the KC classroom were larger than those in the KA classroom. For instance, the construction corner in the KA classroom was narrow, accommodating four children and a cupboard with three shelves of solid wood pieces of different shapes and sizes. The corresponding corner in the KC classroom was wider and had two cupboards; each one contained three shelves holding variously shaped wooden blocks. In the KC classroom, the children used an open parquet floor space for building, dismantling and installation in front of the shelves of construction toys. However, the construction corner in the KA classroom has some merits, as there were wooden pieces kept in baskets, related to the construction of cars, animals, and trees. Also, the corner had a small rug playmat illustrated buildings, railway and roads, and had a space for four children. There was a partition that separated this corner and the corner next to it, and a wall mat with alphabet letters, animals and plants (see Figure 5:4).

Figure 5-4: The construction corner in the KA classroom.

Regarding the cognitive skills corner, in the KC classroom there were more educational toys than in the KA classroom, such as matching, puzzles, sorting and counting toys. Up to nine children could use these toys at the same time by sitting on the floor or using two tables, surrounded by six chairs. By contrast, the corresponding corner in the KA classroom was occupied by only two children and had a few educational toys and one table with a single chair. Figure 5.5 shows some differences between the cognitive skills corners in the two observed classes at KA and KC.

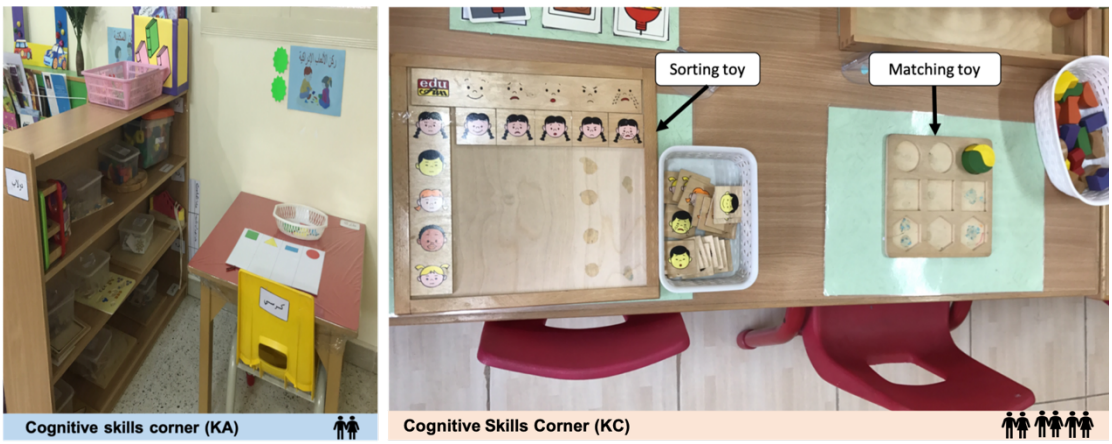

Figure 5-5: The cognitive skills corner in the two observed classes at KA and KC.

5.4.3 Daily programme

All the kindergartens followed the daily programme set by the MoE and mentioned in *the Self-learning Curriculum for Kindergarten* (MoE, 2016) (discussed in Chapter Two). However, teachers may made minor changes to this programme and adapted everyday activities to address children's learning needs and interests. Figure 5.6 shows the basic programme of the kindergarten day. The programme included different and

balanced types of activities: individual and group, structured and un-structured, cognitive and entertaining, and indoor and outdoor.

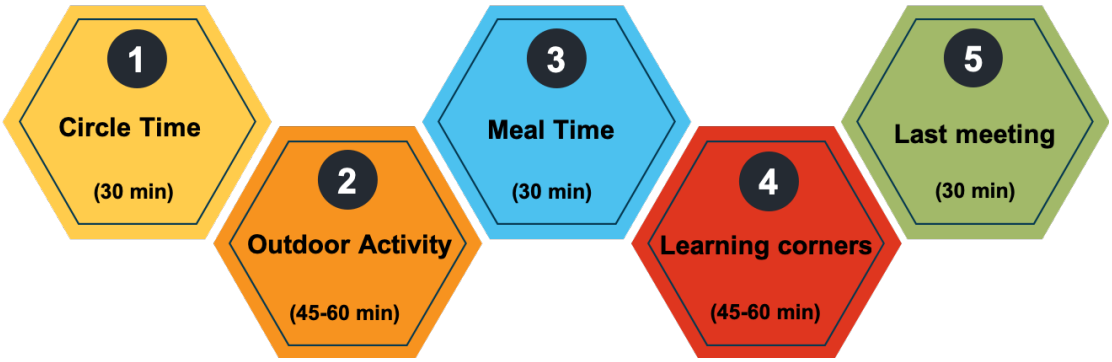

Figure 5-6: Basic daily programme of kindergarten.

During observations, the daily programme of the three kindergartens started with the circle session (structured activity directed by the teacher) at 8:15 am. Teachers presented a topic related to the current educational unit and provided supportive materials for this purpose. Teachers attempted to capture the children's attention and encourage them to participate in the topic. For example, teacher B1 showed a model of a small house and mentioned the types and components of the house. She asked the children about their houses and the children began to describe their houses and identified differences in answers.

Then there was an unstructured outdoor activity, taking 45-60 min, followed by a mealtime of 30 minutes duration. Afterwards, there were sixty minutes for the activities of learning corner activities in all kindergartens. The teacher's role was to prepare corners, observe children while moving between corners, support them to overcome challenges and record their behaviour, abilities and interests. For example, in the individual corner, one girl tried to use the recorder and headphones and reported a

problem with the headphones. Teacher C1 resolved the problem by connecting the headphones to the recorder. The girl turned on a cassette that contains the activity of finding the missing word in a sentence (e.g. I will be happy when .....). Then, the girl listened to the cassette and gave her answers to the teacher. The teacher recorded the answers on the sheet and evaluated the girl's work.

Finally, there was the last meeting with the teacher, for thirty minutes. This meeting included reviewing the day's activities, listening to a story or rhyme, and doing some physical activities such as roll and move, short races and dancing. For example, teacher B1 reviewed the day's topic and invited some children to speak about their work in the art and crafts corner. After that, she used finger play with rhymes and read the story: *Are you my home?* She showed a board made from baize cloth that contained some animals, such as bird, spider, duck, fish and mouse, and their homes (see Figure 5.7). She imitated the sounds of the animals in the story excellently and excitingly. Whilst the teacher was telling the story, children interrupted the teacher, shared with her the end of story, and expressed their views about the story. Then, the teacher placed the animal puppets in the library corner so the children could act out the story (see Figure 5.8).

Figure 5-7: Baize board for the story.

Figure 5-8: The animal puppets for the story.

Another occasion, in the same kindergarten, teacher B2 narrated a story about the building of the holy Ka'aba. She seemed not to succeed in choosing the appropriate method to tell the story and did not use any supportive tools. Accordingly, most children were chatting and ignored the teacher's story and were unwilling to participate during the meeting activity.

It was noted that this basic daily programme did not change much and there was a balance between activity and relaxation in all three kindergartens. However, the observed difference between kindergartens in this study was the duration of the daily programme. The daily programme in the KA was from 8:15 am to 11:30 am for children and was extended until 12:30 pm for staff, whereas in KB and KC it started at 8:15 am and finished at 12:45 pm and 1:30 pm for children and staff, respectively. This was due to the addition of some breaks and short activities between the basic activities in the programme, such as snacks and the written symbol circle. In the written symbol circle, the teacher selected one of the numbers or the Arabic alphabet letters, and then she created some activities to help children to learn the correct way of writing the selected symbol.

Although the curriculum guidelines encourage regularity and constancy in the sequence of daily programme periods, in order to give children a sense of comfort and safety, kindergartens have some degree of scheduling flexibility in interpreting this guideline. It was observed that in KA, as the outdoor playground was not large enough to include all the kindergarten children, some amendments were made to the programme by swapping between circle time and outdoor activities for some classrooms.

As mentioned above, the daily programme of kindergarten is based upon the self-learning curriculum. The self-learning curriculum encourages the children to interact with various educational materials and experiment and discover the educational environment independently, which helps the children to develop their abilities and improve them according to their growth model.

5.5 Current use of ICT in kindergartens

The following section describes the use of ICT in the three kindergarten settings and identifies types of ICT resources available, with a focus on the teachers' teaching methods concerning their use of ICT in the classroom practice.

5.5.1 ICT resources available in the kindergarten settings

Before beginning to monitor teachers' practices regarding the use of ICT in the classroom, it was necessary to identify the types of ICT resources available in the three settings. Here, observations focused on the positioning of ICT resources. The researcher noticed various forms of ICT resources for teachers' use, as shown in Table 5.3. There was a significant difference between kindergartens in terms of availability of ICT resources. Through the researcher's visits to KA it was observed that ICT resources were almost non-existent for teachers' teaching practices in the classrooms. There was a laptop and LCD projector available in the headteacher's office for general use of teachers.

In KB's case, all the classrooms were fitted with projection screens mounted on the wall. Teacher B1's classroom had a laptop and an LCD projector. Most of the other ICT resources were located in the library, for example, interactive whiteboard, overhead projector, epidiascope projectors, microphone, and sound amplifier, as shown in Figure 5.9.

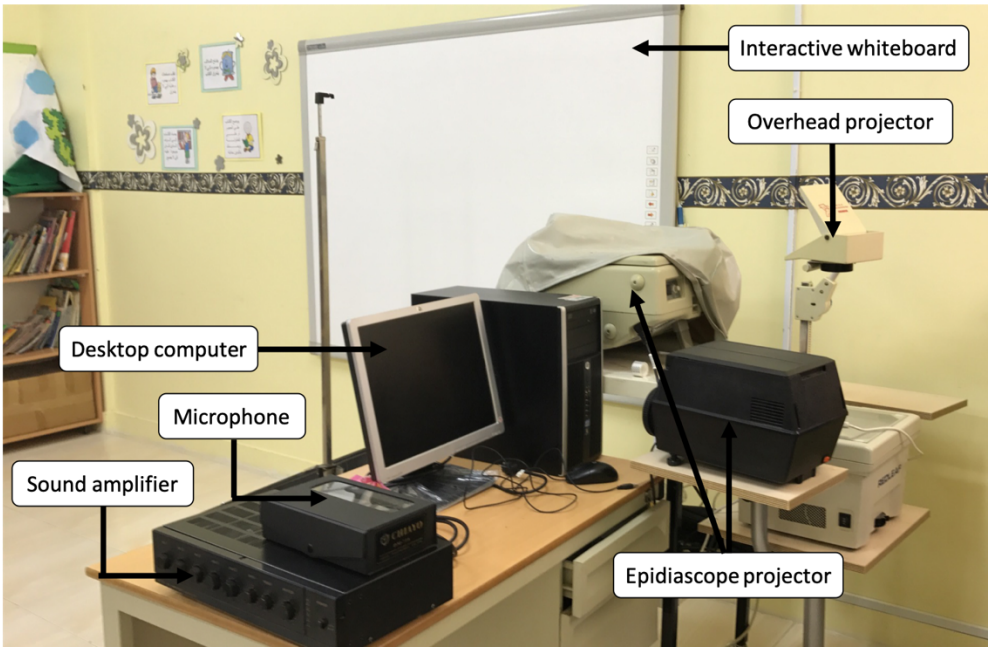

Figure 5-9: Photograph of some ICT resources observed in the KB library.

The KC setting was well equipped with a variety of resources, such as computers and accessories (speaker and headphone), many forms of projectors and projection screens, and other equipment (e.g., cassette player and recorder, TV and videos, and telephone). Also, an Internet connection was available in the KC setting. These resources were distributed in this kindergarten between the classrooms and the library room. In the classrooms, it was observed that there was a laptop for teachers and a desktop computer with accessories for children in the computer corner. The cassette player and recorder were in the individual corner. The LCD projector was hanging from the ceiling, and the projection screen was in the middle of the classroom, opposite the circle time rug. An interactive whiteboard and some other equipment such as overhead and epidiascope projectors, TV, videos, and telephone were found in the library room.

Table 5-3: The available ICT resources in the study kindergartens (Orange boxes indicate these resources were found in the headteacher's office, while blue and green boxes refer to those found in the classroom and library, respectively)

	Kindergarten		
ICT resources	KA	KB	KC
Computer (desktop or laptop).	✓	✓	✓
Interactive whiteboard		✓	✓
LCD projector	✓	✓	✓
Overhead projector		✓	✓
Epidiascope projector		✓	✓
Projection screen		✓	✓
Cassette Player and Recorder			✓
TV & Videos			✓
Speakers			✓
Headphones			✓
Telephone			✓
Internet			✓
Microphone and Sound amplifier.		✓	

5.5.2 Uses of available ICT resources

Several observations focused on the ways teachers used ICT resources in their teaching. During the daily programme of the kindergarten, teachers could use the ICT tools in the structured activities, i.e. circle time and the last meeting. The researcher observed six teachers from the three kindergartens during these two activities, in two-day visits. Thus, each teacher in this study was observed four times in total. The first visits to teachers were made before conducting the interviews with them, while the second visits occurred after teachers' interviews. On the first visit, the researcher conducted the first

and second observations, while on the second visit, the third and fourth observations were made. The teacher participants observed by the researcher were the same as those interviewed later. In this section, each activity scenario related to teachers' ICT uses in the classroom will be described. Table 5.4 shows a summary of the teachers' uses of ICT resources in the observed activities.

Teacher A2: Scenario 3 (Duration of ICT use: 3 min; Number of children: 12/20).

Teacher A2 used Microsoft Word to show pictures of the stages of building a house. The lighting was poor, and the curtain was not closed. The pictures shown were tiny, and the show was directly from the laptop because there was no projection screen in the classroom. Teacher A2 asked children to identify the roles of a carpenter, a plumber, and an electrician in house-building. Some children seemed bored; they were idle and did not pay attention to the teacher. She asked children to perform stand and jump exercises to get more activity.

Teacher B1: Scenario 2 (Duration of ICT use: 15 min; Number of children: 17/21).

The teacher used the computer to display the story of the goldilocks and the three bears. She was highly skilled in varying her tone of voice while telling the story. It was observed that the children were interacting with this story and they could remember the story, answer the questions the teacher asked, and recognize the purpose of the story. She then invited the children to participate in the activity by representing the story. The children were engaged in the activity and played the roles of story characters.

Teacher C1: Scenario 1 (Duration of ICT use: 25 min; Number of children: 22/30).

Teacher C1 used a PowerPoint presentation in the circle time activity, about types of animal homes. There were twenty-two children out of thirty attending that day, and

they were sitting on the rug during the presentation. She started to encourage children's imagination by showing pictures and asking them some questions. For example, "*Imagine you are out on a cold night, with strong wind, and rainy weather, with thunder and lightning*, *what will you do? Where will you go?".* Children started to answer the teacher's questions; for instance, *"I will wear my jacket'', "I will carry an umbrella", "I will ask for help"* and *"I will go home".*

The teacher then showed many slides that contained a group of animal images such as a chicken, a bird, a rabbit, a cow, a horse, a lion, a spider and a bee, and different types of animal houses (e.g. coop, nest, burrow, barn, stable, den, web and hive). She asked the children some questions related to the presentation, such as, *"What is this animal?", "Where does he live?", "Is it a pet or a predator?", "What does this animal eat?".* The children were excited when they responded to the questions, and sometimes they interjected before the teacher could complete the question. Teacher C1 was very motivated to involve all the children, and the children were very interactive with the teacher. The children' responses seemed to suggest that they understood that each animal has specific characteristics that distinguish it from others. This teacher was using a laptop, LCD projector, and projection screen in the activity.

Teacher C1: Scenario 2 (Duration of ICT use: 25 min).

At the last meeting activity, teacher C1 showed story pictures made from PowerPoint. The story was called 'العنزات الثلاث' ('*The three goats*'), and the teacher read the story with varying tones of voice. During the narrative of the story, the children were attentive and well-behaved. There were no signs of children's movements or side conversations. When the teacher finished the story, she invited children to engage in

the activity and reviewed the story again. She asked them some questions such as *"What would you like to call the story?", "Who can tell me some of the story's events?"*. A girl raised her hand to get permission to answer. After the teacher gave permission, the girl said, *"The three goats and the hungry beast who lived under the bridge"*. The teacher then invited each child to complete a part of the story and assisted him/her with some hints. It was observed that the children were excited to participate in this task and they were able to remember the characters by referring to the pictures and complete the story to the end. During the children's participation in the activity, it was observed that one of the children, who was hyperactive, left the class and knocked on the door several times. Then, he entered the room and caused inconvenience and disruption and then left the classroom again. There was no reaction from the teacher towards this child. Finally, she thanked the children for their participation and motivated them for the next day's activities.

Teacher C1: Scenario 3 (Duration of ICT use: 38 min; Number of children: 25/30).

Teacher C1 had given the children a little homework about the beaver 'القندس' to be answered with the participation of children's mothers. She used the PowerPoint to review these questions and the children's answers. For example, the first question was *"Why is the beaver called a skilled engineer?"*. The teacher showed personal photos of four children who answered this question, and she said their answers. Another question was *"How can the beaver cut large trees?"*. Five children answered this question, and their photos and answers were included in the presentation. During this presentation, the hyperactive boy sat in the middle of the circle and caused some disruption in the classroom. Teacher C1 was kind in managing the child's behaviour and ordered him to sit at one end of the circle. She repeated the circle's rules firmly and told the child not

to distract the attention of other children. The boy listened and understood for a short time. He then left the circle and moved between educational corners and then sat in the computer corner.

Afterwards, the teacher used a video clip from YouTube explaining how beavers build their homes. She asked the children some questions related to the video, such as *"Where does the beaver build his house?", "What are the components of the beaver's house?"*, *"What do you like about the story?".* For example, one child said, *"The beaver builds his house on lakes"*, and another child said *"The beaver's house is made from trees and twigs"*.

Overall, it was observed that some children interacted with the teacher and the method of presenting the topic and they had the curiosity to participate in the activity. However, some of them were unwilling to participate. For instance, one child was playing with his hands, another child was whispering with his friend who was sitting next to him, and the third child, with hyperactivity, was moving between corners. It seemed that the time given to this activity, 38-minutes, was too long for some children, even though the teacher changed the activity from PowerPoint presentation to YouTube.

Teacher C2: Scenario 1 (Duration of ICT use: 25 min; Number of children: 24/28).

Before using the computer, teacher C2 asked the children a preliminary question, "*When do you feel safe?*". The teacher selected one of the children to answer, but the child did not answer. She then asked this child to choose another child from the children who raised their hands to answer. She received different answers from children, such as "*When we build a house*", "*When we enter the house*", "*When I sit alone*". Teacher C2 thanked the children and mentioned that there are some risks at home. After that,

she showed the PowerPoint slides containing pictures of some sharp and dangerous objects in the home such as knives, scissors, medicines, cleaning products, the oven and electrical sockets. She mentioned the importance of safety in the home and when children should ask for help from adults. Children participated in identifying the potential risks of these objects.

Teacher C2 presented a picture of a house where some parts were missing and asked them, "*What does this house need to be safe?*". She invited the children to participate in the activity, and children were calm and participated politely in an organised manner. Also, the teacher supplemented this presentation by using sandpaper and coloured cards.

Teacher C2: Scenario 2 (Duration of ICT use: 25 min).

Teacher C2 used the computer to display five different images via data projector. She engaged children in a dialogue about these images by asking questions that stimulated the imagination and thinking skills of the children. One of these images was of a child who had a bowl of salad in front of him, but did not want to eat. This teacher asked the question, "*What can we do to help him to eat?*". The children mentioned several answers, for example, "*Change the dish*", "*His mother will eat it*", "*Give him a porridge*", and "*Add juice*". The teacher C2 offered opportunities to engage children in the activity and encouraged their reflection and imagination. Children were enjoying participating, and they showed their ideas and views.

Teacher C2: Scenario 3 (Duration of ICT use: 15 min; Number of children: 16/28).

The teacher used the computer to present an interactive audio story about the sixth letter in the Arabic alphabet (ح, "ha"). The story contained some words that included this

letter, which was highlighted in a different colour. The children were attentive and cooperative in learning the sound of the letter and words that begin with the letter. She invited children to pronounce the letter, remember the words of the letter, and repeat the pronunciation of the new words. Children were involved in this task and showed the ability to pronounce the letter and words accurately. She mentioned that the letter has different shapes depending on its position within a word, i.e. in an initial (حـ), medial (ـحـ), and final (ـح) position. She invited children again to identify this letter from several words and asked them to give some examples of words with the letter (ح, "ha"). Children responded to the teacher's invitation, and they understood the different positions of the letter in words. Three children mentioned that their names included this alphabetic letter. The teacher commended the children for their right answers by saying (أحسنت, "Well done") and (ممتاز, "Excellent").

Table 5-4: Teachers' use of ICT resources in the observed activities.

Kindergarten	Teacher	First day visit	Scenario 1 at the circle time (min)	Scenario 2 at the last meeting (min)	Second day visit	Scenario 3 at the circle time (min)	Scenario 4 at the last meeting (min)
KA	A1	09/10/17	N/A	N/A	03/12/17	N/A	N/A
	A2	11/10/17	N/A	N/A	04/12/17	Laptop (pictures made from Microsoft Word). (3 min)	N/A
KB	B1	29/10/17	N/A	Laptop (story pictures made from PowerPoint) LCD projector, and projection screen. (15 min)	10/12/17	N/A	N/A
	B2	30/10/17	N/A	N/A	13/12/17	N/A	N/A
KC	C1	19/11/17	Laptop (pictures made from PowerPoint), LCD projector, and projection screen. (25 min)	Laptop (story pictures made from PowerPoint), LCD projector, and projection screen. (25 min)	18/12/17	Laptop (PowerPoint presentation and video clip from YouTube), LCD projector, projection screen, and speakers. (38 min)	N/A
	C2	21/11/17	Laptop (pictures made from PowerPoint), LCD projector, and projection screen. (25 min)	Laptop (pictures made from PowerPoint), LCD projector, and projection screen. (25 min)	19/12/17	Interactive story showed from laptop, LCD projector, and projection screen (15 min)	N/A

5.6 Summary of Observations

5.6.1 Kindergartens' location

The first kindergarten (KA) was the newest among the study kindergartens, being founded in 2014. It was situated in a middle-class rural area of Makkah. This kindergarten was a stand-alone and rented single-floor building comprising three classes with six teachers and 55 children in only two grades: KG2 and KG3. The KA had no DHT, administrative assistant or learning resource officer. The second kindergarten (KB) was located in a middle-class residential area in the centre of Makkah. It was established in 1975 and attached to a secondary school. The KB building consisted of three storeys accommodating eight classes with 17 teachers and 189 children. The third kindergarten (KC) was situated in a high-class residential area in the south of Makkah. It was founded in 1980 and attached to a primary school. KC was one of the largest kindergartens in the city and has 27 teachers, 340 children, and 12 classrooms spread over two floors. The MGDE designated this kindergarten as an applied kindergarten that supported other kindergartens in administrative and technical aspects and also to take part in a programme for Improvement of the Kindergarten Environment. In KB and KC, the organisational structure consisted of administrative staff including HT, DHT and administrative assistant, teaching staff (teachers) and support services staff (learning resource officer). Additionally, KB and KC both had classes for all the three age groups of kindergarten children (KG1, KG2 and KG3).

5.6.2 Similarities and differences between KA and KC in classroom environments

It was observed that all the classroom materials were child-sized, colourful, attractive, robust, and safe for vigorous and repeated use. Each learning corner had a coloured symbol or icon indicating the number of children who could attend in the corner at the same time. The teachers had the flexibility to add or remove learning corner materials based on the children's individual needs and interests. Also, they gave children the freedom to choose in which learning corner to start their activities as individuals or as groups, as well as the sensory tool to be dealt with, before moving to the next corner. The size of the KC classroom (80 square metres) was much larger than that of the KA classroom, which was around 42 square metres. The number of children in the KC classroom was thirty, means each child had 2.6 square metres of space, whereas twenty children were enrolled in the KA classroom, giving each child was 2.1 square metres. Based on the teacher's guide to the self-learning curriculum for kindergartens, the minimum space available inside the classroom for each child is should be 3.25 square metres. By this standard, both observed classrooms in KA and KC were considered small and crowded. While the teacher's guide explained the ratios in kindergarten is one teacher for every twelve children (1:12), KC did not follow the guide in this matter. KA had two teachers for twenty children and KB had two teachers for 21 children, so their ratios conformed to the guide.

Additionally, the KC classroom included more features than the KA classroom, such as the individual corner and the computer corner. It was observed that some of the ICT resources were located in these two corners, and the children used these resources in the time allocated for the learning corners. It was also noted that the children raced to

the computer corner to get the available seats, and this corner was never empty of children. Furthermore, the majority of the learning corners in the KC classroom were larger and had more educational materials than those in the KA classroom.

5.6.3 The daily programme

It was noted that the basic daily programme had not changed much and there was a balance between activity and relaxation in all three kindergartens. However, the daily programme in KB and KC was longer than that in the KA.

5.6.4 ICT resources available in the three kindergartens

It was observed that the KA classrooms were not equipped with ICT resources, but there was limited availability of a computer and LCD projector on the headteacher's office. In the KB classrooms, it was found that there was a computer, LCD projector and projection screen, but most of the ICT resources (such as interactive whiteboard, overhead projector, epidiascope projectors, microphone, and sound amplifier) were located in the library on the third floor. In the KC setting, classrooms were supplied with a wide range of ICT resources such as computers, LCD projector, projection screen, speakers, headphones, and cassette player and recorder. Also, various other resources were found in the library room, including interactive whiteboard, overhead and epidiascope projectors, TV, videos, and telephone.

5.6.5 Summary of the four scenarios

In a total approximately 120 minutes of observation were carried out for each teacher. It was observed in KA, teacher A1 never used any form of ICT resources in the classroom practices, while teacher A2 used only the laptop for a short period of about

three minutes in circle time. In this simple use, some pictures were displayed on the laptop screen directly to the children. Some children showed boredom and idleness, and they did not pay attention to the teacher. This only use of the computer occurred in scenario 3 after the researcher had interviewed the teacher. Overall, both teachers relied on the use of the traditional approach to teaching children.

In the case of KB, teacher B1 used a laptop with an LCD projector to show story pictures made from PowerPoint in only one classroom activity, for 15 minutes. This teacher was highly skilled in varying her tone of voice while telling the story. Children showed interest and interaction with the teacher, and they understood the purpose of the presented story. Teacher B2 made no use of ICT resources in any of the observed activities. Despite the availability of some ICT resources, overall, teachers' use of ICT in the classroom was very limited.

In the third kindergarten (KC), it was observed that both teachers carried out different learning activities that used ICT tools in their teaching practices. The teachers' ICT uses occurred in three activity scenarios (See Table 5.4). However, despite the availability of various ICT tools, teachers employed a narrow range of ICT tools, mainly laptops and LCD projector, speakers and projection screen. Both teachers utilised the computer and projector for teaching to attract the children' attention and assess their learning process and results. Both teachers engaged children in conversation and dialogue about these ICT-related activities by asking questions that stimulated their imagination and thinking skills.

Teacher C1 was very keen to involve all the children, and they were very responsive to the teacher. The children were excited and showed high levels of involvement when they participated in these activities. Sometimes, the children interrupted the teacher before she could complete the question, and they said the answers. Nevertheless, it was observed that some children were unwilling to participate when the activity period was too long, which especially occurred in scenario 3. Besides, the hyperactive boy caused inconvenience for the children and disrupted the discipline in the class. The teacher C1 not to deal firmly with this case, and she did not guide the child to improve his behaviour appropriately.

Teacher C2 encouraged children to engage in all the observed activities and supported them in expressing their ideas and views. Children were attentive and participated politely in an organised manner because the type of activity was engaging. They seemed to understand the content of the learning activities that used the ICT tools, which was apparent in the children' reaction and their responses to the teacher's questions. Teacher C2 was frequently used motivational phrases and thanked children for their participation. Also, this teacher merged the ICT activities with some of the traditional methods in her presentation of the lesson.

Overall, all six teachers tended to be using ICT resources, particularly the computer, as a presentation tool for teaching, not as a learning environment. They did not give the children any chance to use these resources in any of the observed activities. Observations of ICT-related activities revealed that teachers' use of resources appeared to be at an entry level of technology use, typical of inexperienced staff. Frequent interactions occurred between teachers and children, especially verbal

interactions. These interactions mostly involved conversations, question and answer dialogues and giving feedback.

5.7 Summary of the Chapter

This chapter has reported the outcomes of 24 classroom observations (four with each of six teachers, two for each kindergarten) with a particular focus on availability and use of ICT resources. The three kindergartens varied in terms of size, proximity to the city, type of building (e.g. leased versus purpose-built, standalone or attached to a school) and the social class of population served. Classrooms were similar in the range of learning corners available, although the size of corners and range of resources differed, KC being by far the best equipped. Rooms, however, were small relative to the number of children enrolled (based on the space allocation stipulated in the ministry guidelines) and KC did not meet the recommended 1:12 teacher: pupil ratio. The basic daily programme was similar in all three settings, following the ministry guidance: half an hour's structured activity in circle time, 45-60 minutes of unstructured outdoor activity, thirty minutes for lunch, 45-60 minutes in the learning corners, where teachers' role was to facilitate, support, and observe children's activities, and a final meeting involving teacher-directed, structured activity.

Settings varied considerably in availability of ICT resources. KA had only a computer and LCD projector, which teachers could borrow from the headteacher's office; KB had a computer, projector and screen in the classroom, with other resources in the library on the third floor, while KC had a wide range of resources, both in classrooms and in the library. Teachers' use of these resources, of any occurred during circle time

or the final meeting, where a limited range of technology was used as a presentation aid to support teacher-centred, structured activities, such as storytelling, discussion of topics such as safety in the home, and introduction of Arabic letters. Whilst use of ICT did seem to attract children's attention, the success of lessons seemed to depend on timing, and teachers' skill in presenting the material and engaging children in dialogue, rather than the ICT itself.

Teachers' integration of ICT can best be described as entry-level and, even where ample resources were available, children were not given opportunities to use them in any of the observed activities. The issues raised by these observations will be explored in more depth through the teacher interview findings in the next chapter and revisited in the light of relevant literature in Chapter Seven.

Chapter 6

Interview Findings

Chapter outline

Chapter 6 Interview Findings

6.1 Introduction

As explained in Chapter Four (section 4.4.5) interviews were conducted with two teachers in each of the participating kindergartens, and their headteachers. The issues raised were subsequently taken up with the director of the kindergarten department at MGDE. This chapter reports the findings, complementing the observation outcomes in Chapter Five. The chapter begins with profiles of the participating teachers and headteachers. The interview findings are then reported under themes linked to the RQs, namely, ICT resources, the impact of computers, teaching approaches, and obstacles to using the computer.

6.2 Profiles of the participants

The findings of the interview were based on the analysis of the statements of the participants in this study. The sample for this research study consisted of ten participants: they included six kindergarten teachers, three kindergarten headteachers, and the director of Makkah Kindergarten Department. It is important to identify the teachers and headteachers' personal and educational backgrounds, experience and training, as these are likely to have a direct influence on their perceptions and pedagogical beliefs towards using computer technology in classrooms. Table 6.1 (see below) shows this background information. All participant practitioners were Saudi females.

Table 6-1: Participants background information.

Kindergarten	Participant	Age	Qualification	Class	Experience in EYE	Working in the current kindergarten
KA	A1	Late 30s	BA in Kindergarten	KG3	7 years	2 years
	A2	Mid 30s	BA in Kindergarten	KG2	6 years	2 years
	AH	Late 30s	BA in Kindergarten	-	6 years of experience; 5 years in teaching and one year in leadership (Administration).	3 years
KB	B1	Early 30s	BA in Kindergarten	KG3	6 years	6 years
	B2	Late 30s	BA in Kindergarten	KG3	6 years, including a portion of it as administrator at an elementary school.	3 years
	BH	Mid 40s	BA in Kindergarten	-	16 years experience; 12 years in teaching and 4 years in leadership (Administration).	6 years
KC	C1	Early 40s	BA in Kindergarten	KG3	11 years of experience, 6 years at in government kindergartens and 5 in private kindergartens.	4 years
	C2	Early 40s	BA in Kindergarten	KG3	12 years of experience in kindergartens	9 years
	CH	Late 40s	BA in Kindergarten	-	21 years of experience; 16 years in teaching and 5 years in leadership (Administration).	10 years

6.3 Presentation of interview findings

The interview findings will be presented in this chapter under four themes: ICT resources, the impact of computers, approaches, and obstacles to using the computer. This section reflects the four main themes derived from the data analysis by thematic analysis (see Chapter Four; Research Methodology, section 4.5) (see Figure 6:1).

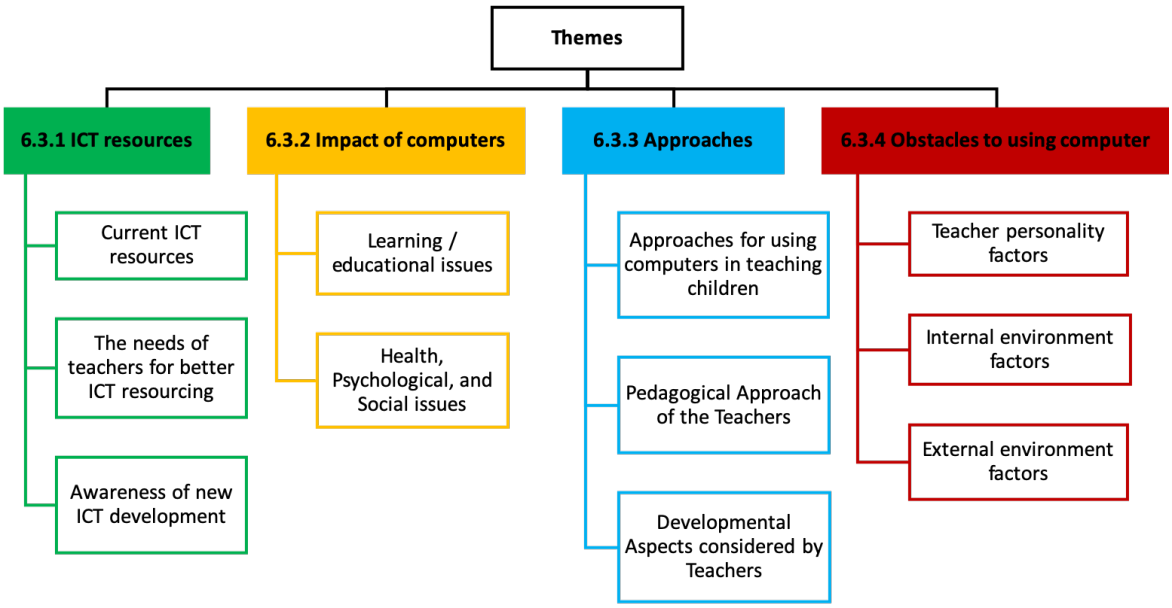

Figure 6-1: The four main themes and some sub-themes derived from the data analysis.

6.3.1 ICT resources

The first theme, ICT resources, comprises three sub-themes, which address the ICT resources currently available, perceptions of resources needs, and teachers' awareness of and feelings about ICT development. This theme addressed three sub-research questions (SRQ1, SRQ2, and SRQ3)

SRQ 1: *What ICT resources are available in the kindergarten classroom?*

SRQ 2: *What are kindergarten teachers' perceptions regarding the needs for better ICT resources in the classroom?*

SRQ 3: *What are kindergarten teachers' perceptions regarding the future of computers in the classroom?*

6.3.1.1 Current ICT resources

The sub-theme encompasses three codes: teachers' provision of their own ICT equipment, use of facilities at the library, and new technology as a substitute for other teaching tools. In interviews, five of the six classroom teachers said they brought their own ICT equipment to kindergarten and used it in classroom educational practices. The resources brought could be laptops, tablets, projectors, recorders or other accessories. In KA, the classrooms were not equipped with ICT resources, so teachers brought their own ICT equipment. For instance, one teacher stated:

> "I do not have a computer in the classroom. However, I have my personal computer (laptop) and bring it from home when I feel that I need it". (A2)

The other teacher in the same kindergarten explained:

> "Unfortunately, there is neither a computer nor a projection screen at the kindergarten, and there is only one projector set for the kindergarten. However, if I need to use a computer, I secure it by myself". (A1)

The headteacher's view was consistent with that of teachers, as she identified the current ICT resources:

> "We have a single projector in the kindergarten and the laptops used by teachers were purchased by them from their own pockets. However, the Educational Directorate provided us at the administration with a desktop computer". (AH)

One teacher from KB described the ICT status in her kindergarten as follows:

> "At our kindergarten, we have a smart board and desktop computer at the library, and a single projector for all the teachers. However, I have my own personal laptop, projector and tape recorder". (B1)

The headteacher encouraged teachers to utilize the ICT facilities available at the library, although she pointed out that:

> "They do not use these resources, even though I encouraged them to use the computer and told them there are attractive things and that it would be a good opportunity if they took children to the library. However, they consider it is somehow difficult to move with 20 to 25 children in the classroom to the third floor". (BH)

The headteacher explained how the kindergarten dealt with the lack of equipment in the school day, if more than two teachers needed the projector at the same time.

> "In some cases, the teachers need to cooperate with each other. Anyone who has a data projector at home should bring it, but anyone who has no projector at home, she should coordinate with her colleague as one of them has to postpone the time of her study session and the other has to advance it. This will give them both the opportunity to take advantage of the projector usage". (BH)

KC was observed by the researcher to be the school best equipped with ICT resources (see Chapter Five). The participants gave their opinions about the current availability of ICT resources in the kindergarten.

> "At our kindergarten, we have a desktop computer, data projector, epidiascope projector, interactive whiteboard and a laptop for certain

classrooms. I have purchased a laptop with its accessories such as speakers and a tape recorder from my own pocket for my classroom. The headteacher has neither forced nor requested us to purchase them". (C1)

"In each of the three ground floor classrooms there are a desktop computer, a screen and data projector; but in the remaining ten classrooms upstairs, there are no computers, because the classrooms are newly created and constructed. The smart board is in the library and the projection screen is on the ground floor. The Educational Directorate provided all the desktop computers to us after we had demanded them for many years. Normally, the laptop of every teacher is [her] personal [property]. However, the laptop you now see in this class has been donated to us by a parent of a child and it is found here throughout the year". (C2)

The headteacher of KC noted that the new technology, such as data projector and computer, replaces some teaching tools:

"Nowadays, we don't use the epidiascope projector, especially after the introduction of the data projector in the kindergarten's activities but before it was used heavily. I wish I could train my pupils on the usage of the epidiascope projector, but as far as any teacher is concerned, the usage of the computer with data projector helps them to do the duty more rapidly than any other similar tools". (CH)

6.3.1.2 The needs of teachers for better ICT resourcing

In interviews, participants identified a number of needs that they believed should be available for better ICT resourcing. These needs could be divided into ICT equipment, programs, curriculum, and the physical classroom environment.

Needs of ICT equipment

Most participants perceived the availability of equipment as an important priority in activating the integration of technology in an early childhood education setting. Consequently, many needs were raised for a variety of types of equipment, such as computers, data projectors, and projection screens.

KA was considered by the researcher to be resistant to using computers. Practitioners were surprised that the researcher asked about the number of requests for ICT equipment made to stakeholders. For example, the headteacher commented that:

> "The first thing is that the GDEM should make computers available at the various kindergarten sites. We have demanded many times to be provided with computers, but unfortunately they have not provided us with computers. I can show you the evidence of our demands in this respect". (AH)

One of the classroom teachers expressed that:

> "I need the computer and projection screen to be removed to another place, and to be safer for the child and me". (A1)

The second teacher indicated that:

> "Every teacher should be given a computer and projector and projection screen, in addition to providing classrooms with spacious areas". (A2)

In KB, participants' demands were fewer than those in KA. However, there were clear attempts by participants to overcome the difficulties of lack of equipment.

> "Every teacher should be provided with a computer. Presenting with the computer alone is prohibited, as it won't help you to convey the

> information to the child who will not be able to see. Thus, I need a projector and projection screen for each and every classroom". (BH)

One teacher wanted to see in her classroom:

> "A fixed projector, a computer and white screen for displaying. It looks like a cinema show. It is attractive and exciting". (B2)

In contrast, B1, who previously mentioned that she had her own personal equipment, stated that:

> "All the things I need are available at my classroom; and I am 100% satisfied with its current contents". (B1)

In KC, no comments were made by the participants because they had no need of equipment, as all the classrooms were well equipped with ICT resources.

Programs

In the interviews, a few participants suggested need for some specific programs for kindergarten children. For instance, one classroom teacher pointed out that:

> "I need children's programs. I need new programs that serve the child". (C1)

Similarly, the headteacher in the same case (C) acknowledged that:

> "In order to improve the environment for ICT integration, I think it is important to have appropriate educational software for kindergarten children and this is what we need from the GDEM". (CH)

Another headteacher indicated that there is a shortage of Arabic educational programs. She made the following statement:

> "The programs that are directed to children in Arabic are very few in number. When we deal with the computers, you find that the programs that are directed to children in English are very numerous, compared with those in Arabic. In fact, we need programs in Arabic for the children, even the letters and numbers, as Arabic is the national language". (BH)

Physical classroom environment

The headteacher of KA described the needs of the kindergarten as follows:

> "There should be a special room for the computer so that the child knows that this is the time of the computer period, even if such time is only half an hour, like this session, which can be a computer session. All you need is to separate the child from his current place and move him to another place. This means that the time taken from your daily working hours is devoted to this particular activity. After that we leave the child at his place and you head for the room at which you practise your normal activities. This helps the child concentrate on the things he enjoys". (AH)

Yet another teacher added that:

> "I would like it to be wider in space; and to be provided with computer sets and a projector, in addition, every teacher should be given a computer more advanced than the ones currently available. The classroom should also be properly lit, air-conditioned, ventilated and the sun should be allowed to enter it". (A2)

Some of the participants mentioned that the inadequate space of the classroom and poor lighting are obstacles to using computer technology in kindergarten (see section 6.3.4: obstacles to using computers).

Curriculum

Some participants indicated that there is a need for a new curriculum that effectively supports the use of computers and other ICT resources in an early childhood education setting. One headteacher stated:

> "The administration of the kindergarten is responsible for its affairs. We need to be provided with attractive topics to encourage teachers to use technology with children". (BH)

Additionally, the need for an integrated curriculum that incorporates technology was mentioned by one of the teachers, who said:

> "I need to be provided with a specific simple curriculum or syllabus designed to incorporate technology for the child so that I comply with it; and that every student should be furnished with computer for training". (A2)

6.3.1.3 Awareness of new ICT development

Research participants were asked to predict the future of computers in early childhood education settings. For instance, one teacher anticipated that the ministry would make computer use in kindergarten compulsory. She acknowledged that:

> "Computers will be entered in teaching. I feel that the Ministry is going to make it compulsory". (A1)

Another teacher expected that official approval would be issued as regards the integration of computers in kindergarten:

> "I anticipate that those in charge will prescribe it as a course and send a circular letter to relevant educational bodies to apply and implement it" (B2)

In KC, one participant expected that traditional teaching methods might no longer be used in kindergarten and the Internet would be the main resource for the teacher.

> "Computers will be a necessity. Teachers might not be allowed to use traditional methods, as everything will be through the Internet. I conclude that it will be obligatory". (C1)

Moreover, the other teacher anticipated that computers would dominate life and have a bright future in kindergarten settings, as she described:

> "The computer will impose itself, because it has become one of life's necessities. It will have an honourable, prosperous future in early childhood education". (C2)

In contrast, another teacher expected that the new development would be in the area of educational programs, while the usage of computers would be quite limited. She stated:

> "I don't expect a prosperous future for it. Our class environment is different from that of higher education, as a bright future means that every child should have a computer or iPad. Nevertheless, in future, I expect that development would take place in the field of educational programs or applications, but I think the usage would be quite limited". (B1)

The headteachers' point of view was not very different from that of the teachers. One headteacher expected that more computers would be introduced in the future:

"It is possible that it will be entered in teaching". (AH)

Similarly, another headteacher indicated that:

"It will develop. They will introduce the computer in the curriculum". (BH)

To summarise this theme, the evidence indicated that ICT resource availability differed considerably from one site to another, with teachers adopting various strategies to compensate for lack of provision by the ministry. They called for a variety of additional equipment, but also pointed out the need for appropriate programs and curriculum, as well as more spacious and better-lit classrooms. They anticipated the spread of computers in future, with official support, and that they might even replace traditional teaching.

6.3.2 Impact of computers

The second theme, the impact of computers, addressed the sub-research question (SRQ4): *What are the positive and negative impacts of using the computer in the classroom?*

Participants' responses are divided into two sub-themes: learning / educational issues and health, psychological and social issues.

6.3.2.1 Learning / educational issues

This category encompasses participants' perception of the impact of computers on teaching and learning. The factors mentioned included positive impact on appealing to children, developing their skills and facilitating teachers' work. However, some teachers also perceived negative impact on certain other skills, as will be seen below. From KA, one teacher addressed the potential learning gains of using computers in teaching kindergarten children such as promoting children's intelligence and keeping children up to date with technology. She stated:

> "Computer usage is easy and it attracts the child, because its programs are diversified and include intelligence toys that promote children's intelligence. I feel that such computer programs promote intelligence more than ordinary paper and pen, whose usage prevents the child from performing activities and make him feel bored". (A2)

She also expressed that:

> "Time has changed and necessitated the introduction of effective computer usage in all fields of life". (A2)

Another teacher perceived that computer use in the classroom encourages children to improve their pronunciation and develop thinking skills. She highlighted:

> "We notice that there are many children who have difficulty in pronouncing letters, numbers, and words. With computer usage, children start to amend their pronunciation; and with repetition they pronounce letters and words correctly now. I also consider that computer use is an

initial step in developing the child's thinking skills in the early years of study". (C2)

The headteacher of KB mentioned that the computer conveys information to children faster than traditional methods. She described this by saying:

> "The computer helps to deliver quickly the piece of information to the child, as such delivery sometimes takes only one minute. On the contrary, you need time to deliver a piece of information to the child when you use the traditional method". (BH)

Similarly, another teacher believed that the use of computers could easily provide the required information for learning.

> "I use it in consideration of the excitement element and as an enrichment tool; and that it provides us easily with the information we need". (C1)

The headteacher of KC indicated that using computer technology is an opportunity to change the daily routine in kindergarten, capture a children's attention, and improve literacy and numeracy skills:

> "It is nice for the child and constitutes a change from the routine; and the child can learn faster from this technology than by other means. Computers capture the attention of children and support permanent learning, particularly in literacy and numeracy". (CH)

Moreover, respondents were asked to indicate their opinion of using the computer as an educational tool in the kindergarten. It was clear during the interviews that teachers used computers as an educational tool for children in kindergarten for several reasons,

describing it as marvellous, attractive, easy to use, comfortable, and saving stationery materials.

> "It is a marvellous act, because it attracts children and makes them feel enthusiastic in dealing with it. Furthermore, as far as the teacher is concerned, it is easy for her to use it". (B1)

> "It is very essential in modern life; and it attracts children more than any other educational tools". (C2)

> "As for me as a teacher, the computer is comfortable, especially when it is connected to the Internet. For example, Google provides us with such amazing things that I can easily display". (A2)

> "The usage of computer saves ink and paper that we need". (B2)

Correspondingly, participant headteachers reported that computers are more motivational, attractive and helpful tools than other educational tools.

> "It is considered to some extent a motivation tool for children. (AH)

> "When I was a teacher, I used it frequently during my teaching of children. I feel that computers attract children more than cards do, and children can learn faster with computers than other tools". (BH)

On the other hand, the interviews conducted with some teachers indicated their perceptions that there are negative impacts of computers on the learning of

kindergarten children. One teacher indicated that the use of computers could prevent learning through tactile engagement. She commented:

> "The disadvantages are focused on the child, who should have tangible and touchable things to deal with while learning; and the usage of computers deprives him of this benefit". (A2)

In the same case (A), another teacher also believed that the computer was not beneficial for kindergarten children and could inhibit sensory learning.

> "The child will not benefit, and will not learn and will not taste or touch. The child watches a video clip; it is true that he knows [the material presented] now. But, the moment he leaves the classroom, the matter is over as far as he is concerned, because the computer impact has now dominated the scene. The child has neither tasted nor touched anything. This is among the disadvantages of using the computer, because it fails to engage or utilize the child's senses". (A1)

She believed that sensory learning is better than learning via computer because of the multiple uses of the senses of a child, which help him or her to gain new knowledge and understanding of objects.

> "We have other things such as touching, smelling, tasting, watching and hearing. I consider that these things are better than the computer, because the child is effectively attracted to them. But, in using the computer, the child only watches and hears". (A1)

She expressed further:

> "When I have a subject that I need to present with a non-computer method, I prefer that method. In case there is no option in usage regarding certain

subjects such as tasting, then it is difficult to satisfy myself by showing the children images of fruits or honey etc on the display screen and not allowing them to taste it. Then they won't benefit, because they just see it. They just have an idea about the picture. On the contrary, if we bring the fruit to the classroom, and let the child taste it to feel whether it is sour or otherwise, then he realizes its benefit" (A1).

Also, she also expressed scepticism about the educational value of the computer:

"Our children need a lot of information; and in both cases [using computers or traditional methods] the result is almost the same, whether in using or not-using the computer. If you ask a child, the next day, about what he read or watched in a previous class, he would not remember, whether the computer was used or not". (A1)

For further clarification of this point in case A, respondents were asked to indicate in what classroom situations they would prefer to use traditional methods for children's learning. Both teachers strongly recommended the use of tangible objects and sensory learning but A2 said learning can be extended through the computer.

"If the presented subject has more than one method, I bring it physically to the child if it is possible so that he can hold it; and in this particular situation I do prefer the usage of traditional methods instead of the computer". (A1)

"Take for example the case of the rooms of the house or its components. I prefer to teach the lesson about them by bringing to the classroom objectives or models made of cork or cardboard in a simple manner. The children can be encouraged to arrange with me as a teacher the components of the bedroom that I bring them with me. Since the components are tangible and the children can touch them, this is- of course- better for them. In such matters it is better to have solid objects

> than pictures in a computer, because it assists greatly in conveying the required information. The child then feels that he has arranged something and that he assisted his teacher". (A2)

One teacher thought the computer should be a supplementary tool in the classroom, but not the only source of learning. She indicated:

> "There should not be total dependence on the computer, which should be a complementary assistant tool. However, in the case it is available to me or that I have a circumstance that made me unable to print or that I could not prepare the required educational subject that I present to children, then I need the computer for dire necessity. It is ok to use the computer but we should not totally rely upon it". (A2)

Moreover, the headteacher supported the teachers' comments regarding this point, as she preferred to use traditional methods in the kindergarten classroom.

> "In all the situations of the classroom, I want the teacher to use the traditional teaching method based on play in the classroom, toy blocks, and the usage of sandpaper... etc. When a child puts his hand on an item whose surface is different, he can evaluate. When he writes on the whiteboard, it is different from writing on sand, as the smoothness of the surface affects his action. When a child draws a picture on a very transparent paper, it is different from colouring that picture with normal colours". (AH)

It is clear that all the participants in case A were supportive of using traditional teaching methods in the classroom, particularly tangible objects and sensory learning, rather than computers.

In addition, one teacher warned that the overuse of computers could impede reading and writing skills. She explained:

> "We prepare the child for reading and writing; we don't want him/her to get addicted to the usage of the computer mouse. [if they do], children don't get accustomed to read and hold pens and pencils effectively". (C1)

Another teacher expressed:

> "They [children] have lost handwriting [skills] and rely to a great extent on computer writing. Those children or young men include my younger brother, who is a fresh university graduate. When he holds the pen I feel it is heavy in his hand, due to his addictive and intense usage of the computer since he was a child". (B2)

The headteacher of case A indicated that while using the computer in classroom, the child does not speak and remains silent, which could cause a weakness in speaking skills.

> "The child does not know how to say the word. I think that it [computer use] makes him remain idle all the time and he is not able to speak during the display time". (AH)

These views are contrary to the views previously mentioned, that computer use improves literacy and pronunciation skills. Furthermore, another impact of computers on children was mentioned by the headteacher of case A, who commented that computer use could limit the child's memory skill.

> "When the children remain listening and looking at the screen, most of them fail to retrieve immediately what they saw. It is wrong to allow your

student to retrieve more than one picture at the same time as this affects the student's intellect". (AH)

She commented further:

> "Even we as adults, if you ask any one of us to memorize anything that you will be asked later about, you will memorize it in tension and stress as you will receive during display a huge amount of information for due retrieval. If this is the case of the adult, what about the child?". (AH)

6.3.2.2 Health, Psychological, and Social issues

Some participants indicated concern about the possible detrimental impacts of computers on kindergarten children's development from health, psychological, and social aspects. One participant emphasized one impact of computers on children's health as:

> "It may cause the symptom of extra electricity in the mind as it has been proven by the latest studies that computer usage has an impact on the child. Since parents are concerned, they fear for their children". (A2)

In KC, both classroom teachers provided rich information on the possible detrimental impacts of computers. Radiation is one of the risks associated with the use of computers. For instance, a teacher stated:

> "The computer itself radiates rays that inflict harm on people". (C1)

Similarly, the other teacher in the same kindergarten explained that the radiation could damage children's organs:

> "The radiation emitted by these computer sets, especially the screen, negatively affect the children, because the organs are very tiny and they should not at such an early stage of growth, be exposed to such intensive, concentrated and constant direction of radiation". (C2)

Moreover, C1 indicated some potential impacts on the vision, hearing and body of the child, as she highlighted that:

> "The lighting emission from the computer affects the child's eyes; and the loud voice coming out from the speakers affects his hearing and the constant holding of the computer mouse affects the elasticity of his fingers". (C1)

She expressed further:

> "Computer usage weakens the children's muscles in performing both domestic work and activity in the outside world as they feel fatigued, because their muscles are idle and they move only their fingers on the computer sets; other parts of the limbs remain motionless, which is something unfortunate". (C1)

In addition, one participant indicated that the overuse of computers at an early stage could lead to some medical conditions. She had a case of child with hyperactivity in the classroom. She described this case:

> "When I discussed this matter with parents whose child suffer from hyperactivity, they told me that they used to leave their child for long hours using a laptop and other devices". (C1)

In KA, the headteacher mentioned that computer use could prevent social interaction with people, especially between teacher and child in the classroom.

> "The child feels puzzled and confused if the teacher uses the computer more than once in a week as he/she will wait till that day of the display, because he/she is accustomed to receive the information by just seeing, not even using his hearing. There will be no interaction between the teacher and the child, because during display children are usually quiet, but when there is interaction there will be questions and answers and this leads to a dialogue between the teacher and children. Then the personalities of the teacher and student appear; and this helps the teacher understand the student". (AH)

She stated further:

> "Non-interaction with the teacher can be explained by the fact that she doesn't pay any attention to the children and this is seen as negative. Then based upon such negligence or negative attitude, the child leaves the teaching session, and starts to play and moves around, claiming that he is not interested".

6.3.2.3 Summary

Teachers perceived a number of positive and negative impacts of using computers with kindergarten children. On the one hand, they recognised the attractiveness of computers and thought they could potentially help to improve children's pronunciation, literacy and numeracy skills. As facilitation teaching aids, they found computers easy to use, and appreciated the saving of consumables such as paper and ink. On the other hand, they expressed perceptions about the failure to engage all children's senses, and possible detrimental impact on writing, speaking and memory skills, compared with traditional teaching methods. From a health perspective, they were concerned about impacts of radiation and damage to vision and hearing, and one suggested a link

between computer exposure and hyperactivity. They also expressed concern that computer use constrained opportunities for social interaction.

6.3.3 Approaches

This theme refers to the ways in which teachers used computers in kindergarten teaching. It encompasses three sub-themes: teachers' approaches to using computers, their pedagogical approaches, and the issues they took into consideration when planning computer use.

This theme addressed the sub-research question (SRQ5): *How do kindergarten teachers use the computer in the classroom?*

6.3.3.1 Approaches to using computers in teaching children

This sub-theme concerns the purposes for which teachers used computers, and the specific applications used. The participants indicated a number of approaches to using computers to teach kindergarten children. For instance, one of the participants used the computer in displaying stories and videos.

> "I use the computer in displaying the topic in the teaching session or stories; I use it also in the class as per the proposed topic to be taught. I show images or video clips recorded in voice and picture". (A1)

Another teacher used the computer for recitation of Quranic verses, a key element in Islamic studies, as well as to enhance topics through rhymes, stories, and videos. She described that:

> "If I have a discovery and have certain stopping points at the Qur'anic Suras (chapters) and we want the children to repeat them, then we operate

> or display them for the children. This can also be used in my study session, because if I have a story or rhymes or videos, I can show them to the children". (B1)

Moreover, the computer could be applied to teach children letters, numbers, ethics, supplications, behaviours and explanation. One teacher from case C commented that:

> "I use it in the reading and numbers subject so that the children know the correct way of pronouncing a letter as this requires many exercises so that the children can differentiate among the different letters. The same procedure applies to numbers as well. It is also used in the etiquette to be observed when you enter and exit a toilet. These we find them downloaded in YouTube. We save it in a flash memory and display it for the children". (C1)

> "I use it in the explanation of certain study lessons and sometimes in the last sessions we wait to use the computer in the practical sessions. We show them - for example – the way of making a sandwich. This includes what the practical steps are, the tools and what is the mode or modus operandus. This gives the child the opportunity to watch and apply [the process] with us, in addition to certain stories. This process [using the computer] facilitates the job as the display screen is big; the image becomes conspicuous for the child". (C1)

In the same case, teacher stated that:

> "I use it in lessons display, in the preparation of the educational means and to raise awareness regarding certain negative social phenomena such as sexual harassment and family violence". (C2)

Similarly, AH mentioned that health awareness can be delivered to children by using computers during the teaching sessions. As she pointed out:

> "I think teachers use it more in teaching sessions. They use it when they have lessons on enlightenment on a particular thing – for instance -, such as health awareness about certain useful and useless foods and proper nutrition, as well as in stories, especially religious stories, when we cannot act out their characters or change our voices to cope with the situation, we just bring it in the form of a film". (AH)

Participants were also asked to indicate in what classroom situations they would prefer to use a computer instead of traditional methods for children's learning. Some participants preferred to use computer technology to show topics that could be difficult to convey to the child by other methods. One teacher stated that:

> "If the subject is about factories, journeys or visiting of cities, it is difficult to convey it to the child with any method other than watching. This may be achieved by computers". (A1)

The headteacher of KA described that:

> "The usage of computers must only be in difficult things such as the sea world. You use it for tiny things in the human's body – for instance- bacteria in tooth decay: which are difficult for you to describe for [the child] as he will not understand it. When he sees it in image or display, it will be a very small thing that can't be seen by the naked eye". (AH)

Likewise, BH suggested that the computer is effective to convey scientific knowledge to kindergarten children:

> "The computer objectives remain in the units of the academic study sessions, as it is very helpful in the scientific study sessions. I have the stages of the foetus (embryo) development in his mother's body. It will be very beneficial, especially when I display to the child the development of the foetus stage by stage". (BH)

In contrast, the headteacher of case C, who had twenty-one years of experience, reported that:

> "I prefer for the computer to be used in all situations". (CH)

Most of the participants reported that they had the knowledge to use common Microsoft programs such as Word and PowerPoint.

> "Word and PowerPoint are the only two I am able to apply". (A1)

> "I like Word, as I play according to it in the manner I like. I bring with me prepared work". (B2)

Also, the YouTube website was used in classroom session to show stories, rhymes and children's songs. As one teacher stated:

> "I use YouTube when I want to offer a rhyme or short story; I begin my study session and allow the children to watch it as an introduction to the session. After that I ask the children about what they watched". (B1)

One teacher motivated children in an interesting way through the use of Word and Microsoft Paint programmes with CD.

> "I attach the image of every child to his CD and write his name on it. I work on the Word program and Paint. This is intended to teach him how to properly hold the computer mouse and how to write his name. I just teach him how to insert the CD and how to open the program on either the Word or Paint program. Also, how to write letters, draw and colour objects. Then I save it for him on his named CD and at the end of the year I give it to the child to show his progress to the parents". (C1)

6.3.3.2 Pedagogical Approach of the Teachers

The sub-theme of pedagogical approaches of the teachers is concerned with how children interact with the computer in the classroom. For instance, A1 identified children's interaction with the computer as follows:

> "When the child starts answering the question or likes to participate, he/she gives the piece of information before I even begin the question itself. Then here it is observed that I have reached the information I am seeking". (A1)

In the same way, another teacher explained:

> "I know that they are interacting with me when they quickly answer any question I ask them". (B2)

Another view of this point was provided by A2, as she explained:

> "I see that they are interacting according to the displayed pictures. Sometimes, I present the same picture but the children show apathy with me rather than the interaction I usually expect. I know that they were not impressed by what I submitted. The same thing happens in the case of pictures, they are uninterested, depending on their mood. Therefore, the child must be attracted; and you should break the routine by encouraging

the child to move on the spot or you clap for him in order that he is excited". (A2)

In case C, one teacher said she made children interact effectively with the computer through enabling them to participate in using it:

> "This is reflected from their sitting with you; they effectively participate when they see the image, they respond and react. They have good observation and they quickly like to participate. This is contrary to [other times when] they see it, you feel that they are in state of apathy as if they say to you," Oh, teacher we don't want any more". Therefore, we should not display matters to them intensively". (C1)

She stated further:

> "I allow them to participate in educational games or the final study meeting. For instance, we set them a task to identify things with their names. I take, for example, a thing starting with the Arabic letter (th- ث)", then the child presses the image of the word that starts with that letter, which in this case is the Arabic word "thobe- meaning a dress", then he correctly chooses the desired word. I sometimes let them participate in the computer corner as this makes them more familiar with the sets". (C1)

The other teacher in the same kindergarten observed that the interaction of children might be of limited duration:

> "[It lasts for] a limited period, and that depends on the lesson given. This is also known through his concentration. If I notice that the child participates with me as a good listener and is attentive, this implies his due concentration". (C2)

The opinion of the headteacher of KB is similar to what was already mentioned by the teachers, as she indicated:

> "Whenever I use the computer in the introduction, the thing always becomes clear. I start to review the topic with the children through their answers and reactions. I begin discussing with them through the computer. It becomes apparent to me whether they have assimilated the information I delivered to them or not. This applies in evaluation, too. As regards the story activity, I know I can display a story or a game to children via computer. I ask them what they saw after due completion of the story and how many characters, and what does each one of them was wearing. Based on their replies to these questions I can extract and know whether they have actually comprehended the information I delivered to them or not".

The headteacher of KC, who had twenty-one years of experience, mentioned an important point in this respect, that the family could be involved with the kindergarten to recognize the impact of interaction. She described that:

> "This is felt from the mothers' reaction. When they say "Our children have developed", then we feel that we have a positive impact on children. When we give the child the things that he loves, which are the lessons in the research session, he feels happy. It is nice to know that when the child returns home and asks his mother to search for him in the Internet about the beaver (an animal), then I feel gratified in this regard as the child will join his mother who will search for him about the information he desires". (CH)

6.3.3.3 Developmental Aspects considered by Teachers

Participants of all three cases were asked to indicate the rate extent of their use of the computer in their classroom practice. It was clear from their responses that the level of computer use in KA was slightly low as it was used once a week at most.

> "I use it approximately twice a month". (A1)

> "I may use it once or twice in a month". (A2)

> "It may be passed to each class once every week". (AH)

In KB the level of computer use was moderate as teachers operated it two to three times a week.

> "This depends on the requirements of the study session. However, I use it approximately twice or three times per week". (B1)

> "We usually use it in the class once or twice per week". (B2)

> "The teachers in KG3 use the computer two to three times in the week. For KG2, some classes use the computer only once in the week. (BH)

> "I use it three to four times a week; and I think this rate is high. (C1)

> "Most teachers use computer technology in the classroom three times weekly. (CH)

The headteacher of KC reported that children's needs and children's individual differences are two factors of motivation that encourage teachers to use computers in classrooms. As she indicated:

> "The kindergarten child is seen as the strongest indicator in the class environment. The children's needs are the very objective that I want to

> reach. If the objective is limited, I think that the computer will meet that need. There are individual differences among children. This is another indicator, irrespective of the child's environment as one child may have a special laptop or computer but another child may not possess these things; and you feel that he has strong enthusiasm to know and use these things or sets". (CH)

Some headteachers indicated that the usage of the computer depends on the grade of the class. For instance, the headteacher of KA suggested that:

> "In the case of KG3, this class teacher uses the computer more than other classes". (AH)

Similarly, BH explained that:

> "The teachers in KG3 use the computer two to three times in the week. For KG2 some classes use the computer only once in the week. I think that at KG1 and KG2, the children need more physical exercises than computer usage as this will give their bodies the chance to grow more quickly". (BH)

6.3.3.4 Summary

Teachers used computers for a variety of purposes and different subject areas: for display, to provide practice in literacy, for awareness raising, and to convey information that would be difficult to present otherwise due to practical constraints. Word and PowerPoint were the most used applications, although YouTube and Paint were also mentioned. Teachers ensured children's engagement and learning through question and answer, encouraging participation, and involving the family in research projects. The level of computer use differed across the three kindergartens, from once

or twice a month to three times a week, depending on children's needs. Computers were used more with older children (KG3) than younger ones, for whom the focus was more on physical activity.

6.3.4 Obstacles to using computers

In interviews, participants identified a number of obstacles, which they faced when integrating the computer (as a part of ICT) into their work practice. The findings on the obstacles faced by kindergarten teachers in using computers are presented under three sub-themes: (1) Teacher personality factors; (2) Internal environment factors; and (3) External environment factors. This theme addressed the sub-research question (SRQ6): *What are the opportunities and difficulties reported by kindergarten teachers in using computer technology in classrooms?*

6.3.4.1 Teacher personality factors

The *lack of computer skills* is one of the obstacles faced by teachers in use of computers, which is reflected in one teacher's comment:

> "……. my computer skills are on the average level as I know simple programs, but I don't know how to amend or design programs or projects for the child". (A1)

In the same case (KA), another teacher mentioned:

> "I have taken a training course on the things that concern me such as Power Point, but that doesn't give me the right to describe myself as one who possesses experience and skill in its usage". (A2)

It seems that both teachers in KA perceived they lacked the skill to use the computer in the teaching process for kindergarten children. Similarly, one teacher from case KB said:

> "I have no adequate knowledge about modern programmes such as Photoshop". (B2)

This may be evidence that training courses are limited or not enough. The lack of training courses is one of the external factors that will be discussed later in more detail. The participants' *confidence* about information and communications technology (ICT) in kindergarten could be a barrier to integrating computers in early childhood settings. The level of self-confidence may be shaken by the fear of technical breakdowns, as one teacher stated that:

> "I fear technical breakdowns, which take a long time to fix". (A1)

In addition, from case KB, a teacher was hesitant in her self-confidence and preferred not to stay in front of the computer:

> "I don't like to sit at the computer, as I fear failure". (B2)

6.3.4.2 Internal environment factors

This sub-theme covers some internal environment factors to using computers, including the large number of children in the classroom, the lighting, lack of support from the headteacher, and the kindergarten location.

The majority of participants reported that one of the major obstacles facing kindergarten teachers in using the computer was the large number of children in the classroom. B1 pointed out that the large number of children in the classroom hinders the use of the computer during the school day and may also affect the time that can be used to attend training courses:

> "The problem we face is that the number of students is very big. Thus, we usually remain with the children till one o'clock (pm). I couldn't leave my colleague alone; we really make great effort in this connection. Thus, we always find ourselves compelled to reject all offers for training courses given to us. They should conduct the training courses when we finish the academic semester; and then we have a month or two for the course during our holidays". (B1)

In the same case, B2 believed that the number of children in the classroom makes a difference in using the computer, as she stated that:

> "The number of the children is large; some would disturb the others as every child would like to sit at the front. The fewer the number, the better the benefit for the children, especially in the case of the demonstration". (B2)

Moreover, the headteacher supported the teachers' comments regarding this obstacle, saying that it is a challenge in teaching and supervising kindergartener:

> "Since you have 20 to 25 children in the class, you will really encounter difficulty in teaching them during lesson time and supervising their access to computers". (BH)

Similarly, teacher participants from KC expressed that:

> “The number of children is very high; and this affects the computer corner”. (C1)

> “I suggest reducing the number of students in the classrooms, so that I, in my capacity as a teacher, will be able to convey to them correctly the required information”. (C2)

Their headteacher mentioned that the large number of children leads to teacher frustration. She described this saying:

> “When the number is big, it is difficult to give all children the chance to use it [the computer] at the same time hour. This makes the teacher feel frustrated and you feel that as if she says ‘I don’t want this big number’. (CH)

In KA, one teacher hinted that dealing with the large number of children and using computers in the classroom at the same time was wasted time:

> “If the number of students is big, the display or show always takes place on the projection screen, as this causes me to waste time because I suffer greatly from the electrical connection of the set as the set is not connected and I attempt to connect it; and thus time is wasted in this process”. (A1)

On the other hand, A2 showed her enthusiasm made her do something about these problems compared to the other teacher in KA, as she stated:

> “Despite the fact that the number of students and the small area of the classroom are obstacles, we always attempt to adapt the situation to a reasonable degree that helps us do our work”. (A2)

In the previous comment, another obstacle was mentioned, which is the inadequate space of the classroom. It was also mentioned by the headteacher from case KA:

> "Among the problems that face the teachers is the size of the classroom; if there are many students, then the teacher faces a problem in controlling and dealing with them". (AH)

Furthermore, CH mentioned that the inadequate space of the classroom and the lighting could influence teachers' inclination to use the computer:

> "I think that the classroom environment plays an important role in motivating the teacher to use the computer, for example the size of the classroom and the lighting". (CH)

HB also revealed that lighting could be a problem, as she highlighted:

> "The lack of good lighting for the classroom stands as a problem, because poor lighting is an obstacle for the computer usage. Therefore, there should be good lighting in the classroom". (BH)

C2 expressed another of the difficulties pertaining to the classroom environment, which was that:

> "There is notable noise which is associated with too frequent entry of many people into the classroom and their subsequent exit" (C2)

In addition, the lack of support from the headteacher can create a significant barrier to computer use. For example, A2 identified a lack of support from the headteacher as an important barrier to computer integration, as the headteacher did not support the

use of computers, preferring the traditional methods of teaching children. In contrast, the other teacher (A1) in the same kindergarten said she experienced moral support from the headteacher.

The teachers in KC also perceived their headteacher as supportive:

> "It is the moral support. Our headteacher encourages us" (C1)

Another teacher in (C) indicated:

> "The head teacher gives us material support, which is represented in the provision of needed tools, equipment as well as doing necessary maintenance. if there is an occasion or festival and the kindergarten teachers present a distinctive lesson, then they can be morally supported by the school administration". (C2)

The headteacher of KA also mentioned some other internal environmental obstacles such as the kindergarten location and lack of access to the Internet, saying:

> "The reason why they [the MGDE] did not provide us with computers, is that our kindergarten is situated in a rural area where Internet access is not available".

6.3.4.3 External environment factors

This sub-theme covers some external environment factors to using computers including lack of training courses, equipment, access to the Internet, and support from stakeholders, official disapproval, lack of funds and maintenance, no computer specialist, and lack of ICT policy.

Lack of training courses

If new technologies are to be integrated into classrooms, teachers must be trained to use this technology. On this subject, some initial training is required for teachers to develop suitable skills, attitudes and knowledge regarding the effective use of computers to support learning. Some participants (A1, B1, and C1) agreed that they did not receive training on the integration of ICT in teaching, which clarifies their failure to use ICT in their teaching. Hence, some claims were made by teachers of a need to intensify the training courses to develop the basic skills in computers and ICT.

> "I haven't received training courses or refresher courses on computer usage in teaching kindergarten children". (C1)

> "I need to be given advanced training courses on computers". (A2)

> "I don't prefer a theoretical training course; I need a practical training one". (B2)

This is consistent with the headteachers' view that teachers need some training courses, as the headteacher from KB commented:

> "There are teachers who need to be given training courses. They need such training courses in order that they know how to prepare various relevant programmes". (BH)

She expressed further:

> "I need my kindergarten teachers to be given training courses on the usage of the computer".

As appears from the interviews, there were suggestions by headteachers that the Ministry of Education (as presented by the Makkah General Directorate of Education) had failed to provide training opportunities on computers for kindergarten staff. As articulated by the Headteacher of KC:

> "To my knowledge, no training courses were given to the teachers in using computers in teaching kindergarten children". (CH)

The Headteacher in KB said:

> "The Educational Directorate doesn't give the teachers training courses on computer usage. However, they conducted a training course for teachers last year. It was very fine and intended to help teachers to make an electronic story". (BH)

She continued further:

> "Every year we call for various types of training courses that we need for the teachers, who really need such training courses". (BH)

On the other hand, class teachers held different views from headteachers regarding the availability of training opportunities provided by the Makkah General Directorate of Education (MGDE). One teacher, in KB, acknowledged that she had not attended any training courses and explained:

> "It is negligence on my part. MGDE provides training courses every year. There is now a training course called Personal Safety for the Child provided for kindergarten teachers in Makkah. I am willing to participate in such training courses if I have time" (B1)

She also mentioned that she was short of time because of having too many other demands. The obstacle of time was previously reported by her and other participants, such as B1, BH, CH, and A1, as an internal obstacle to using computers in early years settings.

One teacher, who had 12 years of experience in kindergartens and had attended some training courses on interactive board and Photoshop, noted that these courses are considered as personal efforts by interested teachers:

> "Most of these courses were conducted by the personal efforts of the teachers, who organise them" (C2)

Based on the data collected, it seems that training courses on computers are scarce and may not exist. Due to the limited training courses on computers, some participants had been on a self-financed course. As one teacher put it:

> "I have taken a two-month specific training course on computers financed from my own pocket, and then I was trained on the programs I needed. But, the Ministry of Education has not arranged for me as yet any training course on computers". (A2)

Another teacher highlighted:

> "As far as I am concerned, I have already taken a training course on computers from my pocket, at the end of which I was awarded a Diploma. Not all teachers at the school have this qualification or privilege I enjoy". (C1)

What is surprising is the comment of the headteacher of KA, who did not support computer use in her kindergarten:

> "I haven't demanded any training courses for the teachers. I haven't spoken about this subject. Participant teachers have taken all these refresher courses from their own pockets. Regarding my case, I have taken seven training courses on computers that were financed at my own expense and with personal efforts". (AH)

She suggested that these courses should be optional and limited to those interested, as she explained that:

> "We should conduct training sessions on computers in a manner liked by the teachers who are interested in computers, but the matter should not be compulsory". (AH)

When the researcher interviewed the director of the Kindergarten Department in Makkah, she asked her for her point of view on the issue of training courses. The director explained:

> "Most training courses are conducted at the Department of Training and Scholarship in Makkah General Directorate of Education (MGDE). Sometimes, we conduct additional training courses at the different locations of the kindergartens. Mostly, participants who attend these courses will receive a certificate at the end. Similarly, we occasionally conduct small-scale meetings, and workshops in the same kindergarten for all the teachers. The majority of training courses are provided by training specialists. They work on the preparation of courses and the evaluation of

the programme. The rest of the courses are provided by kindergarten supervisors or members. This year we have 400 trainee teachers, we plan by 2020 to cover all the teachers in Makkah".

"There are two types of training courses; ministerial courses and initiative courses. The ministerial courses are a group of courses supervised directly by the ministry, represented in the MGDE, and compulsory for all members of the kindergarten. Some examples of these courses are personal safety of the child, the occupational development of kindergarten teachers, and the improvement of the kindergarten environment. Initiative courses are proposed and prepared by kindergarten members. These initiatives go through several procedural steps in the MGDE, so it may be a long time before they are adopted and implemented".

"Now, we have a training programme based on the usage of ICT, called the auditory story. The auditory story programme is the recording of stories through the training of teachers on a sound effects programme in cooperation with Saudi TV. All the public and private kindergartens were involved. Five kindergartens were selected for the participation of three teachers from each kindergarten as a first stage. The design of a blog containing 30 audio stories for all kindergarten levels was completed. It is suitable for the objectives of kindergartens and to enrich all educational units in order to develop the child's sense of hearing through audio stories, enrich the child's linguistic output, develop children's imagination skills and help to solve speaking difficulties. This programme was the idea and initiative of one of the headteachers in Makkah".

Lack of equipment

It was clear from the interviews that some classroom teachers and headteachers complained about the lack of equipment in their establishments. For instance, one teacher stated that:

> "No computer or the projection screen are available in the kindergarten". (A1)

The other teacher in the same setting described that:

> "We had no projection screen and to solve the problem we brought a piece of cloth and used it as a display background for the projector". (A2)

In KA, both teachers complained about lack of equipment, but A2's enthusiasm led her to do something about it, but for A1 it seemed to be an excuse for not doing anything.

Similarly, some comments came from participants in KB saying:

> "There were difficulties when the sets were not available". (B1)

> "The non-availability of the projector is considered an obstacle if I need it and at that time another teacher is using it". (B2)

> "The limited number of projectors constitutes a difficulty. Some people have their salaries but they are not sufficient for their needs, let alone to help them to make saving that would allow them to purchase different computer sets, which are – of course- expensive". (BH)

Comments from participants, quoted earlier indicate that kindergartens A and B had a shortage of essential equipment that is necessary for activating computer use in kindergartens.

Due to the lack of equipment, some teachers brought their own equipment to facilitate children's education and to present the lessons effectively. This will be discussed later in more detail.

The issue of equipment shortage was raised in the interview with the director of the Kindergarten Department in Makkah to find out her point of view about ICT equipment. She commented:

> "Most ICT equipment is provided by the MGDE, because the furnishing of the kindergartens includes the distribution of computers, display screens, smart board and projectors. I was a headteacher of a kindergarten and demanded certain things and they were sent to me. However, some of them are provided by the headteachers of the kindergartens from the fund of the school administration. They purchase them from the funds of the Educational Directorate and make them available for the kindergarten. Also, the staff of the kindergarten provide some of them, then they take them home because they have bought them from their own money and so they are their property and not the kindergarten's assets".

Lack of support from stakeholders

Some participants felt that there was a lack of adequate support from the stakeholders to encourage them to integrate the computer in early years education.

> "The educational Directorate, unfortunately, offers nothing". (B2)

> "The Ministry of Education, represented by the MGDE, doesn't provide any support". (C1)

> "The Local Educational Directorate provides us with the support, but only after repeated requests or applications". (C2)

Also, the headteacher of KA reported that those in charge have insufficient understanding of kindergartens needs. She indicated:

> "Despite the fact that we receive the materials from them, there is poor/bad classification; and that they fail to find out what each kindergarten does actually need". (AH)

Official disapproval

One teacher considered that more frequent use of the computer might be disapproved of by people in authority, as she described that:

> "The usage of computers is not totally sanctioned by the Ministry of Education. On the contrary, we are criticized for too much usage of the computer, because the kindergartener (kindergarten pupil) at this stage needs touchable things to deal with, so that he can comprehend the matter taught to him". (A2)

She continued further:

> "You will be criticized if you use computers frequently in teaching the child, especially in regard to questions where there are touchable and tangible aids for the child, who needs them at that particular age. I am supposed to make tangible things available for the child, more than laptops. As I said to you, some consider that the usage of computers should only be in case of extreme necessity". (A2)

On the other hand, another participant reported that:

> "If the supervisor sees that you have a computer or you made it available for due usage, this matter is considered a credit to you". (B1)

Lack of funds

> "The kindergarten budget is very limited, covering only the basic requirements for continuing the educational process. We cannot purchase some equipment that may be expensive". (AH)

To shed more light on this issue, the researcher asked the director of the Kindergarten Department in Makkah about the policy of distributing the budget to kindergartens. She explained:

> "The difference in the budgets is determined by the number of children and the classrooms. The more children you have at the kindergarten, the higher the budget sanctioned for it, provided that the kindergarten is not in its first opening year. If the kindergarten has been open for many years, its administration will receive a high budget to run its affairs. We always need to take into account the inception year of the kindergarten in question for the proposed budget determination. Therefore, we have many factors that affect the budget. These include the kindergarten's establishment year, the number of children, the number of classrooms, the location of the kindergarten (a rural area- village or urban area-city), the sub-district of a city and the building, whether it is government-owned or rented, whether it is old or new building. All these constitute elements that either increase or decrease the amount of the budget of the kindergarten".

Lack of maintenance and technical support

Some participants complained about the absence of maintenance and technical assistance services. For instance, one headteacher stated that:

> "I think the teacher has a problem with lack of technical support and maintenance". (CH)

Another headteacher reported that lack of a computer specialist is one of the obstacles of using computers:

> "Sometimes the computer breaks down for some reason; and we haven't a teacher specializing in computers. But, if we had a computer specialist at the kindergarten, we could simply ask her to solve the problem confronted by a particular teacher". (AH)

Summary

Participants' perceptions of obstacles to computer use in their teaching revolved around three main issues: their personal lack of related skills and confidence; a challenging internal environment, in terms of class size, time, classroom conditions and headteacher support, and external factors such as lack of training, equipment, funds and technical support. There was also a perception that the education authority did not favour too much use of computers with kindergarten children. The same issues were raised in all three cases, but teachers' perceptions differed somewhat from the perspective of the director of the Kindergarten Department, who provided further information on training, equipment, and budget issues.

6.4 Summary

This chapter has presented the interview responses of kindergarten headteachers and teachers, supplemented by views from the director of the Kindergarten Department, regarding the opportunities and difficulties perceived in using computer technology.

Kindergarten Participants, who were in their 30s and 40s, all had bachelor degree in kindergarten education. One teacher taught KG2; the rest teachers taught KG3. Teachers' experience ranged from six to twelve years, while headteachers' experience (including years in teaching and subsequently in administration) ranged from six to twenty-one years. KA had the least experienced staff, including a headteacher who had been promoted to leadership only one year previously, after six years as a teacher. None of the interviewees in that setting had been in KA for more than three years. In contrast, KC had the most experienced staff, including a headteacher who had taught for sixteen years (five of them at KC) before becoming a headteacher, a post she had held for five years.

From the interviews, four themes emerged. The first theme was ICT resources. Participants reported a lack of resources, to the extent that they often resorted to providing their own, and they called for more equipment, as well as more suitable programs and curriculum, and a more conducive classroom environment. They saw computers as the way of the future, possibly becoming compulsory and dominating education, although some expressed concern that they should not be overused or completely replace other resources and teaching approaches.

Regarding the impact of computers, there were conflicting views. On the one hand, some participants perceived positive educational outcomes in some areas, as a result of the attractiveness of computers and capacity for information provision. On the other hand, some participants feared negative impacts on children's memory, writing and speaking skills, and deplored the lack of sensory engagement, compared to traditional teaching methods. There were also concerns about possible health dangers, from radiation and screen exposure, and negative social impacts.

The third theme, approaches, showed that teachers used computers in a variety of subject areas, mainly as a presentation tool and encouraged children's engagement through questioning, giving them opportunities for participation and research projects in which families could become involved.

The last theme was obstacles to using computers, where participants pointed to teachers' lack of skills and confidence, internal environmental issues such as class size and classroom conditions, and external factors such as lack of training, equipment and support.

In the next chapter, these findings will be compared with the observation findings (as presented in Chapter Five) and discussed in the light of the research questions and previous literature.

Chapter 7

Discussion of Research Findings

Chapter outline

Chapter 7 Discussion of Research Findings

7.1 Introduction

This study investigated kindergarten teachers' perceptions and pedagogical beliefs towards using computer technology in the classroom. In the previous two chapters, the researcher provided descriptive results of the classroom observations and rich accounts of the interviews with ten participants (six teachers and three headteachers) from three kindergartens, as well as the director of Makkah Kindergarten Department (MKD) in MGDE. This chapter draws together the key findings of the study in relation to the research and sub-research questions provided in Chapter One. The main research question [MRQ] for this empirical research is: ***What are the perceptions and pedagogical beliefs of kindergarten teachers towards using computer technology in classrooms?***

To address the MRQ, six sub-research questions [SRQs] have been developed (see Table 7.1).

Table 7-1: Data collection methods in relation to the sub-research questions.

Sub-research questions	Data collection methods
SRQ1: What ICT resources are available in the kindergarten classroom?	- Observation. - Semi-structured interviews.
SRQ2: What are kindergarten teachers' perceptions regarding the needs for better ICT resources in the classroom?	- Semi-structured interviews.
SRQ3: What are kindergarten teachers' perceptions regarding the future of computers in the classroom?	- Semi-structured interviews.
SRQ4: What are the positive and negative impacts of using the computer in the classroom?	- Observation. - Semi-structured interviews.
SRQ5: How do kindergarten teachers use the computer in the classroom?	- Observation. - Semi-structured interviews.
SRQ6: What are the opportunities and difficulties reported by kindergarten teachers in using computer technology in classrooms?	- Observation. - Semi-structured interviews.

To address these questions, this chapter analyses the data generated from classroom observation and interviews. It identifies and synthesises the core themes that emerged from the analysis of the data and relates these to the literature as described in Chapter Three. The stages of the data collection are presented in Table 7.2.

Table 7-2: Data collection during the four stages in this study.

Stages	Data collection method	Type of data collected
One	Classroom observation (Oct to Nov 2017)	Information about kindergartens' location, classroom environment, daily programme, and sub-research questions SRQ1, SRQ4, SRQ5 and SRQ6.
Two	Semi-structured interviews with kindergarten teachers and headteachers (Oct to Nov 2017)	Information about sub-research questions SRQ1, SRQ2, SRQ3, SRQ4, SRQ5 and SRQ6.
Three	Classroom observation (Dec 2017)	Information about sub-research questions (SRQ1, SRQ4, SRQ5 and SRQ6).
Four	Semi-structured interviews with the director of MKD (Dec 2017) about some environmental factors such as training, lack of equipment, and funds.	Information about sub-research question (SRQ6)

In this chapter, the main themes will be discussed in sections 7.2 to 7.5, corresponding to the objectives and questions of this research (see Chapter Four, Figure 4.3). The goal is to have the results interpreted and discussed in the form of a logical flow to help achieve the research objectives and answer the related questions. The discussion will start with the first theme, 'ICT resources', which covers the availability and the current use of ICT resources (SRQ1), the needs of teachers for better ICT resourcing

(SRQ2), and perceptions of new ICT development (SRQ3). This will be followed by a discussion on the impact of computers on children and teachers, in answer to the sub-research question SRQ4. Then, the third theme 'Approaches' includes teachers' approaches to using computers, their pedagogical approaches, and the issues they took into consideration when planning computer use, in answer to the sub-research question SRQ5. The final theme is the answer to the sub-research question SRQ6, which considers the obstacles preventing teachers using computers in Saudi kindergartens.

In addition to addressing the research question and sub-questions through the four themes outlined above, the discussion provides further insight into the findings by exploring, in section 7.6, the extent to which teachers' attitudes and practices towards ICT integration are related to their age, teaching experience, training, qualifications and specialism. Lastly, the discussion contains a reflection on the findings in the light of the UTAUT theoretical framework introduced in Chapter Three, section 3.3.3, in order to assess to what extent the findings are consistent with that framework and to evaluate the model's applicability and value for understanding issues around ICT integration in the Saudi EYE context.

7.2 Theme One: ICT resources

7.2.1 The availability and the current use of ICT resources in kindergartens

This section presents salient information derived from the findings of the study concerning sub-research question SRQ1: *What ICT resources are available in the kindergarten classroom?* The aim of this question to find out a detailed description of the availability of ICT resources in three Makkah kindergartens and delineate the

extent of teachers' use of ICT in their classroom practices. This was addressed by classroom observation and semi-structured interviews with kindergarten teachers and headteachers, as described in Chapter 5 (section 5.5) and Chapter 6 (section 6.3.1.1).

The findings of observations and interviews showed that there was a substantial variation across kindergartens in terms of availability of ICT resources. These resources were almost non-existent in the KA classrooms, KB included some basic ICT resources, while KC had a rich ICT infrastructure including Internet access. This difference in resources may be due to some considerations such as kindergartens' location (urban or rural), and needs (as expressed to the directorate by the headteacher); these matters will be discussed later in this chapter, under sections 7.5.2 and 7.5.3. Regarding KA (which is a rented single-storey building), another possible explanation of the poor ICT infrastructure is that this building was not purpose-built to serve as a kindergarten. This explanation seems to be consistent with the study conducted by Albugami and Ahmed (2015), which stated that rented buildings still suffer from inadequate ICT infrastructure, since these buildings were originally constructed for housing.

Surprisingly, the results of the interviews showed that most of the teachers were bringing their own ICT equipment to kindergartens and utilising them in classroom educational practices, whether or not ICT infrastructure was available in the setting. It seems possible that this practice reflects teachers' enthusiasm toward ICT, which drove them to bring their own equipment into the classroom practices. As teachers commented:

> "I do not have a computer in the classroom. However, I have my personal computer (laptop) and bring it from home when I feel that I need it". (A2)

> "… I have purchased a laptop with its accessories such as speakers and a tape recorder from my own pocket for my classroom". (C1)

From the previous comments, it is clear that the lack of ICT infrastructure did not prevent teachers from using ICT resources. This finding agrees with Hammed's (2014) finding, which showed that teachers' enthusiasm motivated them to bring and use their laptops in classroom practice when there was a lack of ICT resources in the setting.

Furthermore, there was evidence from the interviews of a positive involvement of the community, represented in support from parents to develop an ICT environment in one of the participating kindergartens. As one teacher (C2) stated:

> " …. the laptop you now see in this class has been donated to us by a parent of a child and it is found here throughout the year". (C2)

This may be a sign of parents' awareness about the benefits of ICTs and contribution to the development of the EYE setting. Also, it may be due to the location of KC in a prosperous neighbourhood in Makkah and the reportedly high educational status of parents (as mentioned in section 5.2.3). This result is similar to a case in Hammed's (2014) study, which found that the involvement of the parents had contributed to develop the ICT infrastructure in one kindergarten.

Despite the availability of various ICT tools, teachers employed a narrow range, mainly laptops and LCD projector, speakers and projection screen. The present findings seem to be consistent with other Saudi studies (Hammed, 2014; Alasimi, 2018) which found the most commonly used ICT tools were computers (whether laptop or desktop), and projectors (whether overhead or LCD). In the same way, Plowman et al. (2010) in a Scottish study indicated that computers were more widely used and significant for many kindergarten teachers than other ICT resources available for use in early years settings. However, their finding in Scotland predated the appearance of tablet computers, (e.g. the iPad launched in 2010). Later, as mentioned in the literature (Chapter Three), the availability of digital tablets has increased significantly in preschools (Blackwell et al., 2013; Wang et al., 2016; Herodotou, 2018). For example, the result of the quantitative study of Blackwell et al. (2013) showed that 35% of teachers used touch-screen tablets, while 17% of teachers used computers. However, Saudi studies, including the present study, showed no use of tablets, except for Alasimi's (2018) study, which reported very limited use of tablets by teachers. The use of a narrow range of ICT tools in the current study may be explained by a lack of knowledge and skills. This will be discussed in more detail in section 7.5 on obstacles to using computers, which could impede teachers from diversifying tools used in their practices.

The results of observations suggested that teachers did not use some ICT resources available in the libraries of KB and KC, such as interactive whiteboards, video players, telephones and sound recorders, although the headteacher of KB claimed in interview that she encouraged her kindergarten teachers to utilize these resources. There are several possible explanations for this result. The location of ICT resources may be a hindrance to their use in teacher' work practices, leading teachers to use mainly those

resources placed in their classrooms. As mentioned in section 5.6.4, in the case of KB, the library, where many of the ICT resources were kept, was located on the third floor. In interview, the headteacher mentioned that the reason behind the teachers' lack of use of library ICT resources was the difficulty of transferring 20 to 25 children from the classroom to the third floor. The obstacles that prevent teachers from using ICT, such as the locations of ICT, lack of training, teacher' lack of confidence, and class sizes, will be discussed in more detail in a later section (7.5). This potential explanation is consistent with earlier studies (Fenty & Anderson, 2014; Nikolopoulou & Gialamas, 2015a; Plumb & Kautz, 2015) which have indicated that the use of ICT resources is influenced by their locations within early childhood settings. It is important to operate a system for reservation of library ICT resources for teachers, which will help teachers to access to these resources easily, then they can take them to their classrooms.

Another possible explanation may be the lack of training for teachers on how to use these tools and to incorporate them into their practices in appropriate ways. This problem has been reported in study conducted by Zalah (2018), who found that most Saudi teachers never used interactive whiteboards due to the lack of adequate training. Additionally, teachers' lack of confidence towards the use of ICT may create a significant obstacle to the integration of ICT (Fenty & Anderson, 2014; Nikolopoulou & Gialamas, 2015a). Masoumi (2015), in his case study, reported that there was very limited use of the interactive whiteboard because teachers had very low levels of confidence towards its use.

All teachers and headteachers in this study were asked in the interviews to indicate the extent of teachers' use of the computer in their classroom practice. It was clear from their responses that the level of computer use in KA was lower than in KB and KC, as

it was used once a week at most. In KB, the level of computer use was moderate compared to the two other kindergartens, as teachers operated it two to three times a week. Computer use in KC is considered high compared to cases KA and KB, as the classroom teachers used it three to four times a week. This somewhat accords with the outcomes of 120 minutes of observation of each teacher (as described in section 5.5.2 and summarised in Table 5.4), which showed that two teachers (A1 and B2) never used any form of ICT resources in their classroom practices, whereas teachers A2 and B1 used the available ICT resources in only one classroom activity for a short period of 3 and 15 minutes, respectively. The teachers of KC (C1 and C2) were found to use these resources frequently in most of the observed activities. Overall, the findings of both observations and interviews revealed that teachers' use of ICT, particularly in the classrooms of KA and KB, was very limited. This result aligns with some previous studies conducted in the Saudi context, in particular, that of Alasimi (2018), who examined teachers' use of technology in Saudi kindergarten classrooms and found that teachers' use of technology for classroom activities related to children's learning and development was limited. Similarly, Ihmeideh (2009) reported that teachers' use of computers in Jordanian kindergarten classrooms was minimal. Yurt and Cevher-Kalburan (2011) indicated that most Turkish teachers used computers once or twice in a week in their practices. The result of the limited use of computers in the current study is different from Hammed's work (2014) about the status of ICT use in the Saudi and Scottish contexts, although the studies, based on questionnaire data, provided limited information on computer use, measured on a scale of daily, weekly, monthly, termly and never. She reported that 31% of Saudi teachers used the computer daily, while computers were used more widely among teachers in Scotland, with 77% of Scottish teachers using the computer daily. However, she gave no indication what

computers were used for, or the duration of use.

The differences in teachers' computer use in the three kindergartens involved in this study might be due to the observed difference in the availability of ICT resources in these kindergartens (as described in section 5.5.1 and discussed earlier in this section). For example, KA had a lack of adequate ICT resources. Another possible explanation is that teachers' educational beliefs related to ICT play a significant role in the effectiveness of integrating ICT into the classroom environment, as they precede the use of the computer. Aa indicated in the literature review (Chapter Three), prior studies have mentioned that the effective use of ICT depends on the beliefs and attitudes of the kindergarten teacher, who may create a restrictive or supportive environment for ICT (Ertmer, 2005; Blackwell et al., 2014; Fenty & Anderson, 2014; Mertala, 2017). Ertmer (2005) indicates that teacher beliefs are the 'final frontier' for the integration of technology into schools, considering that obstacles such as access to resources, support, training and time had been overcome. In the same vein, Dong (2018a) suggests that the main reason for poor integration of technology into classrooms is related to teachers' intentions and capabilities. The findings of teachers' perceptions and pedagogical beliefs about using computer technology will be discussed later in section 7.5.

In summary, from the findings of the study concerning sub-research question SRQ1, it appears that ICT resource availability differed considerably across the three settings. These resources were almost non-existent in the KA classrooms, KB had some basic ICT resources, while KC had a rich ICT infrastructure. KC's teachers were seen to use these resources more often than teachers in the other settings. This resource difference seemed to be due to some considerations such as the kindergarten's location, needs

and budget. One of the issues that emerged from these findings is the involvement of parents in developing the ICT infrastructure in the KC. Although teachers in this study showed enthusiasm toward ICT, which led them to bring their own equipment into their practices, their use of ICT technologies in kindergarten classrooms was minimal. In general, teachers tended to utilise a narrow range of available ICT resources in the classroom. Furthermore, the results of the study revealed that teachers were reluctant to utilise the library ICT resources. These results of the actual use of ICT resources are quite similar to the results of previous studies conducted regarding the earlier attempts of ICT integration in Saudi early years settings (Hammed, 2014; Alasimi, 2018). The findings also revealed a series of issues behind the non-use or poor integration of ICT into Saudi kindergarten practices, such as lack of ICT infrastructure, teachers' pedagogical beliefs, teachers' lack of knowledge, skills, and confidence, and lack of training. These issues seem to be highly consistent with the findings of previous studies conducted by several researchers (Blackwell et al., 2014; Fenty & Anderson, 2014; Plumb & Kautz, 2015; Masoumi, 2015; Nikolopoulou & Gialamas, 2015a; Mertala, 2017; Dong, 2018a) and will be discussed in more detail in the section, "*Obstacles to using computers*" (7.5).

Through identifying the current state of availability and use of ICT resources in the participating kindergartens, the researcher found that there are essential needs to improve ICT resourcing in the educational environment. In the next section, these needs will be explored and discussed in relation to sub-research question SRQ2 and the literature.

7.2.2 The needs of teachers for better ICT resourcing

This section introduces salient data obtained from the findings of the study regarding sub-research question SRQ2: *What are kindergarten teachers' perceptions regarding the needs for better ICT resources in the classroom?* This question aims to explore teachers' perceptions concerning what is needed to improve the current use of ICT and support the teachers to integrate ICT in the EYE. This was addressed by interview sessions with kindergarten teachers and headteachers, as described in Chapter 6 (section 6.3.1.2).

Firstly, the provision of ICT infrastructure is the primary strategic step for effective and successful incorporation of ICT in kindergartens. The findings showed that most participants called for a variety of ICT equipment in their settings, especially in KA and KB. The claims made by the participants from KA were more emphatic than those from KB, due to the extreme scarcity of ICT resources (as discussed in the previous section).

In KA, teachers raised the need for many resources, such as computers, data projectors, and projection screens. The AH went further and expressed that there was a lack of collaboration with stakeholders in meeting these resource demands. As she stated:

> "We have demanded many times to be provided with computers, but unfortunately they have not provided us with computers. I can show you the evidence of our demands in this respect".

The standpoint of stakeholders, represented by the director of MKD in MGDE, on this point will be reviewed later in section 7.5.3.

In KB, participants' demands were lower than those in KA. The researcher noticed that there were apparent attempts by teachers to overcome the difficulties of lack of ICT resources. Clearly, teachers in KB were enthusiastic and adopting various strategies to compensate for this lack of provision from the ministry, as they were bringing their own ICT equipment. However, the situation was different at KC from the other kindergartens; the participants did not claim any resource needs because the setting was well equipped with ICT resources. Based on this, it is evident to the researcher that resource needs are strictly related to the state of ICT resources availability in the kindergarten.

Overall, this finding is in accordance with many earlier Saudi studies both in general education and in EYE (Aldossry, 2011; Hakami et al., 2013; Hammed, 2014; Alkahtani, 2017; Alasimi, 2018), which found that learning environments need more ICT resources. Internationally, in the review of Hew and Brush (2007) in which they analysed 48 international empirical studies conducted between 1995 and 2006, they concluded that lack of resources was the most cited factor influencing the integration of ICT and represented in 40% of the total studies. However, access to ICT resources has increased in the last decade. Given this, several researchers (Gray et al., 2010; Ertmer et al., 2012) believed that teachers' internal factors (such as beliefs, knowledge and skills) were the most significant challenge and more critical to teachers' acceptance and use of ICT than external factors (such as resources, training, and support). In general, the findings of the present study show that lack of resources seems still to be a critical problem in the integration of ICT. In the view of many Saudi researchers, such as Oyaid (2009), Aldossry (2011), Hakami et al. (2013), and

Alkahtani (2017), the problem of the lack of resources has still not been solved in the Saudi context over the last two decades.

Secondly, a few participants stressed their needs for appropriate educational software programs for teachers and young children. These needs were evident from interviews with the participants of KC, who tended to make more intensive use of ICT. Besides, the BH suggested the need for Arabic educational programs designed to improve children's literacy and numeracy skills. These findings are consistent with those of relevant Saudi and other Arabic studies (Ihmeideh, 2009; Hammed, 2014; Alkhawaldeh et al., 2017; Alasimi, 2018) which indicated a strong need for developing suitable software programs for both kindergarten teachers and children. For example, Ihmeideh (2009) revealed that the scarcity of appropriate software programs, particularly Arabic programs, is the most serious obstacle for Jordanian kindergarten teachers to integrate ICT into their practice.

Thirdly, KA's participants only expressed a strong need to improve the physical classroom environment for better ICT resourcing. They demanded more spacious and better-lit classrooms. In this regard, the observations revealed that classrooms in KA were small and crowded, when compared with the specifications in the teacher's guide, which mentions that the minimum space allowed for each child in the classroom is 3.25 square metres. Although KA was founded in 2014, the results of classroom observations revealed that the size of KA classrooms was around 42 square metres, which gives each child space of 2.1 square metres (as discussed in section 5.6.2). These small classrooms may be related to the type of kindergarten buildings (a rented building in the case of KA), which were originally houses and not specially built as

kindergartens (Alkahtani, 2017). In another Saudi study, as discussed earlier in section 7.2.1, Albugami and Ahmed (2015) stated that rented buildings still suffer from ICT infrastructure shortage, since these buildings were originally constructed for housing. As mentioned in Chapter Two, in 2018, such rented buildings accounted for about 23% of all Saudi school settings. It is worth noting that the Ministry has reduced the number of rented school buildings from 7,600 to 5,200 in 2018. Also, the MoE has developed a plan to achieve the objectives of the National Transformation Programme 2020 (derived from Saudi Vision 2030), which will involve 600 school buildings being built to replace half of those rented buildings by 2020.

Fourthly, two participants (BH, A2) asked for a curriculum that encourages the use of ICT in teaching and learning. A possible explanation for this request might be that the current national early years curriculum does not mention ICT and does not provide guidelines for teachers on when and how to use the ICT in their practices. As mentioned in Chapter Two, the evidence from the Saudi literature states that the national curriculum does not include information regarding the integration of ICT into EYE settings. This finding agrees with Al-Dayel's (2009) findings, which showed that Saudi kindergarten teachers require proper guidance and opportunities to become capable, competent, and knowledgeable about the potential and educational role of ICT in the EYE. Besides, Alasimi (2018) demonstrated that one of the barriers to the use of ICT in kindergarten classrooms is that the EYE curriculum lacks specific guidance relating to ICT integration into EYE practices.

In conclusion, together these results provide important insights into teachers' perceptions regarding their needs for better ICT resources in the kindergarten

classroom. Due to the observed lack of ICT resources in KA and KB, participants expressed demands for having a variety of additional ICT equipment in the two settings. Furthermore, the AH complained about the lack of cooperation from stakeholders in meeting these resources demands. However, some teachers employed various strategies to compensate for lack of provision by the ministry. Evidence from this study and relevant previous studies suggests lack of resources has continued to be a concern in the Saudi context. Moreover, a few participants pointed out the need for appropriate programs for teachers and young children, particularly in the Arabic language. As a result of the small classrooms and the rented building of KA, KA's participants only emphasised the need to improve the physical classroom environment to be more conducive to the integration and use of ICT, as they demanded more spacious and better-lit classrooms. Due to the lack of a national EYE curriculum that mentions ICT integration, some participants stressed the need for a curriculum that supports ICT incorporation in practices and gives guidance for teachers on when and how to use ICT.

After exploring teachers' current needs, which influenced their ability to use ICT, they were asked their how they saw the use of ICT in EYE developing in the future. Findings on this topic are discussed next.

7.2.3 Perceptions of new ICT development

This section reveals some important findings in relation to sub-research question (SRQ3): *What are kindergarten teachers' perceptions regarding the future of computers in the classroom?* This sub-research question sought to determine teachers' perceptions of the likelihood of future changes in ICT in the EYE. The data was collected from interviews with kindergarten teachers and headteachers, as described

in Chapter 6 (section 6.3.1.3).

Participants' views towards the probable future of ICT in EYE settings were enthusiastic and optimistic. Some participants from KA expected that the MoE would require all kindergarten teachers to use the computer in their teaching practices and provide computers in all kindergartens in the future. Similarly, teacher B2 anticipated that official approval would be issued for the integration of computers in early years education. Moreover, headteacher BH expected that the computer would be integrated into the EYE curriculum. Another expectation was that traditional teaching methods might no longer be used in kindergarten, and the Internet would be the main resource for teachers in the future. In contrast, teacher B1 expected that the new development would be in the area of educational programs or apps, while the usage of computers would be quite limited. The findings of the current study are consistent with the findings of some studies conducted in Saudi contexts (Oyaid, 2009; Hammed, 2014), which addressed the future of ICT in secondary education and EYE, respectively. Oyaid (2009) anticipated that technology would spread in schools, new hardware and specialised Arabic programs will be produced, and the MoE will develop the education policy to incorporate ICT use in teaching, as well as oblige teachers to use ICT in their teaching. Hammed (2014) reported expectations that the EYE curriculum would change to include instructions on how and when to use ICT effectively.

Generally speaking, participants had a promising and positive view of the future of the computer in EYE. They expected that the kindergarten learning environment would be well-equipped with computers and Internet connection. They anticipated that the MoE would obligate kindergarten teachers to use the computer in their teaching practices. They expected that a radical change in the policy and curriculum would be issued towards the integration of ICT. It is evident that kindergarten participants hope

to be involved in the change process and that their voices will reach stakeholders in the MoE. This is especially important, given that, as discussed in Chapter Two (section 2.5), most of the criticism faced by previous educational reforms and projects concerned the absence of teachers' involvement in planning. Possible recommendations in this regard will be presented in the next chapter (section 8.4).

7.3 Theme Two: Impact of computers

This section presents salient information derived from the findings of the study concerning sub-research question SRQ4: *What are the positive and negative impacts of using the computer in the classroom?* The question looked at the impact of using computers with kindergarten children in the view of different aspects such as learning, health, psychological, and social. The findings of this section were addressed by classroom observation and interviews with kindergarten teachers and headteachers, as described in Chapter 5 (section 5.5.2) and Chapter 6 (section 6.3.2).

7.3.1 Impact on children's learning

The interview sessions revealed that most of the teachers and headteachers believed that the use of computers in teaching has many benefits for kindergarten children's learning. The only evidence from KA was expressed by teacher A2, who believed the potential learning gains from using computers with children are to enhance the child's intelligence more than other traditional tools and keep children up to date with technology. This is consistent with some of the evidence from the literature reporting that children who use computers show significantly better gains in memory skills,

intelligence, and basic knowledge compared with those children who do not (Vernandakis et al., 2005). Besides, some participants, from cases KB and KC, demonstrated many positive perceptions about the value of computer technology in supporting children's learning by improving pronunciation and developing thinking skills, capturing children's attention, and improving literacy and numeracy skills.

The results extracted from participants' interviews somewhat concur with the results of classroom observations. For instance, teacher C2, in the observed scenario 2 (as described in section 5.5.2, p.178), employed the computer to display different images and engaged children in a dialogue about these images by asking questions. These questions stimulated children's imagination and thinking skills and encouraged them to participate and express their ideas. The same teacher, in scenario 3 (p.178), presented an interactive audio story about the sixth letter in the Arabic alphabet. The presentation was exciting and grabbed the children's attention. Through this activity, the story encouraged the children to learn the letter sound and pronounce the letter and the new words accurately. Elsewhere, with teacher C1 in scenario 1 (as described in section 5.5.2, p.174), a PowerPoint presentation was used to find out children's experience of natural phenomena (e.g. a cold night, strong wind, rain, thunder, lightning) and to prompt them to think about their own experiences and express their feelings. Also, teacher B1 in scenario 2 used the computer to display and tell a story while varying her tone of voice, which effectively captured children's attention.

In the same vein, the findings from the Middle Eastern literature indicated that computers could be beneficial for the cognitive development of children. For example, in a recent Saudi study, Aseri (2018) found that the creativity and thinking skills of the children improved as a result of the use of ICT. Also, it was observed in the same

study that children's pronunciation improved, and they showed the ability to speak difficult words in the English language after a tablet intervention in classroom practices. Additionally, Kara and Cagiltay (2017) found that most Turkish preschool teachers believed that ICT holds children's attention. With regard to the enhancement of children's literacy and numeracy skills, Alkhawaldeh et al. (2017) found that Jordanian teachers believed that computers could support children in learning to spell words, writing their names, learning numeracy skills such as counting, addition and subtraction, classification, and comparison as well as distinguishing between sizes, colours, and shapes. Similar findings were reported in many other international studies, which also showed that some teachers had positive attitudes toward the role of computers in improving children's literacy and numeracy skills (Judge, 2005; Voogt & McKenney, 2008; Beschorner & Hutchison, 2013; Herodotou, 2018; Dong, 2018a).

In contrast to the above-mentioned positive findings, a few participants in this study expressed concerns that overuse of computers by children may impede reading and writing skills and may lead to weakness in speaking skills. This could be due to the long time spent focusing on the screen, which takes the child away from creating a conversation or communication with others and practising literacy. This finding is consistent with the findings of previous literature. For example, Plowman and McPake (2013) argued that using technology does not guarantee the development of children's literacy and does not simulate the experience of adult-child conversations. Also, Sigman (2011) argues that early exposure to computers and a long time spent watching the computer screen are strongly related to a significant decrease in reading time.

The findings of this study also show that some teachers and headteachers (i.e. BH, C1 and CH) revealed additional advantages of the integration of ICT into kindergarten

settings, such as providing much information and valuable knowledge to facilitate learning, conveying information to children faster than traditional methods, changing the daily routine, and preventing boredom and stagnation in learning environments. These findings are consistent with findings in a study by Hammed (2014), who reported that 86% of participating practitioners, from both Saudi and Scottish contexts, considered the use of ICT resources as an effective method to convey information, while 81% of them considered it as a method to change the routine of activity and to retain the interest of the child. Also, Wood et al. (2008) believed that computers offer diverse enrichment of the curriculum, as well as being an available information resource.

The results suggest that teachers perceived the computer as an educational tool for kindergarten children for several personal reasons, describing it as marvellous, attractive, easy to use, comfortable, and saving stationery materials. Regarding the comparison between the computer and other educational tools, participants reported that computers are motivational, attractive, helpful tools, and save time and effort compared to other educational tools. These results are in line with the results of Hammed (2014) who concluded that teachers found ICT most appealing as it provides a considerable amount of information, it saves preparation time and it is easy to use.

Despite these positive attitudes, it is important to mention that in KA, which had poor ICT infrastructure, all the participants showed some negative perceptions of the use of computers in children's learning. Teacher A2 believed that computer use in the classroom could prevent learning through tactile engagement. This perspective is inconsistent with what was found early in this study. Teacher A2 wondered whether the use of computers in the classroom enhanced children's intelligence more than other

traditional tools or prevented learning through tactile engagement. From this, it seems to the researcher that there was scepticism from this teacher about educational objectives related to the use of ICTs in learning environments. This seems to be consistent with Hammed's study (2014), which found that some teachers were sceptical about the value of ICT due to the lack of a clear plan and guidance for ICT integration in the Saudi EYE sector. Notably, this teacher stressed the need for a curriculum that supports ICT incorporation and provides guidance on when and how to use the ICT in teaching and learning practices (as discussed earlier in 7.2.2).

In this kindergarten, the other teacher (A1) had a stronger viewpoint on this matter, as she firmly believed that the computer is not beneficial for children and that sensory learning is better than learning via computer because of the multiple uses of the senses of the child. She suggested that the use of computers could impede the sensory learning, which the child needs in the early stages, because it failed to engage or utilize the child's senses such as taste, smell and touch. She also expressed scepticism about the educational value of the computer in children' learning. These findings are in line with the findings of many early studies, which concluded that computers were not developmentally appropriate for children in EYE, diverted children's attention from real-world experiences, and provided no educational benefits (Elkind, 1996; Healy, 1999). Furthermore, these perspectives also corresponded with the findings of various researchers who claim that kindergarten children should learn via the use of tangible objects (such as paste, water, sand, and clay) and outdoor play (Alkhawaldeh et al., 2017). However, there is evidence in the literature that many forms of ICT, such as multimedia-based digital storybooks and educational software programs, offer educational activities that rely heavily on multiple senses (Smeets & Bus, 2013: Prasetya & Hirashima, 2018). Additionally, the observations revealed that this teacher

never used any form of ICT resources in her classroom practices. This finding is consistent with Al-Harbi's (2014) claim that teachers who hold negative attitudes towards the ICT are less likely to employ or encourage ICT use in their schools, as compared to teachers with positive attitudes.

Through interviews with KA's teachers, further probing revealed that although teachers had already indicated their willingness to bring their own ICT equipment to kindergarten if necessary (as presented and discussed earlier in 6.3.1.1 and 7.2.1, respectively), they seemed to share some slightly negative perceptions towards the integration of computers in their classroom practices. It is noteworthy that both teachers strongly recommended the use of tangible objects for learning and encouraging sensory learning in activities. However, teacher A2 suggested the possibility of extending the learning process through the use of computers, and she considered the computer as a complementary assistant tool, but not the only source of information and knowledge. These perspectives of teacher A2 corresponded with the findings of the Epstein report (2015:7), which suggested that "Technology should be used in moderation to supplement, not replace, hands-on learning with real materials that provide a full range of physical, sensory, intellectual, and social experiences".

Classroom observations also affirmed that teacher A2, in scenario 3, as described in section 5.5.2 (p.174), employed the laptop to show some pictures for a short period of about three minutes. This teacher's observed use of resources appeared to be at an entry-level of ICT integration, and she seemed to be inexperienced of ICT and unconfident about the value of ICT for children. These explanations are consistent with the findings of a Saudi study conducted by Oyaid (2009), who found a relationship between teachers with negative attitudes towards ICT and a shortage of

confidence with ICT.

The interview results indicate that the KA headteacher's perception was somewhat in line with the perceptions of teachers in the setting. The headteacher voiced concerns about the negative impacts of ICT in children's learning. She strongly preferred to see her kindergarten teachers use traditional methods rather than a computer in the classroom. She also expressed concern that computer use could hinder children's memory skills, because they failed to retrieve what they saw immediately. However, due to the lack of ICT resources in KA, the headteacher had requested the provision of computers in the kindergarten, and she also complained about the lack of collaboration with stakeholders in meeting resource demands (as discussed earlier in 7.2.2). From the data, it seems to the researcher that the headteacher used the presence of obstacles (such as lack of ICT resources and lack of sufficient support from the ministry) as a convenient excuse for not using ICT in the setting, whilst the real reason seems to be her negative attitude towards ICT. This explanation seems to be consistent with the study conducted by Michaelides (2011), which stated that teachers who feel unconfident and hold negative attitudes about ICT are inclined to believe that obstacles hinder their use of ICT. It also accords with Lindahl and Folkesson's (2012) assertion that the most frequent barriers to the incorporation of ICT into teaching and learning are teachers' negative beliefs and attitudes. Overall, the negative perceptions of KA's headteacher towards the use of computer in classroom practices seem to be have significantly influenced and shaped the teachers' responses in the interviews.

7.3.2 Impact on children's health, psychological, and social development

The evidence from this study suggests some teachers' perceptions concern possible

detrimental impacts of computers on children from health, psychological, and social aspects. Some participants reported that the use of the computer might lead to a variety of health problems in the vision, hearing, and body of the child. They were concerned that the radiation exposure resulting from the screen could damage the vision, the loud background noise may affect the hearing, and sitting in front of the computer and the constant use of the mouse could result in muscle weakness in the limbs and fingers. These concerns matched with the findings of some studies found in the literature (Cordes & Miller, 2000; Theodoto, 2010), which outlined potential health hazards related to children's computer use, including obesity, repetitive strain injuries, blurry vision and eyestrain from the radiation, headaches, tiredness, and musculoskeletal dysfunction. At the same time, the literature also reports evidence from other researchers that computers could improve children's manual dexterity (Haugland, 2000), improve eye-hand coordination (Li & Atkins, 2004), and develop children's fine motor skills (Bedford et al., 2016). It is important to highlight the fact that the study participants' concerns as regards the potential health hazards of the computer for children seem to apply to long periods of computer use. This explanation is in line with the ideas of Morgan and Siraj-Blatchford (2009), who concluded that the evidence regarding these health hazards remains unclear, and they suggested limiting young children's computer exposure to reduce any potential dangers. Furthermore, Hammed (2014) found that some Saudi teachers felt the inappropriate use or overuse of ICT could cause health issues for children.

One participant (teacher C1) had a case of a child with hyperactivity in the classroom. She believed that this was caused by the overuse of computers, which she inferred from discussion with the child's parents about the case, where they explained that the child spent long hours using a laptop and other devices. Contrary to this result, there

is evidence from the literature that computer use may be beneficial for children with hyperactivity, as it provides them with instant gratification, fosters visual and auditory skills, and reduces cognitive dysfunctions and symptoms (Green, 1995; Bikic et al., 2015). It is notable that during the classroom observations with this teacher, the researcher noted that the hyperactive child was moving between educational corners and then sat in the computer corner. Afterwards, the child started to use the computer, write in Word and draw in the Paint program skilfully. It is seemed to the researcher that the teacher's inference was of doubtful validity, because such cases require an accurate health diagnosis from medical experts.

Headteacher AH worried that the use of the computer may prevent social interaction with people, especially between teacher and child in the classroom. Besides, she believed that computer use in the classroom could make children passive, as they do not speak, remain silent, and look at the screen or the show. These findings are in line with the findings of some studies in the literature. For instance, Alkhawaldeh et al. (2017) stated that the use of computers could lead to children's poor social relationships and isolation. Similarly, Rikkers et al. (2016) concluded that frequent computer use might increase children's social isolation, resulting in mental health issues such as loneliness and depression. On the other hand, some studies offer a more positive picture, suggesting that these fears about computer usage isolating children are unfounded or not persuasive (O'Hara, 2008; Grey 2011), and indicating that the use of computers encouraged the social interaction of children with peers in developmentally meaningful ways (Lim, 2012; Alasimi, 2018).

Regarding the impact of ICT on children's social development in the classroom, the teacher plays a vital role in enhancing learning and social interaction through creating

a supportive environment for ICT, which promotes active learning rather than passivity and enriches communication and collaboration in the classroom. In this respect, teachers with more traditional beliefs apply a teacher-centred approach, which tends to make children passive recipients, while teachers with more constructivist beliefs are found to implement more student-centred learning. As discussed earlier, in section 7.3.1, headteacher AH had negative attitudes towards ICT, and was supportive of the traditional methods of teaching, so she believed that the computer threatened communication skills between children and others. Outside the learning environment, according to the findings from the literature, reducing computer time gives opportunities for interactions with family members and the involvement of the parents with young children during ICT use helps conversations and social behaviours.

Summary of the section

In conclusion, together these results provide valuable insights into teachers' perceptions regarding the potential impact of using computers with kindergarten children in the view of different aspects such as learning, health, psychological, and social. This study revealed that the participants, particularly from KB and KC, held positive attitudes for the integration and use of computers in early years environments. They believed that the use of computers in teaching has many benefits for kindergarten children's learning, such as improving pronunciation and developing thinking skills, capturing children's attention, and improving literacy and numeracy skills. These findings are in accordance with some of the Middle Eastern studies in the field, which found that the use of ICT improved children's creativity, thinking skills, pronunciation and speaking skills (Aseri, 2018), grabbed children's attention for learning (Kara & Cagiltay, 2017), and enhanced children's literacy and numeracy skills (Alkhawaldeh

et al., 2017). Likewise, the results of classroom observations somewhat concur with the results of participants' interviews. The evidence shows that the teachers from KC held more positive perceptions about the advantages of ICT in learning, especially computers, and tended to employ ICT in their classroom activities. KB's teachers were already well informed of some ICT advantages, but they did not fully apply ICT for teaching, perhaps due to insufficient pedagogical understanding of the use of ICT in classroom practices.

Furthermore, some participants, from cases KB and KC, believed that using computers enriches the learning experience by providing much information, changing the daily routine, and preventing boredom and stagnation in learning environments. These findings are consistent with findings in a study by Hammed (2014), who reported that 86% of practitioners, from both Saudi and Scottish contexts, considered the use of ICT resources as an effective method to convey information, while 81% of them considered it as a method to change the routine of activity and to maintain the interest of the child. The results suggest that teachers perceived the computer as an educational tool that was easy to use, motivational, attractive, helpful, and saving of time and effort compared to other educational tools. Nonetheless, a few participants were less positive about the use of computers by children, fearing that overuse could impede their reading and writing skills and cause weakness in speaking skills. These perspectives echo those noted in several studies, which also indicated that using technology does not guarantee the development of children's literacy and does not simulate the experience of adult-child conversations (Plowman & McPake, 2013), and long exposure to computers is strongly related to a significant decrease in reading time (Sigman, 2011).

The findings of this study also show that only positive evidence emerged from the KA setting, as teacher A2 expressed that using computers with children enhances the child's intelligence more than other traditional tools. This finding further supports the idea of Vernandakis et al. (2005), who concluded that children who use computers show significantly better gains in memory skills, intelligence, and basic knowledge compared with those children who do not.

Despite these positive attitudes, all the participants from KA showed some negative perceptions of using the computer in children's learning. The results show that teacher A2 appeared to hold the least negative perceptions towards using the computer in children's learning compared to other participants in the KA. However, it is noted that there was an inconsistency in the responses of A2, indicating doubts in the educational objectives of computer use. These doubts may be due to the lack of a clear plan and guidance for ICT integration in the Saudi EYE sector (Hammed, 2014). Besides, the classroom observations revealed that this teacher seemed to be inexperienced with ICT and unconfident about the value of ICT for children. These explanations are consistent with the findings of a Saudi study conducted by Oyaid (2009), who found there is a relationship between teachers with negative attitudes towards ICT and a lack of confidence with ICT. It is important to mention that the surrounding environment was influential in shaping her perceptions towards the use of computers and made the teacher hold these negative perceptions.

From interview results, other participants (A1 and AH) seemed to have more negative perceptions towards the use of computers in classroom practices. They were supportive of the traditional methods and very uncertain about the benefits and potential of the computer in children's learning. These findings are in line with the

findings of many early studies, which accompanied widespread debates in the early years of the introduction of ICT in early childhood settings (Elkind, 1996; Healy, 1999). They also expressed perceptions about the failure to engage all children's senses, and possible detrimental impact on memory skills, compared with traditional teaching methods.

Notably, the headteacher used the presence of obstacles to using the computer (such as lack of ICT resources and lack of sufficient support from the ministry) as a useful excuse for not using ICT in the setting, whilst the real reason seems to be a negative attitude towards ICT. This explanation seems to be consistent with the study conducted by Michaelides (2011), which stated that teachers who feel unconfident and hold negative attitudes about the ICT are inclined to believe that obstacles hinder their use of ICT. Indeed, the negative perceptions of KA's headteacher towards the use of computers in classroom practices seemed to be have significantly influenced the teachers' responses in the interviews.

The findings, as mentioned earlier, show some participants reported that using computers might lead to a variety of health problems in the vision, hearing, and body of the child, and one suggested a link between computer exposure and hyperactivity. It is important to mention that these concerns regarding the potential health problems of the computer on children seem to be strongly related to the overuse of the computer. This explanation is in line with the ideas of Morgan and Siraj-Blatchford (2009), who concluded that the evidence regarding these health hazards remains unclear, and they suggested limiting young children's computer exposure to reduce any potential dangers.

Furthermore, participants also expressed concern that computer use constrained opportunities for social interaction in the classrooms. This, however, it can be argued, is the responsibility of a teacher, who plays a vital role in promoting learning and social interaction by creating a supportive ICT environment, which enhances active learning rather than passivity and enriches communication and collaboration in the classroom. Consequently, it seems that there is a lack of awareness of the importance of teachers' pedagogical role in the integration of ICT in the learning environment.

Overall, the evidence from this study demonstrated that the attitudinal picture towards the use of computers in classroom practices was not consistently positive, particularly with KA participants. The participants of KB and KC held highly positive attitudes towards the integration and use of computers in early years environments. However, those from KA were reluctant to integrate ICT into their practices and believed in the old-fashioned method of education. Some obstacles to using the computer were used as a useful excuse to hide the real reason, which is the negative perceptions and low confidence towards the computer. Hence, one reason for participants holding these negative perceptions and attitudes towards ICT is the existence of obstacles to using ICT. Also, it was found in both the literature and the current study that the beliefs and attitudes of teachers are the most frequent obstacles to the integration of technology in the classroom. Therefore, it is important to explore teachers' pedagogical approaches related to computer use in teaching children (which will be discussed in the next section 7.4) and to examine their perceptions of obstacles to the use of the computer (which will be discussed in section 7.5).

7.4 Theme Three: Approaches

This section reveals some significant findings concerning sub-research question SRQ5: *How do kindergarten teachers use the computer in the classroom?* This sub-research question sought to explore participants' perceptions about how teachers used computers in kindergarten teaching. This section deals with the following aspects; teachers' approaches to using computers, their pedagogical approaches, and the issues they took into consideration when planning computer use. The data was collected from classroom observations and interviews with kindergarten teachers and headteachers, as described in Chapter 5 (section 5.4 and 5.5.2) and Chapter 6 (section 6.3.3).

Through discussion with participants, it became apparent that they had different perceptions of how ICT was being used. They indicated a number of purposes for which they used computers to teach kindergarten children in their classroom practices. Firstly, they used computers as a presentation tool for displaying stories, videos, pictures and rhymes. Secondly, they used computers as an educational tool for teaching children letters, numbers, ethics, supplications, and behaviours, and to aid explanation of some specific lessons (e.g. how to make a sandwich). Thirdly, they used computers as a facilitating tool for conveying scientific concepts (e.g. stages of the embryo) and simplifying complex topics (e.g. the sea world) that may be difficult to convey by other methods. Here, it is somewhat surprising that participants of KA with negative perceptions of ICT preferred to use the computer to show topics that could be difficult to convey to the child, instead of using other methods. This could be due to the fact the computer offers very visually attractive and realistic (e.g. movies), which have greater impact than pictures in the book. This result agrees with Hammed's (2014) result, which showed that ICT tools could break down complicated and dense

information into more digestible ideas for young children. Fourthly, teachers used computers as an awareness tool for providing health education and warning certain negative social phenomena (e.g. sexual harassment and family violence).

Besides, the evidence from observations shows that teachers tended to use the computer mainly as a presentation tool for teaching, not as a learning environment, and this teaching process was based on a teacher-centred approach. Therefore, teachers did not give the children any chance to use these resources in all the teacher-led structured activities. This evidence seems to be consistent with the studies conducted by some Saudi researchers (Al-Dayel, 2009; Hammed, 2014; Alasimi, 2018), as discussed in Chapter Two (section 2.5), which indicated that kindergarten teachers' use of ICT was based upon their own efforts, and they used the computer in practice as a teaching tool, rather than it being directly used by children. For example, Alasimi (2018) found over 67 per cent of kindergarten teachers were using technology as a presentation tool for teaching. She also found that the majority of kindergarten teachers did not let children play games with technology (58.8%) or use the internet to search for information (70%).

However, in interview, only one teacher (C1) reported that she sometimes invited children to participate in computer use during structured activities.

Most of the participants reported that they had the basic knowledge to use popular Microsoft programs such as Word and PowerPoint. Some of them mentioned the use of the YouTube website and the Microsoft Paint program. Classroom observation scenarios also affirmed that teachers employed these programs and applications,

especially PowerPoint, in the observed activities. It can be inferred from these results that teachers seemed to feel more comfortable with producing their teaching materials on PowerPoint, due to its ease of use and its ability to create multimedia content in a single slide.

As mentioned in the literature (section 3.4.2), the Apple Classrooms of Tomorrow (ACOT, 1995) presented a model of ICT integration in teaching and learning, which identifies teachers' ICT proficiency level and classifies ICT use into five sequential stages, namely, entry, adoption, adaptation, appropriation and invention. Applying this model to the result of ICT-related activities observations, the researcher found that the use of ICT resources by the KA and KB teachers seemed to be at an entry-level of ICT integration, while the KC teachers' use of ICT resources was at an adoption level. There was agreement between the results of the observations and interviews on the ICT proficiency level of most teachers, but the results of the interviews showed that teacher C1 went beyond the adoption level to the adaptation of ICT, as she invited children to engage in computer activities. Possible explanations for the low ICT competencies may be the lack of ICT training and the lack of curriculum guidance on the integration of ICT. This explanation seems to be consistent with the study conducted by Dong (2018b), who attributed the lack of ICT competencies the ICT training system and the curriculum's lack of specific guidance on the use of ICT, which does not encourage teachers to improve their ICT competencies. Similarly, Mukhari (2016) identified three factors limiting teachers' competence in using ICT for teaching children, which are lack of training, lack of confidence and lack of ICT skills. In general, it can be said that the proficiency of teachers in the use of computers generally lay between the stages of entry and adoption or and any case did not exceed

the level of adaptation.

Based on teachers' approaches to using computers described above, it is essential to identify teachers' pedagogical approaches about how children interacted with these computer-related activities. The interview data from teachers and headteachers indicated that during these activities, they ensured children's engagement and learning through question and answer, encouraging participation, and involving the family in research projects. Likewise, the results of the practice observations supported the results of the interviews. The researcher found that both teachers C1 and C2 engaged children in a conversation and dialogue about these ICT-related activities by asking questions that stimulated children's imagination and thinking skills. They also offered children opportunities to engage in research projects in which families could become involved (for example, with Teacher C1 in Scenario 3 and Teacher C2 in Scenario 2, as discussed in section 5.5.2). However, teacher C2 revealed that the interaction of children with computer-related activities might be of limited duration due to the type of content presented and children's boredom with the period of activity. Indeed, this occurred with teacher C1 in scenario 3, as some children were unwilling to participate when the activity period was too long.

As reported in Chapter Three, Ljung-Djärf et al. (2005) identified three categories of classroom computer environments from the teacher's standpoint, namely, protective (computer seen as a threat to other activities), supportive (computer seen as an available option for teachers), and guiding (computer seen as an essential activity for students). In this study, the researcher applied these categories based on the evidence obtained from the interviews and observations, reported in the previous section and

this section. It appears that KA represented a protective environment, KB provided a supportive environment, while KC provided two environments at the same time supportive and guiding, since KC classrooms included a computer corner, specifically for children's use.

Furthermore, during the observations, although children did not constitute part of the formal sample, their uses of the computer during the learning corners (unstructured activity) was noticed. They learned the basic skills of operating the computer, used educational games and a drawing and colouring program, and typed letters or their names on the Word page. In teacher C1's classroom, the children raced to the computer corner to get the available seat and use the computer. It was also noted that this corner was never empty of children, throughout the time allocated for the learning corners. This suggests the desire and enthusiasm of the children to use the computer. However, this corner had only one desktop computer and was limited to one seat. The teacher's role was to prepare corners, observe children while moving between corners, support them to overcome challenges and record their behaviour, abilities and interests. Teacher C1 used an interesting way to monitor children's work in the computer corner, when they used the Word and Microsoft Paint programs. Afterwards, she provided parents with a CD of their child's work documenting the child's progress throughout the academic year. This finding aligns with that of Leung (2010) who found that kindergarten teachers documented children's progress with ICT in order to share it with their parents. This gave the impression to the researcher that the presence of ICT in the classroom helped the teacher to assess children's learning.

Evidence from this study suggests that there were some issues that teachers took into

consideration when they were planning computer use. They highlighted that the content of computer activities should meet children's needs and cater for children's individual differences. Moreover, teachers followed the KSA national curriculum guidelines, which give teachers the flexibility to add or remove learning materials based on the children's individual needs and interests. It is imperative that teachers make wise decisions concerning appropriate ICT tools and techniques. This result is consistent with what was found in Roscorla's (2013) study, that the role of teachers in the use of ICT is to identify the most effective ICT tools to facilitate learning, through activities that are appropriate for the individual child, the classroom context, and the content area.

From the interviews, some headteachers indicated that the usage of the computer depends on the class grade level, as computers were used more with older children (KG3) than younger ones. They believed that those children in KG1 and KG2 needed more focus on physical activity. Headteachers' views are somewhat in line with Leung's (2010) suggestion that frequent computer activities in kindergartens threaten the development of young children's fine motor skills. Leung (2010) argued that computers should not be used with young children in KG1 classrooms (3 years of age) and she perceived that the suitable age for introducing computer activities was in the KG2 classroom (4 years of age). Here, it seems that headteachers play an important role in deciding when teachers can use computers in kindergarten classrooms.

Based on the above discussion, it can be concluded that the findings of this study provided evidence that teachers used computers for a variety of purposes and in different subject areas. For example, they used computers for displaying stories,

videos, pictures and rhymes, providing practice in literacy and behaviours, conveying scientific concepts issues, simplifying complex topics, and raising awareness. Mostly, these uses of the computer were based on a teacher-centred approach. They did not give the children any chance to use these resources in the observed activities. Word and PowerPoint were the most used applications, although YouTube and Paint were also mentioned. They also used Word and PowerPoint for preparing lessons and designing teaching materials.

Regarding the ACOT (1995) model, the competence of teachers in KA and KB seemed to be at an entry-level of ICT integration, while the KC teachers' use of ICT resources was at an adoption level. Possible explanations for the low ICT competencies may be the lack of ICT training and the lack of curriculum guidance on the integration of ICT. This explanation seems to be consistent with what was found in the literature (Mukhari, 2016; Dong, 2018b). The evidence showed that during teacher-led computer activities, teachers ensured children's engagement and learning through question and answer, encouraging participation, and involving the family in research projects. However, sometimes the interaction of children with these activities might be of limited duration due to the type of content presented and children's boredom if the period of activity was too long.

Based on the classification of Ljung-Djärf et al. (2005) about classroom computer environments, it is concluded that the KA represented a protective environment, KB provided a supportive environment, while KC provided two environments at the same time (supportive and guiding), since KC classrooms included a computer corner for children's use. One of the teachers supported children by documenting their work with

computers by saving it on CDs for later submission to parents, so they could see the child's progress throughout the academic year. This finding aligns with that of Leung (2010) who found that kindergarten teachers documented children's progress with ICT in order to share it with their parents.

Evidence from this study suggests that some factors were considered by teachers when they were planning computer use. They stressed that the content of computer activities should meet children's needs and be suited to children's individual differences. Besides, headteachers' emphasised that computers were used more with older children (KG3) than younger ones, for whom the focus was more on physical activity.

7.5 Theme Four: Obstacles to using computers

As discussed in the previous sections, the findings of the study provided evidence that although most participants held positive perceptions toward the use of ICT, particularly computers, in early years environments, and also had much enthusiasm to integrate ICT into classrooms, their uses of ICT tools in teaching practices were still limited. Moreover, teachers tended to utilise a narrow range of available ICT resources in the classroom. The reason seemed to be that teachers faced a range of obstacles that hindered their uses and prevented the full integration of ICT into practices. Furthermore, it has been suggested that those who held negative perceptions toward the computer tended to use the presence of these obstacles as an excuse for not using ICT in the setting. Thus, it is essential to explore these obstacles encountering kindergarten teachers in the process of ICT integration in teaching and to find out how to overcome them.

This section introduces salient data obtained from the findings of the study regarding sub-research question SRQ6: *What are the opportunities and difficulties reported by kindergarten teachers in using computer technology in classrooms?* This question aims to explore teachers' and headteachers' perspectives of obstacles that hinder the integration and use of computers in kindergartens. The findings of this section were collected mainly from classroom observations and interview sessions with participants, as described in Chapter 5 and Chapter 6 (section 6.3.4). Besides, the director of Makkah Kindergarten Department (MKD) in MGDE provided further information regarding the difficulties perceived in using computer technology.

Through discussion with teachers and headteachers, they identified a number of obstacles to using computers (as a part of ICT) into classroom practices. The findings on the obstacles faced by kindergarten teachers in using the computer were organised into the following categories: teacher personality factors, internal environment factors (inside kindergartens), and external environment factors (outside kindergartens). This proposed classification of factors is somewhat similar to the classification of Balanskat et al. (2006), who grouped the factors into teacher-level factors, institution-level factors, and system-level factors. However, this classification differs from Ertmer's (1999) classification, which divides factors into two groups: first-order factors that are external to the teacher (whether inside or outside the kindergarten) and second-order factors that are internal to the teacher. Thus, by separating inside and outside kindergarten factors into separate categories, the researcher's classification provides an additional level of specificity, compared to Ertmer's.

7.5.1 Teacher personality factors

The findings of the study identified four potential factors at the teacher-level concerning the influence on teachers' ICT integration: teachers' knowledge and skills, confidence, attitudes, and beliefs (see Figure 7.1).

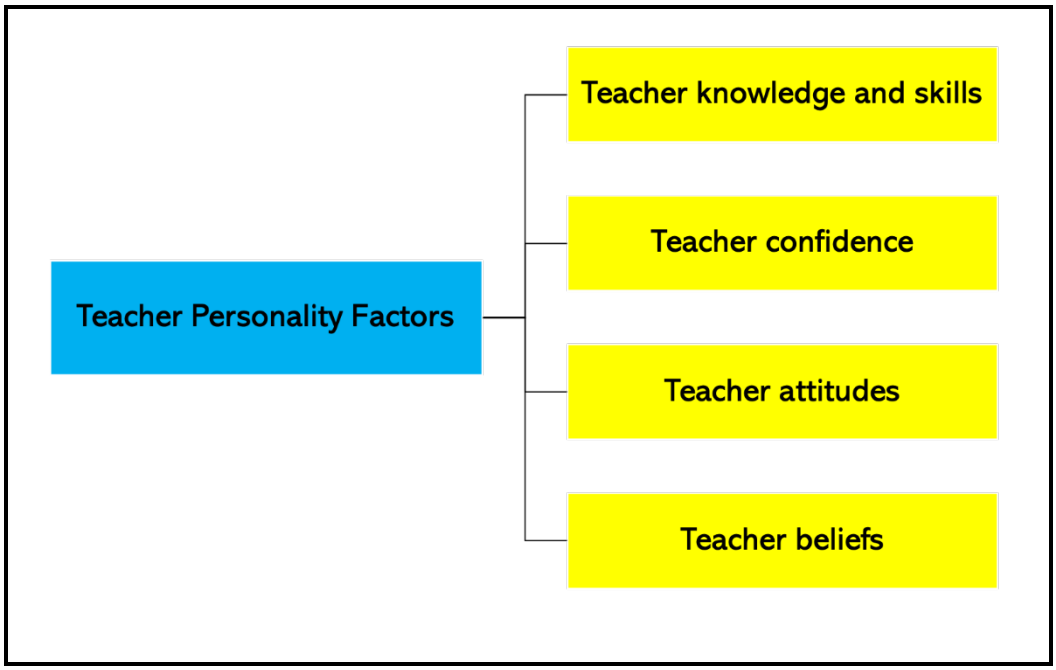

Figure 7-1: Teacher-level factors influencing ICT use.

The findings of the interviews displayed that some teachers (e.g. A1, A2, and B2) had a *lack of computer knowledge and skills* that impeded them from employing computers in the learning environment provided for children. Indeed, unless kindergarten teachers have computer knowledge and skills, they will be unable to integrate the computer into their work practices effectively. Furthermore, the findings of observations, as described earlier in section 7.2.1, supported the results of the interviews and revealed that teachers used a narrow range of ICT tools because they

lacked ICT knowledge and skills, which impeded them from using a more diverse ranges of tools in their practices.

This result is consistent with those of many early years studies (Wood et al., 2008; Ihmeideh, 2009; Nikolopoulou & Gialamas, 2015b; Fenty & Anderson, 2014) and suggest that kindergarten teachers' lack of computer knowledge and related skills is claimed to be an obstacle to their use of computers in practice. Likewise, many Saudi studies have found that the lack of ICT knowledge and skills is a critical obstacle faced by teachers when they intend to incorporate the ICT into EYE (Alshuwayer, 1999; Hammed, 2014; Alasimi, 2018; Aseri, 2018) and general education (Oyaid, 2009; Barri, 2013; Al-Harbi, 2014). For example, Hammed (2014) found that around 40% of kindergarten teachers considered that the lack of knowledge and skills was a barrier to their acquisition of the benefits of using ICT in the classroom.

In the research review of Hew and Brush (2007) about the obstacles to integrating technology into K-12 classrooms, they identify three types of knowledge and skills imperative to incorporate ICT in the learning environment: specific ICT knowledge and skills, ICT-supported pedagogical knowledge and skills, and ICT- related classroom management knowledge and skills. Based on that, teachers need to know how to operate the ICT tools and how to incorporate ICT in a way that is developmentally appropriate for young children. A possible explanation for the lack of knowledge and skills may be related to the 'lack of training' barrier, which will be discussed later in section 7.5.3, as training courses play a significant role in raising skill levels and fostering the ICT integration into classroom practices. This explanation seems to be consistent with many studies showing that training and obtaining

knowledge and skills could not be separated, because one is necessary and precondition for the other (Ihmeideh, 2009; Nikolopoulou & Gialamas, 2015b; Plumb & Kautz, 2015; Dong, 2018a).

Another important finding of the research was that *teachers' lack of confidence* towards the use of ICT created a significant obstacle to the integration of ICT. Evidence from interviews shows that participants who lacked ICT knowledge and skills (e.g. A1, A2, and B2) were concerned and unsure about using ICT in the classroom, and thus they were unconfident to use ICT in their teaching. It was also revealed that teachers' self-confidence was shaken due to the fear of technical breakdowns and failure. Furthermore, the evidence from the interviews provided support for the inference made in section 7.2.1. The lack of confidence was one of the reasons behind the non-use of ICT resources, especially those that were available in the libraries of KB and KC, into their teaching practices. These results are consistent with the results of other studies (Bingimlas, 2009; Blackwell et al., 2014; Plumb & Kautz, 2015), which indicated that a lack of technological knowledge and the fear of failure cause a lack of teacher confidence in integrating technology into their teaching.

Based on this, it is evident to the researcher that confidence is related to knowledge and skills. This seems to be consistent with the BECTA survey (2004), which concluded: "Many teachers who do not consider themselves to be well skilled in using ICT feel anxious about using it in front of a class of children who perhaps know more than they do" (p. 7). Since the lack of skill is attributable to the lack of training courses, therefore the lack of confidence may be caused by limited ICT training. Such a view is supported by the observation, during interviews, that the teachers who lacked ICT

knowledge and skills were the ones who were particularly lacking in confidence to use ICT in the classroom. This notion accords with the view of Bingimlas (2009), who identified three reasons for teachers' lack of confidence in the use of ICT: anxiety, fear of failure and lack of ICT training. In the same vein, Alasimi (2018) suggested that on-going professional development and pre-service training are essential to enhance teachers' confidence and comfort in the use of technology.

As indicated in the literature review, several researchers expressed that the confidence of teachers has the potential to impact and change their attitudes toward the use of ICT (Blackwell et al., 2014; Nikolopoulou & Gialamas, 2015a; Alasimi, 2018). In this regard, Oyaid (2009) explained that there is a relationship between teachers' negative attitudes towards ICT and a lack of confidence with ICT. These findings are supported by the results of observations and interviews in Section 7.3, which indicated that teachers who felt confident had adopted more positive attitudes about ICT, and vice versa. Hence, it reinforces the notion that *teachers' attitudes* toward technology are another obstacle they faced inside their classrooms.

In terms of teachers' attitudes toward ICT, the previous evidence from the study findings, as discussed in Section 7.3, revealed that teachers with negative attitudes towards ICT are less likely to employ or encourage ICT use in their kindergartens, as compared to teachers with positive attitudes. According to the findings of the literature (Plumb & Kautz, 2015; Alasimi, 2018; Dong, 2018a), teachers' attitudes are influenced by internal factors such as teachers' knowledge of computers, confidence in using them, and pedagogical beliefs. In the same way, the study results provide confirmatory evidence that teachers with more traditional beliefs (whose view of

young children's needs and learning led them to prefer non ICT-related activities) perceived the introduction of ICT as not beneficial and a threat to traditional practice. It is important to recognise that teachers' educational beliefs related to ICT play a significant role in the effectiveness of integrating ICT into the classroom environment, as they precede the use of the computer. Thus, *teachers' beliefs* can be considered as a significant obstacle to the integration of ICT, in the line with Ertmer's (2005) argument that teacher beliefs are the 'final frontier' for the integration of technology into schools.

In summary, the evidence from the data suggests that teachers' use of ICT is influenced by four teacher-level factors: teachers' knowledge and skills, their confidence with ICT, their attitudes towards technology and their beliefs regarding its value.

Regarding knowledge and skills, there were indications that some teachers had limited ICT-related knowledge and skills, which contributed to their making little use of ICT, and confining themselves to a narrow range of tools, consistent with many previous studies, both in the west (Wood et al., 2008; Nikolopoulou & Gialamas, 2015b; Fenty & Anderson, 2014) and in Saudi Arabia (Hammed, 2014; Alasimi, 2018; Aseri, 2018). It was suggested that the problem stems from lack of training, which literature shows is a necessary precondition for knowledge and skills development (Ihmeideh, 2009; Nikolopoulou & Gialamas, 2015b; Plumb & Kautz, 2015; Dong, 2018a). Teachers who lacked ICT knowledge and skills in turn lacked confidence to use it in the classroom; another reason for lack of confidence was fear of devices breaking down, as previously found by Bingimlas (2009), Blackwell et al (2014) and Plumb & Kautz (2015). Lack of confidence was associated with negative attitudes towards ICT,

consistent with authors including Oyaid (2009), Blackwell et al (2014), Nikolopoulou & Gialamas (2015a) and Alasimi (2018). Teachers' attitudes are also influenced by their pedagogical beliefs (Plumb & Kautz, 2015; Alasimi, 2018; Dong, 2018a) and evidence was presented that teachers with more traditional beliefs, which precede computer use, had more negative attitudes and, consistent with Ertmer's (2005) claims on the role of beliefs in technology integration, were less likely to use ICT. Thus, these four internal factors: teachers' knowledge and skills, confidence, attitudes and beliefs all interacted to deter their integration of technology in their teaching practices.

7.5.2 Internal environment factors

Through interviews, kindergartens' participants expressed several obstacles and challenges to computer use in the internal kindergarten environment, in terms of classroom conditions, headteacher support, and kindergarten location (see Figure 7.2).

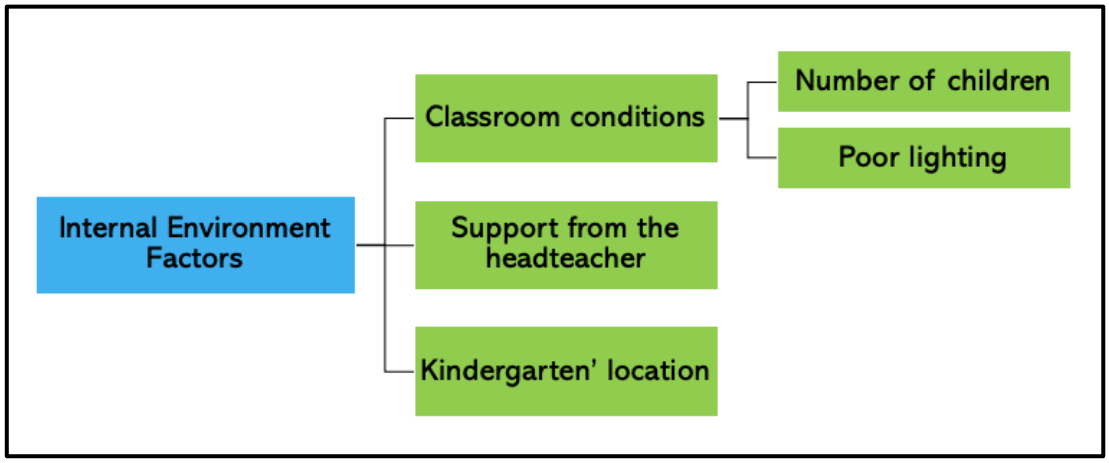

Figure 7-2: Internal environmental factors influencing ICT use.

It was found that all kindergartens' participants suffered from *a large number of children in the classroom*, and they perceived it as one of the significant obstacles facing them in the use of computers. They pointed out that having a large number of children in the classroom was a challenge for teachers to integrate computers and teach and supervise children during the time set for the activity. Some kindergarten participants reported that using the computer with large numbers of children is impractical and wastes time.

Besides, the findings of the classroom observations confirmed the issue of the numbers of children, as described in section (5.6.2). All the observed classrooms in the three kindergartens were small and crowded with children, based on the organisational guide (MoE, 2018c) which mentions that the minimum size allowed for each child in the classroom is 3.25 square metres. Another interesting point made in the guide is that the ratio in kindergarten is one teacher for every twelve children (1:12). The KC did not follow the guide in this matter, as the number of children in the visited classrooms was in the range of 28 to 30 under the supervision of two teachers. Additionally, this study's finding is in some agreement with earlier studies in Jordan and Greece (e.g., Jumiaan et al., 2012; Nikolopoulou & Gialamas, 2015b), which reported that kindergarten teachers perceived a large number of children in the class as a problem toward the use of the computer. In the Saudi context, this obstacle is cited in some studies (Alfifi, 2012; Al Mulhim, 2014) and found frequently at different education stages, except for the early years stage, which, in the researcher's view, is likely to be due to the shortage of Saudi studies about the use of ICT in the EYE.

In another aspect, some headteachers revealed that *poor lighting* in the classroom was an obstacle for computer usage. Regarding these two obstacles, the study evidence shows that participants called for the physical environment of classrooms to be improved, to enable better integration and use of technology, in particular, they demanded more spacious and better-lit classrooms, as previously discussed in Section 7.2.2.

Another reason perceived as an internal factor influencing teachers use of computers in the current study is related to *the support from the kindergarten headteacher*. Kindergarten management has an essential impact on the internal environment and in keeping a positive subjective norm. In the absence of a clear ICT policy in the Saudi EYE sector, as discussed in Chapter Two (section 2.5), teachers looked to headteachers to offer a supportive environment for the integration of ICT. If the headteacher does not offer sufficient encouragement and support to teachers, it is challenging to create an excellent working environment to motivate teachers to integrate ICT in classrooms. Also, the headteacher is considered as the main link between teachers and stakeholders in the educational authority.

In kindergartens KB and KC, teachers confirmed that their headteachers (BH and CH) gave them both material and moral support and motivated them to use ICT in their practices. In KA's case, teacher A1 experienced moral support from the headteacher AH, but the other teacher, A2, indicated that the headteacher did not support the use of computers, as she preferred the traditional methods of teaching, and the teacher saw this as a barrier to computer integration. This is consistent with what was extracted from the interview with headteacher AH, as discussed in section 7.3.1. She strongly

preferred to see her kindergarten teachers use the traditional methods rather than a computer in the classroom. Generally, her negative perceptions towards the use of computers in classroom practices seemed to have had influenced significant influence and shaped the teachers' responses in the interviews.

The lack of support from kindergarten management is found as an obstacle in similar studies (Nikleia & Despo, 2005; Fenty & Anderson, 2014; Liu & Pange, 2015; Nikolopoulou & Gialamas, 2015b). For example, Nikleia and Despo (2005) suggest that if the management did not support ICT integration, favouring instead a traditional early years setting without ICT, this becomes an important obstacle to ICT integration.

The headteacher of KA stated another internal environmental obstacle to computer use in her kindergarten, which is *the kindergarten location*. Through the researcher's visits, it was found that KA is situated in a rural area in the eastern region of Makkah, around 40 km from the city centre. It seems to the researcher that the location is not a serious problem to computer integration but it affects the amount of the budget allocated to the kindergarten by the ministry (as will be discussed later in 7.5.3) and this, in turn, could have a potential impact on the integration of ICT.

To summarise, this section has demonstrated that internal environmental conditions posed several challenges to computer use in the classroom. Classroom conditions, particularly the large numbers of children in each class, were perceived to make computer use difficult. Similar problems have been reported previously in Saudi contexts (Alfifi, 2012; Al Mulhim, 2014). Another unfavourable condition was said to be poor lighting in classrooms. Teachers were also deterred from using computers

where they perceived a lack of headteacher support, as did one teacher in KA, whose headteacher favoured traditional teaching methods. Other authors, including Nikleia and Despo (2005) suggest, similarly, that lack of management support was an obstacle to ICT integration. Lastly, it was found that kindergartens' location – specifically, rural location – is a factor influencing their budget, which can leave them with insufficient resources to invest in computer integration.

7.5.3 External environment factors

The kindergartens' participants (e.g. teachers and headteachers) revealed several external environment factors (system-level factors) that they believed had impeded the use of ICT in kindergarten classrooms. Besides, the director of MKD in MGDE provided further information about the major difficulties perceived by teachers and headteachers regarding the use of computer technology. The external factors (outside kindergartens) most commonly raised by kindergartens participants were: (1) ICT training courses, (2) ICT equipment and resources, (3) support from stakeholders, (4) kindergartens' budget, and (5) maintenance and technical support. Figure 7.3 shows these external factors that emerged from the data.

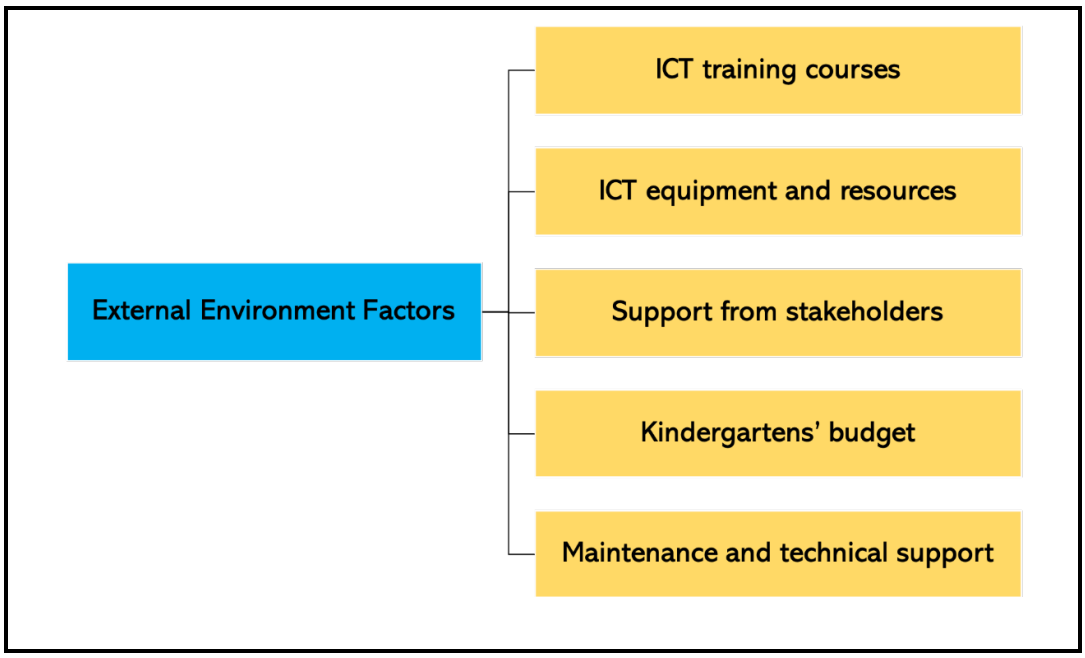

Figure 7-3: External (system level) factors influencing ICT use.

Training courses

Al Mulhim (2014) indicated that improving any educational system significantly depends upon teachers' training and professional development. On this subject, training is vital for teachers to develop proper knowledge, skills, and attitudes regarding the effective use of computers to support teaching and learning. This is supported by evidence from this study, as discussed earlier, which revealed that training is strongly related to teachers' knowledge and skills, confidence, and attitudes towards computer use. Although training is under the responsibility of the MoE, who require Makkah General Directorate of Education (MGDE) to perform any training courses and confirm those are applied in the city, the study findings revealed that there was a perceived lack of ICT training from the MGDE.

In the current study, one of the most interesting finding was that kindergartens' participants emphasised their dissatisfaction with the training provided by the MGDE

from different aspects. In terms of the training factor that influences teachers' ICT use in their classrooms, participants confirmed that lack of training is a major obstacle that faces them in their ICT use. They stressed the importance of training and made claims of a need to intensify the training courses to develop their basic skills in computers. These findings are consistent with those of relevant Saudi and other Arabic studies (Ihmeideh, 2009; Hammed, 2014; Alkhawaldeh et al., 2017; Alasimi, 2018) which indicated that shortage of ICT training opportunities for teachers was an obstacle to successful ICT integration.

In terms of courses on using ICT in the teaching and learning process, some teachers confirmed that they had not undertaken any training on the integration of computers in teaching, which contributed to their inability to use the computer in their pedagogical practice. They stated that the available training courses were scarce, focused on theoretical learning (not practical), and conducted by the personal efforts of the teachers. Also, headteachers reported that MGDE had failed to provide pedagogical training opportunities on computers for kindergarten teachers. These perspectives echo those noted in several Saudi studies both in EYE (Alshuwayer, 1999; Hammed, 2014) and general education (Barri, 2013; Albugami & Ahmed, 2015), which indicated that the educational authority has not committed to providing sufficient pedagogical training on ICT for teachers, even though it emphasizes the use of ICT in education. For the researcher, these pieces of evidence demonstrate the need for teachers to have training opportunities, both on the basic skills of ICT and on the pedagogical aspects. It seems some teachers do not feel they have the basic technical skills, let alone understanding of the pedagogical potential.

In terms of the time of training, some kindergarten participants indicated that a shortage of time was a major barrier to attend training courses. Teachers perceived that training could not be provided within working hours, because they did not have enough time and had too many other demands; thus, this led to rejecting all offers for training courses. One teacher stated that:

"They should conduct the training courses when we finish the academic semester, and then we have a month or two for the course during our holidays. I am ready to participate in such training courses". (B1)

The finding of classroom observations revealed that time constraints and a large number of children in the classroom resulted in high teachers workload, which left no time for them to attend training opportunities for acquiring ICT skills. According to the literature, several researchers emphasised that the lack of time found as a hindrance to access ICT training (Al Mulhim, 2014; Albugami & Ahmed, 2015). Similarly, Hammed (2014) reported that some participating practitioners, from both Saudi and Scottish contexts, were unable to attend training in ICT due to their workload, which left them with insufficient time.

Owing to participants' dissatisfaction with the provided training courses and the lack of training courses on the computer, the results indicated that some participants (A2, C1, and C2) had been on self-financed courses. This finding seems to be consistent with findings in a study conducted by Dong (2018b), who revealed that kindergarten teachers overcame the challenge of the lack of ICT training programmes through inquiry or independent learning. Hence, some teachers were ready to attend

commercial ICT training programmes and pay a fee for learning on their own, to meet their ICT needs.

It important to mention that in the interview with teacher A2, she stated that she had taken a two-month specific training course on computers financed from her own pocket. Nevertheless, from the findings of classroom observations (as discussed earlier in section 7.3.1), it appeared that teacher A2 was at an entry-level of ICT integration, and she seemed to be inexperienced with ICT. Also, preliminary findings of the study indicated that although this teacher had some positive perceptions, the negative impact of the internal environment on the use of ICT was influential in shaping her perceptions of computers and making her biased to hold these negative perceptions. This leads the researcher to suggest that, if this teacher had been in another learning environment more conducive to the use of ICT, she might have been more confident about holding more positive perceptions. Based on her attendance of self-financed courses, it seemed to the researcher that teacher A2 was potentially interested in and capable of ICT integration, but was in an unhelpful environment in a kindergarten that did not support the use of ICT, and her expertise was not being used appropriately.

Besides, one unanticipated finding was that headteacher HA, who had negative attitudes towards the use of ICT in the classroom (as discussed earlier in section 7.3.1), had taken seven training courses on computers, which were financed from her own pocket and taken on her personal initiative. This discrepancy between her training and attitudes could be attributed to resistance to change, which could be due to the lack of kindergarten infrastructure or it may be that the quality of the obtained training was poor and it did not focus on pedagogical applications of ICT. This explanation seems

to be consistent with the study conducted by Bingimlas (2009), who attributed teacher reluctance and resistance to change to using ICT to technophobia, school digital infrastructure, teacher competence, and access to ICT tools. However, some of the reasons given by Bingimlas do not apply to HA.

Based on the researcher's investigation of Saudi literature, this study appeared to be the first of its kind to be conducted in the EYE sector and included one of the directors of the kindergarten department in Saudi Arabia. In order to shed more light on the issue of training in EYE, the director of MKD in MGDE was interviewed to ascertain her perceptions on the previous responses of teachers and headteachers. She stated that training courses are mostly conducted in MGDE and sometimes at different locations in Makkah kindergartens. This point seems to explain the issue raised by teachers about the lack of time and workload that hinder the attendance of the courses. It seems to the researcher that it is difficult for teachers to move from their kindergartens to MGDE during the daily working hours, especially as some kindergartens (including KA) are about 40 km from the city centre. Furthermore, the director clarified that most of these courses are given by training specialists, and kindergarten supervisors or members provided the rest. Also, she said that about 400 trainee teachers benefited from these courses in 2017 and that MGDE had granted the trainees training certificates at the end. It seems that the number of trainees is less than half the number of teachers in Makkah (945 teachers). It also appears that providing support through awarding certificates is insufficient incentive for teachers to attend, unless these courses meet their training needs and are held at appropriate times, outside daily working hours.

Through discussion with the director, she classified training courses into ministerial courses, which are supervised directly by the ministry, represented in the MGDE, and compulsory for all members of the kindergarten, and initiative courses which are proposed and prepared by kindergarten members. As regards the current courses or programmes on the usage of ICT for teachers, the director responded that there was a programme called "The auditory story", from the idea and initiative of one headteacher. It recorded thirty stories through the training of fifteen teachers from five kindergartens on the sound effects programme in cooperation with Saudi TV. The researcher is inclined to conclude that the lack of ICT training courses provided by the MGDE is particularly problematic for kindergarten teachers, who turned to self-financed courses to enrich their knowledge and skills. Also, the involvement of teachers and headteachers in demonstrating 'best practice' and planning process for training is a significant step to improve the quality of training, unlike the 'top-down' MGDE courses in which the planning is determined externally.

Lack of ICT equipment and resources

The effective and successful use of ICT requires a sufficient ICT infrastructure in the learning environment (Plumb & Kautz, 2015). Thus, without sufficient ICT equipment and resources, there is little opportunity for teachers to incorporate technologies into their classroom practices. This was emphasised by the evidence from the current study, as the majority of teachers and headteachers confirmed that ICT insufficiency in kindergartens was a major hindrance when teachers sought to incorporate ICT into their work practices. These perspectives were particularly voiced by participants of KA and KB, whose establishments lacked ICT equipment and resources such as computers, projectors, projection screens, and the Internet. It is noteworthy that those

participants demanded a variety of additional ICT equipment and resources in their settings, as discussed earlier in section 7.2.2. Despite the findings yielded by participants of KA and KB, KC's participants expressed satisfaction with the ICT resources available at their kindergarten for teaching and learning, and therefore they did not see ICT availability as an obstacle.

Besides, teachers were adopting various strategies to compensate for this lack of provision from the ministry, as they were bringing their own ICT equipment and creating simple alternatives for ICT tools, such as improvising a projection screen from a piece of cloth, as teacher A2 had done. Since teachers were bringing their own ICT equipment, it is clear that there was little likelihood of their sharing it with other staff members. While KA's teachers complained about lack of equipment, teacher A2's enthusiasm led her to do something about it, as shown in the above example, but for teacher, A1, it seemed to be an excuse for not doing anything. Teacher A2's attempt to overcome some barriers to the integration and use of ICT in classroom practice supports the impression noted previously (in relation to her training participation) that in a more supportive environment. A2 might have been able to make more extensive and effective use of ICT; at KA, however, there seemed to be little scope or encouragement for her interest and skills in the area.

The issue of lack of ICT infrastructure seems to be frequently found and is reported in several studies (Al Mulhim, 2014; Albugami & Ahmed, 2015; Alkahtani, 2017; Aseri, 2018), which confirmed that the lack of ICT equipment and resources is one of the main obstacles in Saudi Arabian schools at different education stages. Similarly, Bingimlas (2009) reported that inaccessibility of ICT equipment and resources

remains a significant obstacle to the integration of ICT in education in both developed and developing countries. Regarding access to the Internet, this result is quite similar to results of Saudi studies (Oyaid, 2009; Al-Harbi, 2014; Alasimi, 2018) and international studies (Ihmeideh 2009, Nikolopoulou & Gialamas, 2015b; Fenty & Anderson 2014). For instance, Alasimi (2018) reported that lack of proper access to the Internet was the main obstacle perceived by Saudi kindergarten teachers toward the use of ICT in classrooms.

To obtain a close picture of the ICT equipment and resources factor in EYE, the director explained that MGDE provided most of the equipment and resources, the headteacher can purchase the required equipment from kindergarten funds, and also some teachers brought their equipment to the setting, which they bought from their own money. The director's perceptions gave the impression to the researcher that MGDE recognizes the problem of lack of ICT infrastructure and desires kindergarten members to contribute in overcoming this lack and take part of the responsibility.

Lack of support from stakeholders in MGDE

One of the roles of stakeholders towards ICT is to provide support to kindergartens in several aspects, including financial and technical support, provision of equipment, plans, strategies and motivation. The evidence revealed that some teachers felt that there was insufficient support from MGDE stakeholders, such as the director of MGDE, the director of MKD, and funding and equipment providers, to encourage them to integrate computers into EYE. For example, in the case of equipment, if there was support, it was given only after repeated demands. Moreover, the headteacher KA reported that those in charge had an insufficient understanding of kindergarten needs.

Notably, this headteacher complained about the lack of collaboration with stakeholders in meeting resource demands (as discussed earlier in 7.2.2). Through interviews, participant A2 raised the point that the education authority did not prefer too much use of computers with kindergarten children, and still use might be criticized by the educational supervisor during her visits. However, another participant in KB indicated that a teacher use of ICT is considered a credit to her by the educational supervisor. This difference of opinions might reflect the lack of a clear policy towards the use of ICT in the early childhood stage, and it requires reforms and development in existing policies of EYE.

For the researcher, it seemed that teachers received only verbal support and encouragement from the educational authority. Teachers need practical support by providing them time for training and reducing their workload, as well as starting evaluation of their progress with ICT.

Insufficient kindergarten budget

As well as the lack of support from stakeholders, the insufficiency of kindergartens' budget also seen as an obstacle that hindered the implementation of ICT in kindergartens. Evidence from interviews shows that headteacher AH, whose kindergarten lacked ICT equipment and resources, was concerned about the shortage of funding, which only covered the basic needs of the kindergarten for continuing the educational process and was inadequate to cover the high costs of purchasing some ICT equipment.

When asked for additional information about the funding issue, the director clarified the policy of distributing the budget to kindergartens from the ministry. She indicated that the proposed budget for each kindergarten was set according to some factors such as the kindergarten's age, number of pupils and classrooms, location (a rural area-village or urban area-city), and type of building (government-owned or rented). These criteria for budget allocation seemed to explain the headteacher's view about the shortage of kindergarten budget coming from the ministry, as KA is located in a rural area, was founded in 2014, and in a rented building and had only three classes with about 55 children. Thus, it was not large enough to qualify for a higher capitation allowance, and was not of an age to benefit from the more generous allocation given to new start-ups, or to older institutions.

Lack of maintenance and technical support

The provision of ICT resources without technical assistance makes these resources challenging to integrate successfully at the kindergarten level. The study findings indicated that headteachers complained about the absence of maintenance and technical assistance services in their establishments. They also showed that the lack of technical support was an issue discouraging teachers from using ICT in their classroom practices. This finding seems to be consistent with the study conducted in Saudi secondary schools by Albugami and Ahmed (2015), which stated that inadequate maintenance and the lack of technical support hinders teachers and has a direct influence on their confidence as a result of their constant fear of technical breakdowns. Similarly, Hammed (2014) conducted a study in an early years context, which revealed that about 57% of her sample of Saudi kindergarten teachers confirmed the lack of technical support and maintenance as a factor influencing their ICT

integration. In Hammed's study, this perception was expressed by 72% of teachers from public and 32% of teachers from private kindergartens. This suggests that Saudi public kindergartens may be more susceptible to the shortage of maintenance and technical support than private kindergartens, and such a view seems to be supported by this study, in which all the participating kindergartens were public.

Due to this issue of the lack of technical support, headteachers in the study expressed an imperative need for an ICT specialist or coordinator to be placed within the kindergarten to solve technical problems and failures. In general, the learning resources officer is the person to whom teachers can refer when they experience technical problems. She is responsible for preparing equipment, advising teachers on technical issues, diagnosing and solving basic problems, and informing the kindergarten management about complex problems and broken-down equipment. However, not all kindergartens have a learning resources officer, and even for those that do, complex problems cannot be fixed in the kindergarten; thus, technical support from the local education authority, MGDE, is needed. In this regard, headteachers claimed in this study that the MGDE was not always able to respond to kindergarten needs.

This is significant when considering that MGDE supervises 59 public kindergartens, as well as other public schools in other educational stages, throughout Makkah, and there is only one maintenance team available to address maintenance and technical issues in all of these schools. It seems to be difficult and time-consuming for this team to visit all of the schools under the authority of MGDE and to deal with repairs. Therefore, the best and most effective solution to maintain ICT resources may be

through the collaboration of kindergartens with partners from the private sector without the requirement of time-consuming bureaucratic procedures involved in MGDE. In this way, strong technical support would be available in each kindergarten, which would allow teachers to work with ICT without worrying about technical problems and failures.

To summarise, this section has shown that, in the perception of the research participants, their use of ICT in their teaching was impeded by several factors in the external environment. Lack of training is one of these. While the director of kindergarten department in MGDE mentioned the availability of both compulsory ministry-run courses and so-called "initiative" courses, teachers indicated a lack of training in basic computer skills and pedagogical use of computers. This echoed concerns expressed in previous Arabic studies (Ihmeideh, 2009; Hammed, 2014; Alkhawaldeh et al., 2017; Alasimi, 2018). One problem was a lack of time, as teachers' workload prevented their attending courses, consistent with findings by Al Mulhim (2014) and Albugami and Ahmed (2015). Some participants had tried to compensate for the lack of training from MGDE by attending self-financed courses, an example of what Dong (2018b) referred to as independent learning. However, the experience of A2 showed that training was not necessarily applied in the classroom, if other conditions were not conducive; her superior, AH, had also attended training, but appeared resistant to change.

Another obstacle to ICT integration was lack of equipment and resources, particularly in KA and KB, previous studies (Al Mulhim, 2014; Albugami & Ahmed, 2015; Alkahtani, 2017; Aseri, 2018) have reported similar problems in Saudi schools –

including lack of satisfactory internet access (Alasimi, 2018). Teachers were attempting to compensate for the shortage of resources by bringing equipment at their own expense – a solution of which the director interviewed was aware and which she even seemed to expect.

Indeed, lack of provision of needed resources was cited as evidence of a general problem of lack of support from stakeholders in MGDE – also shown in participants' perceptions of the lack of a clear policy on ICT use, resulting in confusion among teachers as whether such use would be viewed favourably, or criticized. Kindergarten participants also said that computer integration was hindered by an insufficient budget. Kindergarten funding is based on their age, size, location and building ownership status, so smaller rural kindergartens, like KA, were financially constrained.

Even if a kindergarten had equipment, teachers were hesitant to use it because of the lack of maintenance and technical support – a problem noted by Hammed (2014) and by Albugami and Ahmed (2015) in early years and secondary school contexts, respectively. Not every kindergarten has a learning resources officer to provide technical advices and support, and the MGDE support team is overstretched, leaving teachers to face delay in the event of equipment breakdown. The accumulated impact of all these external factors was place obstacles in the way of teachers' integration of ICT in their practices.

7.6 The relationships between teachers' characteristics and their perceptions and practices toward the use of computers

As mentioned in the literature review, teachers' perceptions and attitudes toward the use of computers are influenced by several factors such as teachers' background characteristics (age, specialisation, educational qualification, and working experience) and training (Blackwell et al., 2014; Dong, 2014; Alenezi, 2018). In this section, the relationship between the teachers' characteristics and their perceptions and practices toward the use of computers in the kindergarten environment is examined. The data of teachers' background characteristics and training were collected by interviews with kindergarten teachers and headteachers, as described in Chapter 6 (section 6.2) and Chapter 7 (section 7.5.3).

The evidence from this study revealed that teaching experience and training have a substantial impact on the positive trend towards the introduction of computers in kindergartens. The most interesting finding was that the older teachers, C1 and C2, with more teaching experience (more than 11 years) held positive attitudes towards the integration of ICT, and they tended to use ICT frequently in their teaching practices. A possible explanation for this finding might be that long experienced teachers may have more confidence and knowledge about the educational value of computers in the early childhood classroom, and be aware of the benefits of diversity in teaching strategies in their practice. It may also be (as Ertmer et al., 2006–2007 found) that more experienced teachers have greater self confidence that if 'things go wrong' they will be able to retain control. However, this finding is inconsistent with what was found in Dong's study (2014), which showed that older teachers with longer working

years held less positive perceptions about the use of ICT in Chinese preschools. They also still relied on traditional methods in their classrooms.

Furthermore, other teachers, who had a maximum of seven years of teaching experience, had varied views towards using the computer in early years environments. KA's teachers showed some negative perceptions of the use of computers in their kindergarten, while KB's teachers were already well informed of some ICT advantages, but they did not fully apply ICT for teaching. This could be due to those with less teaching experience not having a solid foundational knowledge of EYE practices, and being less confident as practitioners, which made it difficult for them to incorporate new teaching procedures such as ICT effectively, even if they had positive attitudes towards them.

In terms of the relationship between headteachers' working experience and their perceptions toward the use of computers, the evidence from the study findings also revealed that headteachers BH and CH, who had more than 16 years working experience in EYE (including about four years in administration), appeared to adopt positive perceptions about ICT usage for classroom practice. They also encouraged their kindergarten' teachers to integrate and utilize ICT in their practices. This may be because they were convinced of the diverse environment of teaching strategies and believed that the use of technology is an essential part of the educational process. In contrast, headteacher AH, who had six years of working experience (including one year in administration), held negative attitudes towards ICT, and she favoured a traditional early years setting, without ICT.

Regarding the impact of teacher training on their perceptions and practices, teachers C1 and C2, who had attended ICT training courses, tended to use ICT more often in their classrooms. Attendance of training, however, did not guarantee computer use, as shown by the case of A2, cited earlier in section 7.5.3 (p. 291). Although teacher A2 had received training in ICT, she held hesitant perceptions towards the use of ICT and did not employ ICT use in her practices. This suggests that other factors in the KA environment conflicted with the benefits of training and denied A2 the opportunity to put her training into practice. In addition, the results of this study did not show that any relationships between teachers' specialisation and educational qualification and their perceptions and practices, as all teachers and headteachers held a bachelor degree in Kindergarten education.

In summary, the evidence revealed that factors of teaching experience and training have a substantial impact on the positive trend towards the introduction of computers in kindergartens. Headteachers and teachers with longer working experience held positive attitudes towards the integrating of ICT, and they tended to support or use ICT frequently in their teaching practices. Furthermore, trained teachers seemed to use ICT more often in their classrooms, but only if the environment was conducive in other respects. Notably, the findings of this study did not show any relationships between participants' specialisation and qualifications and their perceptions and educational practices.

7.7 UTAUT as a theoretical framework

It was explained previously (section 3.3.3) that several models have been developed in an attempt to explain the acceptance and use of technology and the UTAUT model (Figure 7.4), which incorporates insights from several previous models, was selected as particularly relevant to this study. In this section, therefore, the constructs of the model are revisited, and the findings mapped to them. In order to facilitate understanding of the ways in which the Saudi EYE context may promote or inhibit acceptance and use of ICT in the classroom.

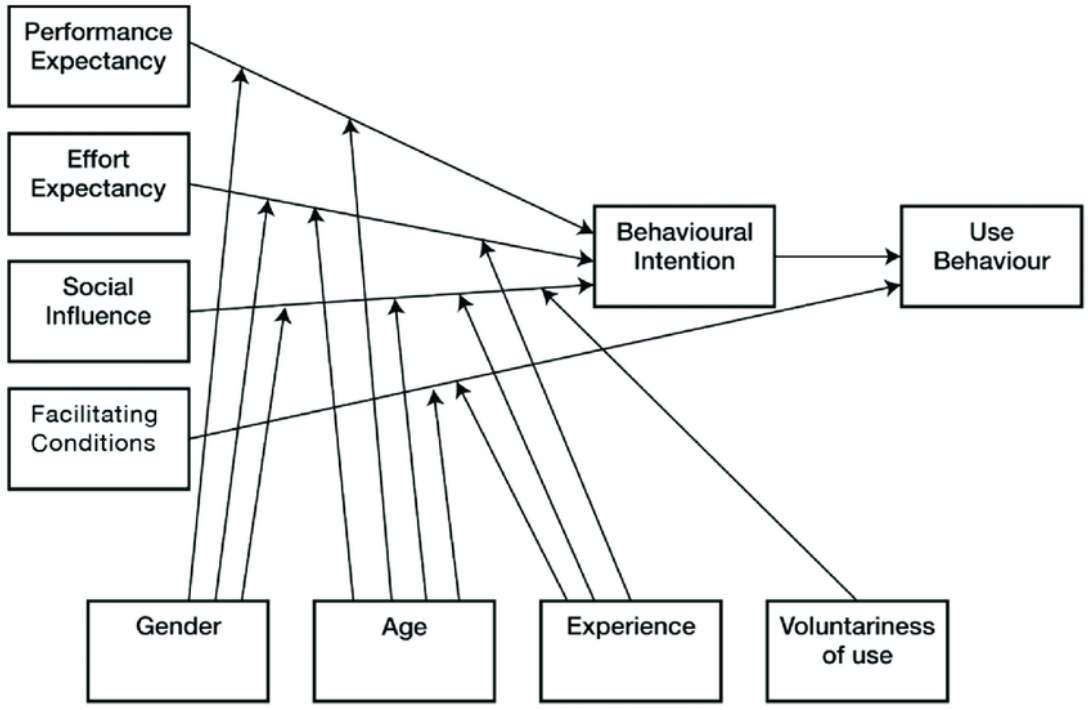

Figure 7-4: Unified theory of acceptance and use of technology (UTAUT) model as introduced by Venkatesh et al. (2003).

Performance Expectancy

Venkatesh et al. (2003:447) defined performance expectancy as "the degree to which an individual believes that using the system will help him or her to attain gains in job

performance". Teachers and headteachers were asked about the advantages of using computer technology in the teaching and learning processes and whether they thought this technology played a part in promoting the work performance in the classrooms. Evidence from this study presented, earlier, showed that kindergarten participants believed that computers were useful and expected that access to computers would improve their work performance, and benefit children's learning (see Figure 7.5, below, which displays the benefits attributed to computers by the interviewees). These positive perceptions of performance expectancy encouraged a positive intention to use computers in their classrooms.

Performance Expectancy
Enhancing the child's intelligence.
Keeping children up to date with technology.
Improving pronunciation and developing thinking skills.
Capturing children's attention.
Improving literacy and numeracy skills.
Providing much information and valuable knowledge to facilitate learning.
Conveying information to children faster than traditional methods.
Changing the daily routine.
Preventing boredom and stagnation in learning environments.
Motivational, attractive, and helpful tools.
Save time and effort compared to other educational tools.
Conveying scientific concepts.
Simplifying complex topics.
Providing health education and warning against certain negative social phenomena.

Figure 7-5: Performance Expectancy: teachers' perceptions of the potential advantages of using computers in the classroom.

Effort Expectancy

Effort expectancy is defined as "the degree of ease associated with the use of the system" (Venkatesh et al., 2003:450). Previous results in this study showed that there were factors that made it difficult for teachers to apply ICT into their practice. Teachers' perceptions in this respect can be seen in Figure 7.6, below. It can be seen that all the perceptions expressed were negative; teachers thought that they lacked the knowledge, time, support and guidance to use computers easily. These factors, if unaddressed, would have a deterrent effect against the acceptance and use of computer in Saudi EYE settings.

Effort Expectancy
Lack of computer knowledge and skills.
Lack of time and heavy workload.
Lack of maintenance and technical support.
Lack of training courses.
Classroom conditions (number of children and classroom size).
Failure of curriculum and policy to provide clear guidance on integration of ICT into EYE.

Figure 7-6: Effort expectancy.

Social Influence

Social influence is defined as "the degree to which an individual perceives that important others believe he or she should use the new system" (Venkatesh et al., 2003:451). The results in this study revealed that there are influences from the

surrounding environment that encourage or constrain teachers' use of computer technology in kindergartens (see Figure 7.7, below). Whereas the attitudes of some important stakeholders (such as MGDE) were supportive to computer use, others were less encouraging. If the surrounding environment is ICT-oriented, teachers are very likely to be interested in using ICT in the classroom, whereas negative attitudes from influential others will discourage them. For example, this was obvious in KA, where the headteacher's negative perceptions about ICT influenced significantly and shaped the teachers' perceptions and attitudes. Teachers in different settings were exposed to different social influences, which encouraged or discouraged their computer use.

Social Influence
Kindergarten headteacher.
Educational supervisor.
Stakeholders in MGDE.

Figure 7-7: Social influence.

Facilitating conditions

Facilitating conditions are defined as "the degree to which an individual believes that an organisational and technical infrastructure exists to support use of the system" (Venkatesh et al., 2003:453). The results of the study found that facilitating conditions is an influential factor in the actual use of ICT in participating kindergartens. Of the six factors listed in Figure 7.8, four were negative perceptions (lack of equipment, suitable software and technical support, and no or slow/weak internet connection) and while satisfaction was expressed in two settings (KB and KC) this was not a universal

perception. The willingness of teachers to use their own resources can be seen as a positive factor, but not all teachers would have the resources to do this, however willing they may be. This reveals that a necessary condition for using ICT in kindergarten classrooms is the provision of equipment and resources. Nevertheless, it has become evident that equipping institutions with ICT resources alone will not be a sufficient condition for use unless there is a clear ICT policy and also training for teachers to use these resources (as found under Effort Expectancy), in addition to adequate technical support and maintenance of the equipment and encouragement from the surrounding environment. This factor has turned out to be linked to the kindergarten location. For instance, this study shows that government kindergarten buildings (KB and KC) in urban areas are better equipped than the rented kindergarten building (KA) in Makkah rural area. Availability of facilitating conditions, in some areas, is insufficient to encourage acceptance and use of technology, and careful planning and investment will be needed to overcome this obstacle.

Facilitating conditions
Lack of ICT equipment and resources.
Use of own equipment.
Satisfaction with the ICT resources.
No Internet.
Lack of educational software programs.
Lack of maintenance and technical support.

Figure 7-8: Facilitating conditions.

As can be seen from the above discussion, using the UTAUT enabled a detailed and systematic analysis of factors in the Saudi EYE environment that facilitate or impact

the acceptance and use of ICT in the classroom. The model provides a list of factors which have been claimed theoretically to be salient in technology adoption, and their importance has been supported empirically (Ifenthaler & Schweinbenz, 2013; Blackwell et al., 2013). The model thus provided a benchmark against which the evidence from the Saudi context could be mapped, and omissions or deficiencies in these important factors identified. The findings showed that the factors proposed in the model are, indeed, salient in the Saudi case.

Looking at the findings from the perspective of UTAUT, it was concluded that teachers generally showed favourable performance expectancy towards ICT, both in terms of improving children's learning and facilitating their own role. However, the positive impact that might be expected from these perceptions was countered by perceptions of the practical difficulties of using technology, especially in the absence of knowledge, training, and policy guidance (effort expectancy). There were also perceptions of a lack of support for ICT use from important others, such as the headteacher, educational supervisor, and stakeholders from MGDE (social support). Other problems were related to an unconducive environment in which various necessary conditions, such as equipment, software, and a good reliable internet connection, were absent. The results suggested that effort expectancy was the most significant factor in teachers' behavioural intention regards ICT integration. Many kindergarten participants need to have training that would enrich their technical and pedagogical skills in using ICT. Teachers' negative evaluation of these factors made it more difficult for them to form a positive behavioural intention towards ICT integration and, hence, less likely that they would use ICT in their teaching practices. Whilst the small sample and qualitative approach of this study do not allow

generalization, using the model guided the researcher to the identification of significant issues that seem to be working against the acceptance and use of ICT in the Saudi EYE settings observed, and the insights gained are used to inform the recommendations made in the next chapter.

7.8 Summary

This chapter has presented a discussion of the research findings in relation to the questions set out in Chapter One, and in the light of relevant literature. In addition, teachers' ICT usage was explored in relation to their personal and professional characteristics (age, qualification, work experience and specialist subject), and further analysed from the perspective of the UTAUT model.

In addressing SRQ1, concerning resource availability and use, attention was drawn to differences in resourcing, between the kindergartens, with deficiencies to some extent compensated by teachers' provision of their own resources, and community donations. The tools most commonly used were computers; even when other tools were available in the library, teachers were reluctant to use them, suggested reasons including practical difficulties and lack of training. Regarding SRQ2, teachers, especially in KA, expressed a need for better ICT infrastructure, appropriate educational software programs, a more conducive physical environment (specifically in KA) and a curriculum with clear provisions and guidelines for ICT in teaching. Despite these difficulties, teachers generally had optimistic views about potential development in EYE computer integration (SRQ3), with the likelihood of policy and curriculum changes.

Regarding SRQ4, teachers, especially in KB and KC, had generally positive views towards the impact of computers on various aspects of children's learning, including literacy and numeracy, creativity and thinking skills. However, some participants in KA, favouring traditional teaching, expressed concerns that computers did not provide a full range of sensory experience, and might impact children's memory skills. Other concerns were that over-use of computers might cause physical harm, and that it would constrain children's social interaction. Such concerns, it was suggested, might be used as excuses for not using computers, to mask teachers' negative attitudes and beliefs, and lack of confidence.

Investigation related to SQR5, concerning how teachers used computers, revealed that teachers adopted predominantly teacher-centred approaches, with computers used more for presentation than as learning tools, and little or opportunity for children to use them. In terms of the ACOT (1995) model, most teachers' computer use was at entry, or at best, adoption level. Only one teacher approached adaptation. Teachers claimed that decisions on computer use were influenced by perceptions of children's needs, and age-appropriateness; with younger children, they felt the focus should be more on physical activity.

Addressing SRQ6, obstacles to teachers' use of ICT were classified into three categories. The first, teacher personality factors, included teachers' inadequate knowledge and skills (both technical and pedagogical) related to ICT use, a consequent lack of confidence, the negative attitudes of some teachers and in a few cases, traditional beliefs about education, whereby ICT was not seen as beneficial, and even threatening. The second category concerned factors of the internal environment: classroom conditions (number of children and poor lighting), insufficient support from

the headteacher, and kindergarten location (rural kindergartens receiving a lower budget and having fewer resources). The third, external environment factors included lack of ICT courses (or difficulty in attending them, due to workload), insufficient equipment and resources, perceived lack of support from stakeholders (reflected, for example, in lack of a clear policy on ICT integration), inadequate budget, and lack of maintenance and technical support.

In terms of teachers' background, teaching experience seemed to have an influence on teachers' attitudes and ICT usage, those with longer experience seemingly having more positive attitudes and making more use of ICT. Training on ICT also seemed to encourage more ICT use, but this was not a consistent pattern (A2, despite several training courses, was still hesitant and made little use of ICT) suggesting that other factors also come into play. No impact was found for teachers' specialisation and qualifications, since all the teachers were similar in these respects.

The findings were analysed using UTAUT, as a benchmark to guide a target focus on factors that theory and previous research are important in influencing the acceptance and use of technology. It was concluded that teachers generally showed favourable performance expectancy towards ICT, expecting it to improve children's learning and to facilitate their own role. A positive impact might be expected from these perceptions. In other respects, however, teachers' perceptions suggested that the environment was less favourable to their using technology in the classroom. They foresaw practical difficulties of using technology (effort expectancy), perceived a lack of support for ICT use from important others, such as the headteacher, educational supervisor, and stakeholders from MGDE (social support), and perceived an unconducive environment in which various important facilitating conditions were

absent. As a result, it was difficult for teachers to form a positive behavioural intention towards ICT integration and, hence, they were less likely to use ICT in their teaching practices. Thus, with the guidance of the UTAUT model, important limitations in the EYE environment were highlighted, which would need to be addressed if ICT use in Saudi EYE is to be encouraged. The resulting insights are used to inform recommendations in the next chapter.

Chapter 8
Conclusions and Implications

Chapter outline

Chapter 8 Conclusions and Implications

8.1 Introduction

Following from the discussion in Chapter Seven, this chapter highlights the conclusion of the research, it begins with a summary of the findings in relation to the six sub-research questions, leading to addressing of the main question. This is followed by discussions of the research limitations and its implications, including recommendations for measures to improve the environment for ICT use in Saudi EYE settings. Suggestions are also made for further research. Following a brief summary, the chapter concludes with some reflections on the research journey.

8.2 Summary of the research and main findings

As outlined in the Introduction of the thesis, the main research question [MRQ] which underpins this empirical research is: '*What are the perceptions and pedagogical beliefs of kindergarten teachers towards using computer technology in classrooms?*' Before answering the MRQ, the key findings are now presented for each of the six sub-research questions [SRQs] below.

The first sub-research question (SRQ1) of the research focused on finding out - ***What ICT resources are available in the kindergarten classroom****?* This sub-research question considers the availability and the actual use of ICT resources in three Makkah kindergartens (KA, KB and KC) and delineates the extent of teachers' use of ICT in their classroom practices. The findings show that there is a substantial variation across the three kindergartens in terms of availability of ICT resources. These resources were

almost non-existent in the KA classrooms, KB had some basic ICT resources, while KC had a rich ICT infrastructure. KC's teachers were seen to use these resources more often than teachers in other settings. This resource difference seemed to be due to some considerations such as the kindergarten's location (urban or rural), needs, budget, and type of kindergarten building (governmental or rented). Although teachers in this study showed enthusiasm toward ICT, which led them to bring their own equipment, such as laptop, projector, speakers and a tape recorder, into their practices, their use of ICT technologies in kindergarten classrooms was limited, largely confined to using the computer as a as presentation tool.

This study has shown that there is a positive involvement of parents in developing the ICT infrastructure in the KC. This may be a sign of parents' awareness about the benefits of ICTs and contribution to the development of the EYE setting. The results suggest that in general teachers tended to employ a narrow range of available ICT resources in the classroom. Besides, the findings of the study revealed that teachers were reluctant to utilise the library ICT resources, such as interactive whiteboards, video players, telephones and sound recorders. This research has shown that a series of issues lie behind the non-use or poor integration of ICT into Saudi kindergarten practices, such as lack of ICT infrastructure, teachers' pedagogical beliefs, teachers' lack of knowledge, skills, and confidence, and lack of training. Through investigating the current state and the use of ICT resources in the participating kindergartens, the researcher gained insights into the *necessary and sufficient* conditions to improve ICT resourcing in the educational environment, which are highlighted later in the chapter.

The second sub-research question (SRQ2) of the research focused on finding out - ***What are kindergarten teachers' perceptions regarding the needs for better ICT resources in the classroom?*** This sub-research question considers the perceptions of teachers and headteachers about the needs for improving the current use of ICT and supporting ICT integration ICT in the EYE. The provision of ICT infrastructure is the necessary strategic step for effective and successful incorporation of ICT in kindergartens. Due to the lack of ICT resources observed in KA and KB, kindergarten participants (i.e. teachers and headteachers) expressed the need for a variety of additional ICT equipment in the two settings. However, some teachers employed various strategies to compensate for lack of provision by the Ministry of Education. Moreover, a few participants pointed out the need for appropriate programs for teachers and young children, particularly in the Arabic language. As a result of the small classrooms and the rented building of KA, KA's participants only emphasised the need to improve the physical classroom environment to be more conducive to the integration and use of ICT, as they demanded more spacious and better-lit classrooms. Due to the lack of a national EYE curriculum that mentions ICT integration, some kindergarten participants stressed the need for a curriculum with explicit provisions and guidelines for ICT in teaching.

The third sub-research question (SRQ3) of the research focused on finding out - ***What are kindergarten teachers' perceptions regarding the future of computers in the classroom?*** This sub-research question considers the perceptions of kindergarten participants regarding the likelihood of future changes in ICT in the EYE. This study has found that generally kindergarten participants had a promising and positive view of the future of the computer in the EYE. They expected that the kindergarten learning

environment would be well-equipped with computers and Internet connection. They anticipated that the MoE would obligate kindergarten teachers to use the computer in their teaching practices. They expected that a radical change in the policy and curriculum would be issued towards the integration of ICT. These expectations are in line with the new directions for the development of the education sector under Vision 2030 in different aspects such as improving the educational environment, changing the dominant traditional teaching methods, and developing modern education curricula.

The fourth sub-research question (SRQ4) of the research focused on finding out - ***What are the positive and negative impacts of using the computer in the classroom?*** This sub-research question considers the perceptions of kindergarten participants about the potential impact of using the computer with kindergarten children, from different aspects such as learning, health, psychological, and social. This study revealed that the participants, especially in KB and KC, held positive attitudes towards the integration and use of computers in early years environments. They believed that the use of computers in teaching has many benefits for kindergarten children's learning, such as improving pronunciation and developing thinking skills, capturing children's attention, and improving literacy and numeracy skills. Also, the study has shown that some participants, from cases KB and KC, believed that using computers enriches the learning experience by providing much information, changing the daily routine, and preventing boredom and stagnation in learning environments. However, other participants in KA, favouring traditional teaching, expressed concerns that computers did not provide a full range of sensory experience, and might impact children's memory skills. Other concerns were that over-use of computers might cause

physical harm, and that it would constrain children's social interaction. The results of this study show these suggested concerns might be used as excuses for not using computers, to mask teachers' negative attitudes and beliefs, and lack of confidence.

The fifth sub-research question (SRQ5) of the research focused on finding out - ***How do kindergarten teachers use the computer in the classroom?*** This sub-research question considers the perceptions of teachers about their approaches to using computers and considerations taken when planning computer use. The findings of this study provided evidence that teachers used computers for a variety of purposes and in different subject areas. For example, they used computers for displaying stories, videos, pictures and rhymes, providing practice in literacy and behaviours, conveying scientific concepts, simplifying complex topics, and raising awareness. This study revealed that that teachers adopted predominantly teacher-centred approaches, with computers used more for presentation than as learning tools, with little opportunity for children to use them. The evidence showed that during teacher-led computer activities, teachers ensured children's engagement and learning through question and answer, encouraging participation, and involving the family in research projects. However, sometimes the interaction of children with these activities might be of limited duration due to the type of content presented and children's boredom if the period of activity was too long. Teachers claimed that decisions on computer use were influenced by perceptions of children's needs, and age-appropriateness; with younger children, they felt the focus should be more on physical activity.

The sixth sub-research question (SRQ6) of the research focused on finding out - ***What are the opportunities and difficulties reported by kindergarten teachers in using***

computer technology in classrooms? This sub-research question considers the perceptions of kindergarten participants about obstacles that hinder the integration and use of computers in kindergartens. Besides, the director of MKD in MGDE provided further information regarding the difficulties perceived in using computer technology. The findings on the obstacles faced by kindergarten teachers in using the computer were classified into three categories. The first, teacher personality factors, included teachers' perceived inadequate knowledge and skills (both technical and pedagogical) related to ICT use, a consequent lack of confidence, the negative attitudes of some teachers and in a few cases, traditional beliefs about education, whereby ICT was seen as not beneficial, and even threatening. The second, internal environment factors included classroom conditions (number of children and poor lighting), insufficient support from the headteacher, and kindergarten location (rural kindergartens receiving a lower budget and having fewer resources). The third, external environment factors included lack of ICT courses, lack of time and workload, insufficient equipment and resources, perceived lack of support from stakeholders, lack of a clear policy on ICT integration, inadequate budget, and lack of maintenance and technical support.

Based on the above evidence from participating kindergartens and the interview with the director of MKD, the following paragraphs address the main research question more broadly.

The findings of this study demonstrated that the perceptions and pedagogical beliefs of kindergarten participants towards the use of computers in classroom practices were not consistently positive. In KA, which is located in a rural area in Makkah, the participants were reluctant to integrate ICT into their practices and believed in the old-

fashioned method of education. The negative perceptions of KA's headteacher towards the use of computers in classroom practices seem to have significantly influenced and shaped the teachers' responses in the interviews. She strongly preferred to see her kindergarten teachers use the traditional methods rather than a computer in the classroom.

Although some of KA's participants (A2 and HA) had been on self-financed courses on computers, they were very uncertain about the potential benefits of the computer in children's learning. They also expressed perceptions about the failure of ICT to engage all children's senses, and possible detrimental impact on memory skills, compared with traditional teaching methods. This leads to the conclusion that the quality of the obtained training was poor and did not focus on pedagogical applications. Sometimes, teachers tended to use some obstacles to using the computer (for example, kindergarten location, lack of ICT resources, and lack of sufficient support from the ministry) as a useful excuse to hide their negative perceptions and low confidence towards the computer.

In other participating kindergartens (KB and KC), participants held positive perceptions towards the integration and use of computers in early years environments. They believed that the use of computers in teaching has many benefits for kindergarten children's learning and that it enriches the learning experience by providing much information, changing the daily routine, and preventing boredom and stagnation in learning environments.

To place these findings in a wider context, it has been found that the findings of the study regarding the perceptions of teachers towards the use of computers are inconsistent (in the case of KA) and consistent (in the cases of KB and KC) with the relevant studies in the literature. There have been several studies reporting teachers' positive perceptions towards the importance of ICT integration in kindergarten classrooms and the value of ICT for learning (Ihmeideh, 2010; Hammed, 2014; Masoumi, 2015; Nikolopoulou and Gialamas, 2015a; Dong, 2016; Alkhawaldeh et al., 2017; Kara & Cagiltay, 2017). The explanation of the inconsistency of the findings obtained from KA with the literature may be attributed to the influence of the internal (e.g. HA) and external environments, which were in many ways not conducive to the use of ICT in practices. In other words, some teachers' perceptions of computer use in EYE were moderated by their perceptions that computer use would be difficult or infeasible due to lack of knowledge, time, resources, social and technical support and the like. Previous studies neglected participants from suburban and rural areas, while the current study included such participants, as in the case of KA, where ICT resources were not available, and funding issues constrained ICT integration. Thus, it seems that teachers' perceptions towards ICT use in EYE were complex and reflected an array of interacting and conflicting factors, some of which supported, and others constrained the propensity to use ICT in the classroom. Teachers' confidence was an important factor, with older and more experienced teachers generally expressing more positive views and more computer use than others. This contradicts Dong's study (2014), which found less favourable attitudes and use of ICT among older teachers.

Reflection on the theoretical framework

Systematic, targeted investigation of specific factors suggested by theory and previous

research to influence acceptance and use of technology was guided by use of the UTAUT model as a theoretical model. By investigating teachers' perceptions of the EYE environment for computer use, it was possible to identify not only positive expectations towards the expected usefulness of computers, which would encourage their use, but also constraining factors that would need to be addressed if government plans to develop EYE (which include use of ICT) are to succeed. The factors, effort expectancy, social norms and facilitating conditions were all shown to be salient in the Saudi context, and were perceived negatively, making it difficult for teachers to form positive behavioural intentions towards ICT and, in turn, to actually use it. These insights inform the recommendations in section 8.4. First, however, it is important to acknowledge the limitations of this work.

8.3 Limitations

Like any research project, this work has a number of limitations that should be highlighted. The current research used case studies and involved only ten participants (six teachers and three headteachers) from three kindergartens, as well as the director of MKD in MGDE. Consequently, the population size of this research was relatively small, and the findings of this research may not be generalizable to the wider population in Makkah, or beyond; it is unlikely to be representative of all the kindergartens in general Saudi Arabia, or even in Makkah. Results of the research will only show the perceptions and attitudes of those kindergarten teachers who were involved in this research. However, the current study helped to explore a phenomenon that has not previously been carefully examined in Saudi literature.

The research was geographically limited to three Saudi kindergartens in Makkah City and conducted by a postgraduate student residing in the UK, who had limited time and Arabic resources (such as theses and articles), compared to those that a full-time researcher residing in Saudi Arabia might enjoy. The methods of collecting data in this research were interviews and observations. If there had been time and resources available to extend the research to more public and private kindergartens in Makkah or other cities, it might have been possible to gain deeper information to expand the current findings. Nevertheless, given the limited time and resources available for the research, it was important to choose only Makkah. This is the researcher's hometown and her knowledge of the city easily assisted the communication with stakeholders and the identification of locations of kindergartens. This was considered preferable to drawing a sample from kindergartens in other cities, which would have required a lot more travel and involved higher cost in terms of money and time.

The overall time allocated for data collection in the fieldwork was three months. The method of collecting data from the research participants started with preliminary observations of settings and ICT-based activities, then face-to-face interviewing with kindergarten participants, followed by second observations of ICT-based activities, and finally interviewing the director of MKD. Each teacher was observed four times in total. The first visits to teachers were made before conducting the interviews with them (which took approximately takes about 40 minutes for each teacher), while the second visits occurred after teachers' interviews. On the first visit, the researcher conducted the first and second observations, while on the second visit, the third and fourth observations were made. Due to the lack of time and participants' commitments, the researcher could not conduct a second interview with the teachers, which could

have provided more information that would lead to better results.

Another restriction was language in the study context, as the first language of participants was Arabic. Thus, the researcher had to translate the interview transcripts from Arabic into English during the process of data collection, and the translation took notable time and effort. Although every effort was to ensure accuracy translating the data, the researcher recognises that misinterpretations or biases are possible.

At the beginning of some of the interviews, it appears that the participating teachers were reluctant in their responses and worried about showing their opinions in public or that data may be used against them, especially by the headteacher. The researcher's role was to reassure them from the beginning of each interview and to explain the ethical procedures of the study that would be followed, along with assuring them of the confidentiality of study and that the data would only be used for study and academic research purposes.

Despite the limitations mentioned above, this research was pioneering and valuable to the discussion of integrating ICT in kindergartens, especially in the Kingdom of Saudi Arabia. The implications resulting from the findings of the study are discussed in the following section.

8.4 Contributions

8.4.1 Originality

In general, there is a paucity of literature dealing with the integration and use of ICT in teaching and learning process from the perspectives of kindergarten teachers; and particularly so in Saudi Arabia. Arguably the most important contribution of the current study is obtained from its originality. This study is a unique case study to explore the perceptions and attitudes of educators toward the use of computers in Saudi EYE practices. This is the first study that draws attention to the actual use of ICT resources at three contrasting kindergartens in Makkah, with the potential impact of using ICT, and the nature of the challenges facing the integration of ICT from three sets of perspectives, those of teachers, headteachers and the director of MKD in MGDE. This study explored kindergarten participants' needs for better ICT resourcing and their expectations for the future of ICT in the Kingdom. Furthermore, the current study is especially timely since it coincided with the launch of the Kingdom's ambitious Vision 2030, which declared plans and strategies for the education sector, such as expansion of early childhood schools, enriching settings with modern infrastructure including technology, creating opportunities for teacher training, and developing curricula and teaching methods. Thus, this is an important and timely study with the potential to inform policy and practice with insights providing additional evidence to the national and international literature. Little data is available about the use of ICT in Saudi Arabian kindergarten practices, or about more general global issues related to ICT integration. Taking into account the motivation and the results of this research project, it is hoped that the current study has made a contribution to filling notable gaps and to enriching knowledge in the area.

8.4.2 Contributions of the study to the literature

The present study makes several noteworthy contributions to existing knowledge in the current literature in different aspects:

In terms of substantive knowledge, this study has provided a clearer picture of the perceptions and actual use of ICT resources in the participating kindergartens and highlighted the role played by teachers' characteristics, training, kindergarten environment, and kindergarten's needs and budget. It is important to have a clear understanding of what is occurring in kindergartens and shed light on the obstacles encountering the introduction of ICT into Saudi EYE, in order for the MoE to successfully support the integration of ICT.

As many relevant studies in the literature neglected the perceptions of other EYE practitioners, such as headteachers and stakeholders at the local education authority, this study contributes in filling these gaps by interviewing headteachers and the director of MKD to provide further understanding and richer insights about the use of ICT in kindergarten settings. It can be said that, according to the researcher's knowledge, no research exploring the perceptions of EYE practitioners (teachers, headteachers and stakeholders) together, as regards the use of ICT in educational practices, has been undertaken in KSA, or the Arab world. Another significant contribution of this study is that it has included kindergarten participants who work in a rural area in a non-Western country, in contrast to the urban, Western contexts that dominate much extant research. This is significant, as the findings of this study showed that they have different perceptions, based on their traditional beliefs, cultural factors and the environments that surround them.

In terms of methodology, the study used a comparative and exploratory case study, which employed semi-structured interviews augmented by non-participant semi-structured observation, to examine the phenomenon studied. This was to obtain rich data that provides in-depth understanding about teachers' perceptions, pedagogical practices and experience related to using computer technology in teaching. Given that the results of the study provide a comprehensive image of the current use of ICT in the three Makkah kindergartens, it generates a foundation for researchers in Saudi EYE to more comprehensively investigate factors that are facing ICT integration in the Kingdom. Besides, this research opens new avenues for future research in this area, either in other Saudi educational stages or in other countries around the world, especially in developing countries, which face similar challenges. The study provided a detailed picture of the current ICT practices for those in MoE, such as stakeholders, decision-makers, and funding providers, informing guidance on how they might facilitate and support ICT integration towards improving the educational environment in the EYE. Hence, in particular, this study is in line with one of the objectives of KSA's Vision 2030, which plans to provide an encouraging educational environment for the children's growth and learning.

As a theoretical contribution, this is the only study to date in KSA that has employed UTAUT as a theoretical model of acceptance and use of technology in EYE settings, and thereby contributes to validate the use of the model in such a context. The model has helped in identifying factors that facilitate or hinder ICT integration in kindergartens. This model can be valuable to use in local and international contexts; it may assist stakeholders in developing approaches to integrate ICT successfully.

The next section offers recommendations that could lead to the effective integration of ICT in teaching and learning process in EYE practices.

8.5 Potential implications for ICT in EYE

The findings of the current study have a variety of significant implications which could improve the use of ICT in teaching and learning process in Saudi EYE classrooms. These implications can be classified into three categories, the first of which addresses recommendations to the kindergarten level, including teachers and headteachers, the second is directed to the government level and, lastly, the third is for training and professional development.

8.5.1 Recommendations for the kindergarten level

Recommendations for Teachers:

As noted in Chapter Three (section 3.4.1), the teacher is the most influential factor in the learning environment and plays a vital role in promoting, facilitating or constraining the integration of ICT into EYE. Moreover, computer use is not likely to be effective unless teachers have appropriate pedagogical knowledge and skills (Fullan, 2013). The findings of this study demonstrated (sections 7.2.1 and 7.3) that the attitudinal picture towards the use of computers in classroom practices was not consistently positive, and teachers' use of ICT in teaching practices was still limited. Moreover, they lacked confidence in computer use and seemed to have little pedagogical knowledge about how to achieve the potential benefits of ICT with their

pupils. To overcome these difficulties, the following measures are necessary, although not in themselves sufficient.

Teachers should be conversant with the merits of diversity in teaching strategies and make efforts to find effective ways to integrate technology in the classroom. This can be achieved by exchanging expertise with other practitioners, peer observation or attending workshops.

As mentioned in section 7.2.1, the results showed that teachers tended to utilise a narrow range of available ICT resources in the classroom. Teachers should employ more ICT resources and forms, such as touchscreen tablets, interactive whiteboards, TVs, Videos, and Internet. This could be achieved by recognising the educational applications of ICT and providing a variety of ICT-related activities to make teaching more effective and more fun for young children.

The evidence from the study found (section 7.4) that teachers did not give the children any chance to use ICT resources in structured activities and their uses of the computer were based on a teacher-centred approach. Teachers should be aware of the educational value of using ICT in creating a child-centred learning environment. This could be achieved by performing ICT activities that encourage a child-centred approach, allowing children to use ICT in the classroom and providing them with opportunities to learn independently.

The evidence of parents' equipment donations demonstrates their interest in their children's education, and willingness to be involved. Teachers would be well advised to develop strategies for further parental involvement, for example, open days or talks for parents, to introduce new ideas and methods or equipment used in the setting and

discuss how they can support children's learning. Some relevant literature shows the benefits of parental involvement in kindergartens or schools (Kalas, 2010; Daniel, 2011), although this study has not extracted data from parents.

Recommendations for Headteachers:

The findings of this study indicate (section 7.5.2) that kindergarten headteachers play an important role in supporting or preventing teachers from integrating ICT in classrooms. In the absence of a clear ICT policy in the Saudi EYE sector, as discussed in Chapter Two (section 2.5), teachers looked to headteachers to offer a supportive environment for the integration of ICT. The recommendation in this regard is that headteachers should design a clear internal implementation plan that outlines the kindergarten's goals for ICT integration and the reasons underlying these goals. Headteachers should engage teachers in preparing the kindergartens ICT plan and goals and give them opportunities to demonstrate their pedagogical beliefs and experience about the use of ICT. In terms of a strategy to achieve this, headteachers from neighbouring schools might form self-help groups. In the UK and elsewhere, the creation of local 'clusters' of schools has been used as a strategy for schools' development as they share their plans to improve the conditions for the delivery of education (Hargreaves, 2010). Clusters are groupings of schools within an area, with the aim of working together to improve education quality (Chikoko, 2007). Forming such networks would offer opportunities for Saudi EYE teachers and administrators to engage in mutual reflection and learning (Kok, 2008), confirming or challenging their own practice (Lock, 2011) and sharing knowledge.

Headteachers should allow teachers to attend and observe ICT-related exemplary teaching sessions provided by other colleagues inside or outside the kindergarten, learning resources officers, and other experts. In this way, a teamwork culture will be developed in each kindergarten which will support the dissemination of good pedagogical practice, the productive cooperation between teachers, the sharing of efficient teaching strategies, and the generation of collective experience. Moreover, teachers will have the opportunity to gain more knowledge in the use of ICT, to enhance their ICT use skills, to improve strategies for the effectiveness of ICT integration in their practice, and to understand the advantages of incorporation ICT in classroom activities.

It is recommended that headteachers should encourage teachers to continue their professional development and training to improve their skills and experience in teaching and enhance their confidence to perform ICT-based learning. One way to incentivize teachers to undertake training and continuing professional development would be by giving more credit for such activities in the annual appraisal system. Currently, when headteachers evaluate teacher performance, only four points are allocated for recognition and reward of such activities, giving teachers little incentive to undertake training. If training counted more heavily in the appraisal, teachers might feel a stronger motivation to attend.

The findings of the study revealed (section 7.5.3) that time constraints and high teachers' workload were found as a hindrance to ICT integration. Thus, headteachers

should free teachers from their heavy workload for a reasonable time to attend training, improve their knowledge and skills with ICT, prepare for the use of ICT in classroom practice and to test its pedagogical possibilities. In order to achieve this, when arranging school programmes, headteachers would need to arrange cover for teachers absent for training. This could be funded by allocating a portion of the training budget received from MGDE to provide supply cover, similar to the "pool teachers" available in the UK.

In addition, headteachers should supervise the process of ICT implementation in classroom practices to monitor progress and promote self-assessment. Again, a practical way to achieve this might be thorough self-help groups of HTs in neighbouring schools. Visits from members of these clusters would offer the benefit of an external perspective, helping in the identification and sharing of good practice.

The evidence from the study found (section 7.2.1) that teachers did not use some ICT resources available in the kindergarten libraries. If the kindergarten does not have a learning resources officer, the headteacher needs to organize and operate a system for reservation of library ICT resources for teachers, which would help teachers to access these resources easily, then they can take them to their classrooms.

The study findings indicated (section 7.5.3) that headteachers complained about the absence of maintenance and technical assistance services in their establishments.

Thus, headteachers should build collaboration with partners from the private sector to offer immediate maintenance and solve technical issues and failures in their settings, and this will ensure unhindered use of ICT in practices. This is another area where headteachers in a cluster of schools might collaborate to share expertise and resources, enabling resources to be employed more efficiently (Hargreaves, 2012; Mphahlele, 2012).

8.5.2 Recommendations at the government level

It has been suggested previously (section 3.4.4) that education improvement needs the integration of technology, pedagogy and system change (Fullan, 2013). The Saudi government has an important role to play in facilitating such integration in Saudi EYE. Owing to the shortcomings of Saudi policy in the provision of clear guidance on the integration of ICT into EYE, the MoE, represented by policymakers and curriculum designers, should formulate ICT policy and update the EYE curriculum for implementation and promotion of ICT in kindergartens in the following ways:

1) explain the reasons behind the integration of ICT in kindergarten;
2) clarify the desired role of ICT in the teaching and learning process;
3) offer teachers a solid theoretical background that will encourage ICT use in practice.

Furthermore, the kindergarten curriculum should be altered to include specific instructions about how and when to use ICT in the learning environments. Such actions should be seen as a collaborative approach and be informed by the views of teachers and headteachers, because they have knowledge and experience of what

occurs within the kindergarten and the classroom. This would help to avoid one of the main reasons for the failure of the previous national policies and projects, which is that the voice of teachers and headteachers is still not heard and recognized, as stated in the Saudi literature (Chapter Two).

One of the notable findings of the study was that ICT infrastructure limitations in kindergartens was a significant hindrance when teachers sought to incorporate ICT into their work practices. The active and successful use of ICT requires a sufficient ICT infrastructure in the learning environment. Therefore, MoE should equip kindergartens with sufficient and appropriate ICT resources such as touchscreen tablets, interactive whiteboards, computers, projectors and Internet, in order to meet at least a minimum level of ICT provision. It could be the responsibility of the MoE, with the aid of educationists and curriculum designers, to determine what is necessary and appropriate to meet the objectives of the national curriculum, while "sufficiency" would be based on the size of the setting (e.g. by stipulating the ratio of computers to children), in the same way as is done for staff-student ratios. Periodic inspections should be carried out to monitor compliance with standards. In addition, due to kindergarten participants' demands for the provision of suitable educational software programs for children (section 7.2.2), MoE should commission and subsidize educational designers to produce Arabic programs suitable for children and adapt high-quality English programs, designed to improve literacy and numeracy skills, into Arabic. National competitions with high-value prizes would also help raise awareness of the importance of quality educational software (that could also be exported to the Arab world).

The study found (section 7.2.1) that ICT resource availability differed considerably across the three settings. The necessity of supplying equal ICT resources to all kindergartens, regardless of their age, building type, or location, is important. MoE, represented by MGDE, should perform a resources audit to ensure a baseline level for its kindergartens. Besides, MGDE should give kindergarten management more authority over the implementation of ICT initiatives. For example, areas of authority could include ICT resources, technical support, continuing development for teachers, creation of kindergarten clusters, etc. Thus, with equal access to ICT resources, kindergarten teachers could produce a rich and appealing ICT setting for children, and children could have opportunities to be engaged in ICT-related activities. These suggestions are consistent with what the crown prince (MBS) emphasized in Vision 2030: "*We want Saudi children, wherever they live, to enjoy higher quality, multi-faceted education*".

The study has found (Section 7.5.3) that technical problems were discouraging teachers from using ICT in their classroom practices and the technical support provided by MGDE was often slow to solve these problems. To avoid this, MGDE should provide better funded and more effective ICT support services, such as securing ICT maintenance contracts, employing ICT specialists available in each kindergarten (or perhaps for a cluster of kindergartens in the same area), and ongoing technical training for learning resources officers and teachers to deal with technical troubleshooting. Moreover, it is recommended that MGDE should give kindergartens more freedom and authority to made contracts with technical services providers privately. To facilitate this, MGDE could compile and periodically update a list of

trusted and approved service providers. Headteachers could then select from the list and contact their chosen provider directly. Providers whose performance was unsatisfactory would be de-listed. However, it would be in providers' interest to remain on the recommended list, as a source of business and reputation.

The study found (7.5.2) that teachers complained about their high workload, which hinders the attendance of training opportunities for acquiring ICT skills. It is recommended that MoE improve staffing ratios in kindergartens so the workload for individual teachers can be reduced. Also, the results showed that the ratio of children to the teacher is higher than mentioned in the organisational guide for kindergartens, 1:12 (MoE, 2018c). MoE must insist that schools adhere to class size and ratio requirements so that the potential educational benefits of kindergarten education are not compromised.

Furthermore, the evidence revealed (7.5.3) that kindergarten participants felt that there was insufficient support from MGDE stakeholders to encourage them to integrate computers into EYE. Connected with this, the director clarified that MGDE had supported and granted the trainees training certificates at the end of courses. In the researcher's view, providing support through awarding certificates is insufficient incentive for teachers to attend, unless there is a financial incentive for teachers and headteachers to engage them in continuing professional training (not just in ICT). In particular, the results indicated that some kindergarten participants had been on self-financed courses. Therefore, the MOE and MGDE should offer a financial incentive for trainees who could be classified as active or 'progressive' and who attend a certain number of training courses over some time. In addition, it could be made a requirement that teachers engage in continuing professional development.

The study has found (7.5.2) that internal environmental conditions posed several challenges to computer use in the classroom. MoE should improve the physical classroom environment to be more conducive to the integration and use of ICT via having more spacious and better-lit classrooms. MoE should plan to discontinue the use of rented buildings which were originally constructed for housing and are unsuited for use as kindergartens.

The findings of the study revealed (Section 7.5.3) that the insufficiency of kindergartens' budget was seen as an obstacle that hindered the implementation of ICT. The policy of allocating the budget to kindergartens according to the kindergarten's age, number of children and classrooms, location, and type of building needs to be reviewed in terms of including building ICT infrastructure and professional development for kindergarten staff. Another recommendation to MoE also would be to allow kindergartens to organize and run their own financial issues. For example, they could be allowed to invest in kindergarten facilities, involve parents in fundraising, and contract directly with local providers (or arrange volunteers) to manage canteen services.

8.5.3 Recommendations for training and professional development

Specifically, for teachers who are reluctant to integrate ICT into their practices and believed in the old-fashioned method of education, they must first gain awareness of the potential educational benefits of ICT for young children and the viability of pedagogical methods to achieve these benefits in classroom practice. The most practical way to achieve that would be through pre-service and in-service training for teachers.

The study findings revealed that there was a perceived lack of ICT training from the MGDE, and kindergartens' participants compensated for this lack by attending self-financed courses. Perhaps the MoE has recognised this lack and assigned some strategic objectives in the Kingdom Vision 2030, by its commitment to fund the professional development and increase the average number of annual professional development hours for teachers and headteachers, as described in Chapter Two. This does not absolve the ministry from its duty to intensify the training courses for teachers and headteachers to develop their knowledge and skills in ICT. As described in Chapter Two, Saudi Arabia has one of the highest levels of spending on education, so the funding pattern should be balanced between sectors, such as training, EYE, general and higher education.

One of the most interesting findings was that kindergartens' participants emphasised their dissatisfaction with the training provided by the MGDE, whether in ICT or in other areas. The recommendation in this regard is that the proposed training opportunities should be designed after a detailed review of the training needs of teachers in ICT, that takes into consideration their preferred training content and forms. This means that teachers need to be involved in the process of planning ICT training to improve the quality of training.

The study has indicated (section 7.4) that the proficiency of teachers in the use of computers generally lay between the stages of entry and adoption or and any case did not exceed the level of adaptation. For improving teachers' ICT competencies, teachers need more effective ICT training to empower them with the necessary technical and pedagogical skills. Also, teachers must be skilful and confident in the

use of technology, mainly as they deal with today's children who are knowledgeable about technology. In identifying teachers' training needs, it is important to consider how teachers will implement their training in the classroom. The study has indicated (section 7.5.3) that teachers stated that the available training courses focused on theoretical learning (not practical). ICT training should focus on pedagogical skills, alongside technical skills, that can assist teachers to learn how to use ICT for educational purposes and understand how ICT can positively impact the teaching process.

8.6 Suggestions for future research

The findings and issues that emerged from the current study indicate several important avenues that need further exploration. Further study is needed to investigate the implications of the Kingdom's 2030 Vision and explore any changes regarding the development of the EYE sector, the enrichment of kindergartens with modern infrastructure, including technology, and the improvement of professional development for EYE practitioners.

There is abundant room for further progress in investigating whether the current educational reforms, under the vision, have addressed the challenges EYE teachers and headteachers face in the process of ICT integration, such as the absence of ICT policy, the lack of ICT guidance in the curriculum, and the shortage of training opportunities, or whether it creates other new issues.

While this case study used qualitative data collection methods, namely interviews and observation, there is opportunity to improve the depth and focus of data collection by employing a variety of other methods. For example, teacher diaries or logbooks would provide an opportunity to capture teachers' thoughts and experiences in relation to ICT use over a longer period and related to a greater number and types of lesson. Understanding of the classroom environment and teachers' practices could also be enriched by video-capture and micro-analysis of classroom interactions.

Whereas this was a cross-sectional study, there would also be value in collecting longitudinal data at intervals over a whole year. This would enable understanding, not only of a wider range of teacher experiences, but also of how their perceptions may change in response to changing conditions, positive and negative experiences, greater familiarity with the technology, training, and the like.

As this current study was limited to three public kindergartens in Makkah, it is suggested that wide-scale research be conducted to explore the use of ICT in public and/or private kindergartens in Makkah or other cities in Saudi Arabia. This sort of research could also identify the differences between public and private institutions, in terms of ICT infrastructure, classroom conditions, the support provided from kindergarten management and LEA's, budget, and maintenance.

Moreover, further work needs to explore the perspectives and pedagogical practices of kindergarten teachers about children's use of ICT. It would be interesting to invite children and parents to participate in such a study in order to enhance the quality of the findings, provide a better understanding about the effectiveness of ICT activities in kindergarten, and explore children's home ICT experiences.

Future research could concentrate on the nature and process of ICT training provided by the MoE by conducting interviews with training providers and trainees, observing training sessions, and analysing ICT training documents. This triangulation-based method would help to identify the effectiveness of ICT training and discover the efficiency of training providers and the potential benefit for trainees from training.

Finally, a comparative study between the integration of ICT in Saudi kindergarten and developed countries, such as the United Kingdom and the United States, could raise policymakers to change the situation in KSA, particularly in terms of ICT strategies and policies.

8.7 Summary

This chapter has summarised the main findings from this study of Saudi EYE teachers' perceptions on the use of ICT in the kindergarten classroom and highlighted a number of implications. In addressing the six sub-questions guiding the research, it was shown that ICT resources varied from one setting to another, but were generally limited and little used. Teachers wanted more hardware and software and anticipated that resourcing would improve in the future, alongside the development of policies encouraging ICT. They expressed beliefs regarding an array of potential positive and negative aspects of computer use for children's health, cognitive skills and social development. Evidence was reported suggesting that teachers use ICT mainly as a presentational tool within a teacher-centred approach, and there was little opportunity for children to use ICT directly. Teachers' low and limited ICT usage was attributed

to several obstacles and challenges, related to their knowledge and beliefs, and factors in the internal and external environments. Use of the UTAUT model to analyse teachers' perceptions helped to identify specific omissions and deficiencies that rendered the context unconducive to acceptance and use of technology in classrooms.

Limitations of the study were acknowledged, for example, the small sample and restricted geographical scope. Nevertheless, it was shown that the study had made important contributions to knowledge by gaining rich insights into teachers' perceptions in an under-researched context at a time when educational reforms and the role of ICT are attracting government attention. Practical implications were drawn for teachers' classroom practice, kindergarten management, the government role, and the need for training and continuing professional development of teachers. The study provides a basis for further research, and avenues for such work have been suggested.

8.8 Final thoughts

During the PhD journey, I learned many skills. On the personal and professional level, at the beginning of this research, I lacked time management skills, but I eventually learned how to prepare and plan widely for this study. I also encountered significant challenges in developing research tools. After the pilot study, I reduced the mistakes and gained more confidence. There were critical moments when I was not sure how to perform the coding and analysis of data, but over time, I was able to overcome this feeling and complete the research. I hope that the current research will be a solid foundation for future study, enabling me to make contributions to benefit the integration of ICT in kindergarten in Saudi Arabia.

On the methodological level, one of the main strengths of this research is that it adopts a comparative case study to explore teachers' and headteachers perceptions, pedagogical practices and experience related to using ICT technology in Saudi EYE practices. The use of interviews and observation added value to this study by allowing methodological triangulation of findings. Most importantly, according to the researcher's knowledge, virtually no research exploring the perceptions of teachers, headteachers and stakeholders in MoE together as regards the use of ICT in educational practices has been undertaken in KSA or the Arab world. This study has answered several questions and in doing so, has opened new avenues for future research in this area. It is hoped that the findings of this study will help EYE practitioners, MoE's stakeholders and policymakers to make the connection between teachers and ICT and motivate them to make future investments in providing ICT infrastructure and professional development for kindergarten staff. In particular, the current study is timely in coinciding with the recently launched Kingdom's Vision 2030, which holds the promise to improve the educational environment that will facilitate the sound integration of ICT in the Kingdom's schools.

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Appendix A: Teacher's Interview Schedule (English)

UNIVERSITY OF HULL

School of Education and Social Sciences

Interviewer: Manar Alotaibi	Interviewee:
School:	Date:
Start time:	Duration:

Interview programme:

- A brief introduction about the researcher's background.
- Introduction of the research aim and objectives.
- Ensuring confidentiality.
- Instructions of the interview: type of questions.
- Conclusion- thanking the interviewee for her participation.

Part One: General Information

A. What is your qualification?

B. What is your academic speciality?

C. How many years of experience?

D. What level(s) are you teaching at the moment?

Part Two: Availability and use of computers in kindergarten schools

A. Do you have a computer in the classroom? Which kind of computer?

B. Can you tell me about the computer or educational technology facilities in your kindergarten school?

C. Why are you (not) using the computer in your teaching?

D. Which kind of software or computer applications do you use?

Part Three: The effectiveness of computer use as an educational tool in the education of kindergarten children

A. What do you think of using the computer as an educational tool in kindergarten?

B. How do you use the computer to teach kindergarten children?

C. What are the advantages and disadvantages of using the computer in teaching kindergarten children to you as teacher? and for children as learners?

D. Are children interacting with the computer? If yes, How do you know?

E. In what classroom situations and for what purposes would you prefer to use traditional methods?

F. In what classroom situations and for what purposes would you prefer to use computers?

Part Four: The motivations and obstacles to using the computer

A. What motivates you to use the computer?

B. What are the obstacles or difficulties you face in using the computer?

- Is there an issue in relation to you as teacher?
- Is there an issue in relation to the school?
- Is there an issue in relation to the environment (outside the school: external factors as the ministry, the policy of computer, etc)?

C. What are your needs in relation to the integration of the computer in the classroom?

D. In terms of your computer knowledge and skills, what kind of support does your head teacher, kindergarten or local education authority provide?

E. Have you received any training in the area of using educational technology/ educational uses of computer or teaching methods? If yes, please describe briefly.

Part Five: The future of computer technology in kindergarten schools

A. Based on the current situation, what do you expect will be the future of computers in kindergartens?

B. What would you like to see in your classroom?

C. Do you want to add any suggestions or comments that might benefit the study?

Thank you very much for your participation and cooperation

Appendix B: Head Teacher Interview Schedule (English)

UNIVERSITY OF HULL

School of Education and Social Sciences

Interviewer: Manar Alotaibi	Interviewee:
School:	Date:
Start time:	Duration:

Interview programme:

- ❖ A brief introduction about the researcher's background.
- ❖ Introduction of the research aim and objectives.
- ❖ Ensuring confidentiality.
- ❖ Instructions of the interview: type of questions.
- ❖ Conclusion- thanking the interviewee for her participation.

Part One: General Information

A. What is your qualification?

B. What is your academic speciality?

C. How many years of experience?

Part Two: Availability and use of computers in kindergarten schools

A. Are your kindergarten classrooms equipped with computers or educational technology?

B. Can you tell me about the computer or educational technology facilities in your kindergarten school?

C. How do you see and evaluate the use of computers by your kindergarten teachers?

Part Three: The effectiveness of the computer use as an educational tool in the education of kindergarten children

A. What do you think of using the computer as an educational tool in kindergarten?

B. How do your kindergarten teachers use the computer to teach kindergarten children?

C. What are the advantages and disadvantages of using the computer in teaching kindergarten children?

D. How will you recognize when the computer is having positive or negative effect on children?

E. In what classroom situations and for what purposes would you prefer your teachers to use traditional methods?

F. In what classroom situations and for what purposes would you prefer your teachers to use computers?

Part Four: The motivations and obstacles to using the computer

A. What are the motivations that encourage teachers to use computers in classrooms?

B. What are the obstacles or difficulties that face teachers in using the computer?

C. What are your needs to improve the use of computers in your kindergarten classrooms?

Part Five: The future of computer technology in kindergartens schools

A. Based on the current situation, what do you expect will be the future of computers in kindergartens?

B. What are your priorities to develop educational uses of computers for your kindergarten teachers?

C. What kind of support do you think is needed from other stakeholders to encourage effective integration of computers in kindergarten settings?

D. Do you want to add any suggestions or comments that might benefit the study?

Thank you very much for your participation and cooperation

Appendix C: Checklist for Observation (English)

School:	Location:
Teacher(s):	No. Students:
Level:	Lesson:
Date:	Time:

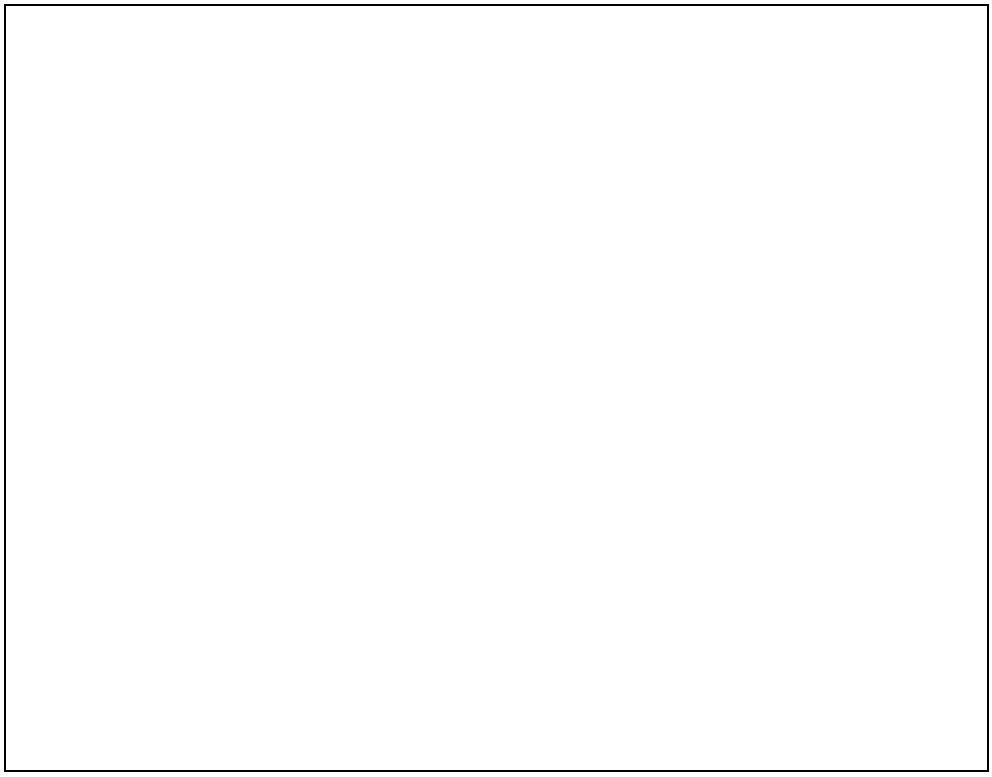
Classroom Environment

Seating Configuration	Circular		Rows		Small groups	
Temperature	Hot		Mild		Cold	
Curtains/Blinds	Full Blackout		Partial Blackout		Not available	
Projection screens	Wall mounted		Free standing		Not available	
Computers	Available		Not available		Type:	
ICTs resources corner	Available		Not available		Types:	
Library (books/stories)	Available		Not available			
Reading corner	Available		Not available			
Blocks/toys corner	Available		Not available			
Cognitive skills corner	Available		Not available			
Art corner	Available		Not available			

Evaluation of the use of computers in teaching/as an educational tool

The teacher use the computer in teaching	Duration	
The teacher use the other ICT resources in teaching	Duration	
The teacher use traditional methods in teaching	Duration	
Children interacting with computers	Duration	
Children use computers	Duration	

Classroom structure



Appendix D: The institutional consent (English)

In the name of Allah the Merciful

Dear Kindergarten Headteacher,

I am a PhD student in the School of Education and Social Sciences at the University of Hull, currently conducting a research project entitled "Makkah kindergarten teachers' perceptions regarding the use of computer technology as a pedagogical tool: a case study" under the supervision of Dr. Peter Williams and Dr. Angel Urbina-Garcia.

I would like you to give me permission to access your school and involve it in my research study. I need your help to identify a group of teachers that meets my criteria. I would need help to approach these teachers and ask them if they would be willing to take part in my study. I would also need permission to complete the interview during kindergarten hours and have access to an appropriate space in which to conduct the interviews. These interviews will record on a digital recorder and take at least thirty minutes and, at most, one hour.

I would like to conduct some observations in your kindergarten for the purpose of my research. These observations will aim to monitor how teachers and children use computers in the classroom environment. These observations will take place within the daily classroom environment and will not disturb the everyday teaching and learning in any way. I would like to take some images of the classroom environment to show details that could not be written. The images will be of equipment and furniture layout. No images will be taken of people.

All information and data contained in interviews and observations will be treated in strict secrecy and will only be used for study and scientific research purposes. You have the right to withdraw your data at any time and without giving a reason and in that case, any information obtained from you will not be used in the research.

For inquiring and further information, please do not hesitate to contact us.

Researcher: Manar Soud Alotaibi

E-mail: M.S.Alotaibi@2014.hull.ac.uk

The contact details of the secretary to the Faculty of Faculty of Arts Cultures and Education (FACE) Ethics Committee are:

Jo Hawksworth, Research Office, Faculty of Faculty of Arts Cultures and Education (FACE), University of Hull, Cottingham Road, Hull, HU6 7RX.

Tel. 01482 466658. Email: j.hawksworth@hull.ac.uk

Appendix E: Teacher consent (English)

In the name of Allah the Merciful

Dear classroom teacher,

I am pleased to invite you to participate in this research (Makkah kindergarten teachers' perceptions regarding the use of computer technology as a pedagogical tool: a case study) required to obtain a Doctorate Degree (PhD) in the specialization of Early Childhood Studies at the University of Hull in the United Kingdom. This research aims to find out the perceptions and pedagogical beliefs of kindergarten teachers regarding the use of computer technology as pedagogical tool in kindergarten and to identify the reality of using this technology in kindergarten child education. It will also address the opportunities and difficulties reported by kindergarten teachers in using computer technology in classrooms and explore opinions on the future of using this technology in the kindergarten stage.

By agreeing to accept the invitation to participate in the interview, which may take sixty minutes (at most), you will help the researcher to identify the themes that need to be seen in the kindergarten stage with some consideration for what may be of importance to make perfect use of the computer technology.

The interview consists of five main themes:

First: General information.

Second: To identify the reality of the availability and use of the computer in kindergarten schools.

Third: To identify the effectiveness of the computer as a pedagogical tool in kindergarten child education.

Fourth: To identify the motivations and obstacles of using the computer.

Fifth: To identify the future of computer technology in kindergarten schools.

I would like to conduct some classroom observations for the purpose of my research. These observations will aim to monitor how teachers and children use computer in the classroom environment. These observations will take place within the daily classroom environment and will not disturb the everyday teaching and learning in any way. I would like to take some images of the classroom environment to show details that could not be written. The images will be of equipment and furniture layout. No images will be taken of people.

All information and data contained in the interview and observation will be treated in strict secrecy and will only be used for study and scientific research purposes. You have the right to withdraw your data at any time and without giving a reason and in that case, any information obtained from you will not be used in the research.

For inquiring and further information, please do not hesitate to contact us.

Researcher: Manar Soud Alotaibi
E-mail: M.S.Alotaibi@2014.hull.ac.uk

The contact details of the secretary to the Faculty of Faculty of Arts Cultures and Education (FACE) Ethics Committee are:

Jo Hawksworth, Research Office, Faculty of Faculty of Arts Cultures and Education (FACE), University of Hull, Cottingham Road, Hull, HU6 7RX.
Tel. 01482 466658. Email: j.hawksworth@hull.ac.uk

After reading the introduction letter of the study and understanding the nature of participation and the purpose of the information to be provided to the researcher through the research tools, **I do not mind participating in this study**.

Sincerely thank you and appreciate for your trust, participation and good cooperation, hoping that Allah, Almighty, grant you all good success and luck.

Signature of the teacher:

Signature of the researcher:

Date:

Appendix F: Headteacher consent (English)

In the name of Allah the Merciful

Dear Kindergarten Headteacher,

I am pleased to invite you to participate in this research (Makkah kindergarten teachers' perceptions regarding the use of computer technology as a pedagogical tool: a case study) required to obtain a Doctorate Degree (PhD) in the specialization of Early Childhood Studies at the University of Hull in the United Kingdom. This research aims to find out the perceptions and pedagogical beliefs of kindergarten teachers regarding the use of computer technology as pedagogical tool in kindergarten and to identify the reality of using this technology in kindergarten child education. It will also address the opportunities and difficulties reported by kindergarten teachers in using computer technology in classrooms and explore opinions on the future of using this technology in the kindergarten stage.

By agreeing to accept the invitation to participate in the interview, which may take sixty minutes (at most), you will help the researcher to identify the themes that need to be seen in the kindergarten stage with some consideration for what may be of importance to make perfect use of the computer technology.

The interview consists of five main themes:

First: General information.

Second: To identify the reality of the availability and use of the computer in kindergarten schools.

Third: To identify the effectiveness of the computer as a pedagogical tool in pre-school child education.

Fourth: To identify the motivations and obstacles of using the computer.

Fifth: To identify the future of computer technology in kindergarten schools.

I would like to conduct some classroom observations in your kindergarten for the purpose of my research. These observations will aim to monitor how teachers and children use computer in the classroom environment. These observations will take place within the daily classroom environment and will not disturb the everyday teaching and learning in any way. I would like to take some images of the classroom environment to show details that could not be written. The images will be of equipment and furniture layout. No images will be taken of people.

All information and data contained in the interview and observation will be treated in strict secrecy and will only be used for study and scientific research purposes. You have the right to withdraw your data at any time and without giving a reason and in that case, any information obtained from you will not be used in the research.

For inquiring and further information, please do not hesitate to contact us.

Researcher: Manar Soud Alotaibi
E-mail: M.S.Alotaibi@2014.hull.ac.uk

The contact details of the secretary to the Faculty of Faculty of Arts Cultures and Education (FACE) Ethics Committee are:

Jo Hawksworth, Research Office, Faculty of Faculty of Arts Cultures and Education (FACE), University of Hull, Cottingham Road, Hull, HU6 7RX.
Tel. 01482 466658. Email: j.hawksworth@hull.ac.uk

After reading the introduction letter of the study and understanding the nature of participation and the purpose of the information to be provided to the researcher through the research tools, **I do not mind participating in this study**.

Sincerely thank you and appreciate for your trust, participation and good cooperation, hoping that Allah, Almighty, grant you all good success and luck.

Signature of the Headteacher:

Signature of the researcher:

Date:

Appendix G: Research ethical approval (English)

FACE Ethics

Reply all

Mon 25/02, 09:50
Manar S Alotaibi <M.S.Alotaibi@2014.hull.ac.uk>;
Peter J Williams

Dear Manar,

Project title:	Perceptions of kindergarten teachers in Makkah regarding the use of computer technology as a pedagogical tool: A case study.
Ref No.:	20172018567
Date:	25/02/2019

I am pleased to inform you that the FACE Ethics Committee has given ethical approval for the above research project.

You are now authorised to carry out the research as outlined in your application.

Best wishes,
Beth

Faculty of Arts, Cultures and Education
University of Hull
Hull, HU6 7RX, UK
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b.luker-barrow@hull.ac.uk | 01482 462083

Appendix H: Supportive letter from Saudi Cultural Bureau in London (Arabic)

بسم الله الرحمن الرحيم

ROYAL EMBASSY OF SAUDI ARABIA
CULTURAL BUREAU
LONDON

سفارة المملكة العربية السعودية
الملحقية الثقافية
لندن

التاريخ 1438/4/28هـ

إفادة

رقم الملف NJU113

تفيد الملحقية الثقافية بسفارة المملكة العربية السعودية في لندن بأن الطالبة/ منار سعود ماضي العتيبي (سجل مدني رقم) والمبتعثة من قبل جامعة نجران لدراسة الدكتوراه ببريطانيا في دراسات الطفولة المبكرة قد التحقت بالبعثة بتاريخ 11-03-1436 هـ الموافق 2015/01/026 م ومن المتوقع أن تنتهي بعثتها بتاريخ 14-04-1439 هـ الموافق 2018/01/01 م.

وقد أعطيت لها هذه الإفادة بناءً على طلبها لتقديمها إلى من يهمه الأمر دون أدنى مسؤولية على الملحقية.

وتقبلوا تحياتي،،،

القائم بأعمال الملحقية الثقافية
بسفارة المملكة العربية السعودية في لندن

د.فهد بن عبدالله محمد النعيم

رقم: ..... التاريخ: ..... الموافق: ..... المرفقات: .....

630 Chiswick High Road, London W4 5RY Tel: +44 (0) 20 3249 7000 Fax: +44 (0) 20 3249 7001 E-mail: sacbuk@uksacb.org
www.uksacb.org

Appendix I: Access approval letter from MGDE (Arabic)

المملكة العربية السعودية
وزارة التربية والتعليم
(٢٨٠)
الإدارة العامة للتربية والتعليم بمنطقة مكة المكرمة
إدارة التخطيط والتطوير

وزارة التربية والتعليم

الرقم: ٣٨١٤٠٤٨
التاريخ: ١٤٣٨/٦/٢٢
المشفوعات: ١ صفحة

الموضوع الموافقة على اجراء دراسة

تعميم لجميع رياض الأطفال

المكرمة قائدة روضة / **وفقها الله**

السلام عليكم ورحمه الله وبركاته ..... وبعد:

فبناءً على خطاب طالبة الدراسات العليا الطالبة / منار سعود ماضي العتيبي والمبتعثة من قبل جامعة نجران لنيل درجة الدكتوراه من جامعة هول ببريطانيا لرسالتها المعنونة بـ :

((تصورات معلمات رياض الأطفال تجاه استخدام الحاسب الآلي كأداة تعليمية
في مدارس رياض الأطفال في مكة المكرمة ـ دراسة حالة))

وحيث إن الدراسة تتطلب مقابلة قائدة و معلمات رياض الاطفال ، وتسجيل الملاحظات الخاصة ببنود الدراسة .

عليه لا مانع لدينا من السماح للطالبة بتطبيق أدوات دراستها مع حشكم الزميلات معلمات رياض الأطفال التعاون معها . شاكرين لكم تعاونكم لخدمة البحث العلمي .

والله يحفظكم و يرعاكم ،،،،،

مدير عام التعليم بمنطقة
مكة المكرمة
محمد بن مهدي الحارثي