Saudi Teachers' and University Students' Attitudes toward Computing

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ABSTRACT

Computer technology is an important tool that enhances people's learning, improves their education and influences the development of society. There is considerable research in Western countries studying attitudes towards computers but few studies have been performed in the Kingdom of Saudi Arabia (KSA). Therefore, it is worth measuring students' attitudes to computer use in KSA as, if students are able to develop a positive attitude towards this during their educational years, they will increase their learning and knowledge, their future work will benefit and in turn this will benefit the national economy.

The aim of this study is to investigate the associations between Saudi University students' knowledge of English, their gender, computer experience, parents' encouragement of use computer usage, place of residence and general attitudes towards the use of computers in their daily life. The main contribution of this study is the investigation of the attitude of both teachers and students within different regions of Saudi Arabia, using a large quantitative data set triangulated with qualitative data.

The results show that Saudi undergraduate students have a positive attitude toward computers, and there are no significant gender differences between male and female students in their attitudes. This study also suggests students in the capital city have a more positive attitude towards computer than students from small cities. There is also a strong relationship between attitudes towards computers and English language skills, computer experiences, parental encouragement and undergraduate students' computer attitudes. A majority of Saudi students in the study don't have access to computers at university, especially females.

The qualitative study conducted with school teachers shows gender differences, with male teachers having a more positive attitudes towards computers, and more computer experience and skills.

The evidence presented in this work suggests that the educational use of computing in KSA requires an increased availability of computers; provision of computer workshops for students and educators starting from early education; levels to higher education and encouragement of students to use computers in learning methods in order to be successful.

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بِسْمِ ٱللَّهِ ٱلرَّحْمَٰنِ ٱلرَّحِيمِ

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All dreams turn to reality.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF QUESTIONNAIRE

Publications

1. M. Alothman and J. Robertson. The Attitude of High School Teachers in Saudi Arabia towards Computers: Qualitative Study. International Journal of Social, Behavioral, Educational, Economic and Management Engineering Vol: 9, No: 3, 2015.

2. M. Alothman and J. Robertson. Saudi Undergraduate Students Attitudes Towards Computers: A Qualitative Study. In: Proceedings of the Saudi Scientific International Conference 2015, London, UK, 31-1 Feb 2015. Saudi Scientific International Conference, London, UK, 1097 p. 25.

3. M. Alothman and J. Robertson. Computer Attitudes of Saudi Postgraduate Students. In: Proceedings of the Saudi Student Conference 2012, London, UK, 11-14 Oct 2012. The 8th Saudi Students Conference, London, UK.

CHAPTER 1.   INTRODUCTION

In the last thirty years, computer use has expanded enormously throughout different areas of our lives. Computers are no longer exclusive tools used by large businesses; they are in use in the majority of homes and work places. Technology has prompted advances in economic, cultural, social and educational spheres worldwide (Alhudhaif & Nalband, 2014; Eren et al., 2014), and these changes are also reflected in the Arab world (Alhudhaif & Nalband, 2014).

The computer has also contributed greatly to the development of innovative educational methods. Technology has the potential to improve many aspects of learning, teaching and planning in education, which then has a wash back effect on society (Pamuk & Peker, 2009). Information technology has prompted changes in the education sector, in terms of how teaching is delivered, by offering both new tools and materials. Advances in computer technology and the Internet have attracted the attention of learners, from schoolchildren to university students. "One of the basic roles of education is to prepare students for the information society. This preparation is the most important source of future economic and social development" (Dyncer & Sahykayasi, 2011).

If students are able to develop a positive attitude towards computer use during their educational years, this will benefit their futures. However, many undergraduate students, especially females, do not have adequate access to computing facilities in the Kingdom of Saudi Arabia. This disadvantages them if they pursue further education elsewhere in the world, where educators expect students to be highly competent at using computers. Considerable research has been carried out in Western countries concerning peoples' attitudes and behaviour toward computer use; however very few studies have been conducted in the Kingdom of Saudi Arabia. It is necessary to replicate Western studies in the Saudi context, to understand how attitudes vary according to cultural expectations, as these differ between countries, relative to the level of economic development (Al-Khaldi & Wallace, 1999).

Eren et al (2014), state that "technologies that maintain the accumulation, processing, storage, and transfer of information anywhere when needed and enable access to this information, have an effect, particularly in education" (P:2522). In order for a user to be able to benefit from modern advancements, they must learn how to use technology

effectively (Eren et al., 2014). The foundation of any society is its educational system; it enriches awareness and improves people's quality of life (Alshammari, 2014). In the modern era, to offer the best education to the Saudi population, there is a need to adopt new technology as a learning tool (Alshammari, 2014). The integration of information technology into classrooms and the curriculum will contribute to improving the quality of learning and teaching (Alfahad, 2012), and introduce learners to an important tool that they will need to master to succeed in the workplace.

More and more, computers are being utilised in educational settings (Kutlusa & Baskan, 2013). Both computers and internet connectivity are now very low cost, meaning this technology is now widely used in universities and in students' homes. This even means that they are accessible to middle class university students in less developed nations. The use of ICT by students has now swollen to include the use of many services, including the following: internet, e-mail, e-shopping, spreadsheets, chat, graphics, programming, as well as the use of other educational sources (Mahmood, 2009). At the university stage, an undergraduate education is expected to contribute greatly to the development of an individual's skill set. According to Timothy (2008), studies (in western countries) demonstrate that a student's acceptance of computers as a learning aid depends on their attitudes towards them, and willingness to use them when embarking on further study. Therefore, it is important that research is undertaken into the degree of computer integration and into what effects computer integration in Saudi Arabia (Kutlusa & Baskan, 2013).

This study aims to assess the present conditions associated with computer use, and attitudes amongst university undergraduate students towards it, in the Kingdom of Saudi Arabia. This will help us to identify the relationships between the factors involved in developing positive attitudes towards computer. Critical factors to measure include the frequency of computer use, user experience, confidence when using computers and understanding how students perceive the idea of using computers in their daily lives.

Computers are used in multiple disciplines, and have had a clear impact on development. Effective use of information technology contributes to a decrease in the cost of transactions, greater employee productivity, greater access to a field of knowledge and faster development; thereby improving economic productivity (Al-Maliki, 2013). This has encouraged policy makers and educators in Saudi Arabia to

consider how best to take advantage of their potential in the field of education (Aldail, 2003). Currently, however, the Saudi education system lags behind other countries in this regard; in other parts of the world information technology has already been utilised in education for a quarter of a century (Aldail, 2003). Institutions in Saudi Arabia began using computers in the educational field to benefit research studies and for organisational, management, as well as more recently as scientific tools and learning aids (Aldail, 2003). However, integrating computers into the education systems in Saudi Arabia, whose culture differs from that of developed countries, will not attain its goals unless it considers the successful integration of such technology, involving every individual using and benefitting from it. Therefore, because the student is at the epicentre of the education system, it is important to measure their attitudes in relation to computers and make sure that they use them effectively, which can be done by discovering the factors which encourage them to use this technology and develop positive attitudes toward it. It is important to think about gender differences, because in terms of attitudes toward computers, these have varying effects. It is a well-known fact across the globe that females are less involved with the computer field and it is consequently considered as a predominantly male field. Saudi Arabian women are not given equal chances to be part of the workforce, primarily as the result of various social, legal, educational, and occupational reasons, which means that the country is currently operating below its maximum economic potential. However, in the country gender equality and the equal access of women to education seems to be on the political agenda. There is a direct correlation between involvement with technology and the level of education, and thus personal benefit and that to the families and communities of those women who do successfully master technology use, in the way of living standards as well as other benefits.

1.1 **Background**

The Kingdom of Saudi Arabia is the second largest country in the Arab world. It has a 27 million strong population, of which 5.6% are under 25. The Kingdom is known within the Arab world for its conservative and ultra-religious society; however, it is attempting to modernise, in a manner that is not in conflict with its strong sense of culture. Religion plays a key role in the decision-making processes of government, and

ultimately moulds attitudes and behaviours at the individual level including towards technology use (Al-Saggaf, 2011 & Alahmadi, 2011).

According to Hofested (2010), Saudi Arabia's power dimension score is high, which indicates people accepting as standard a societal hierarchy in which centralization is key, with subordinates being controlled by a benevolent autocrat. Saudi Arabia is categorised by Hofested as collectivistic, which is highlighted by the significant group mentality, part of which is a substantial degree of loyalty, which is the most important aspect of such a society. The bond between members of groups is strong and people act as a whole, not individually. So, if something goes wrong, they deal with it in a joint way, as opposed to individually. In such a society, the relationship between employees and employers often operates in the same way as familial relationships, and an employee offending will bring shame to an employer like it would to family members. Saudi Arabia is predominantly masculine, and work is paramount. A dominant attitude leading to success is an integral part of the work ethos in the country. People in that culture like certainty, and generally the only way of achieving this is through traditional and long-utilised methods and practices. Thus, structure and rules, even if they seem to be ineffective, are considered to be important. Traditional methods are favoured over innovative ones, and sticking to the rules is important because that means that people will work as hard as possible to make money as efficiently as possible. The mindset of Saudi Arabians is normative and very much in the present, focusing on achieving short term goals using traditional methods.

Saudi Arabia has invested huge financial resources to support the adoption of personal computers (PCs) in business to sustain its ever-expanding economy (Ministry of communications and information technology, 2015). Consequently, the PC business has become one of the fastest growing sectors in the Kingdom of Saudi Arabia (Ministry of communications and information technology, 2015), making the computing market in Saudi Arabia the largest in the Gulf region (Al-Maliki, 2013). Concentrated primarily in larger cities, and spreading nationally, many computer stores are now open to the public (Al-Maliki, 2013). This has prompted local manufacturers and small businesses to produce their own technology products (Al-Maliki, 2013). As technology spreads, it is becoming increasingly common that medium and small sized organisations in Saudi Arabia use technological facilities such as e-mail and networking to communicate (Al-Maliki, 2013). In other sectors, such as education, computers are used to store and

process administrative records and personal information (Alshumaim & Alhassan, 2010).

The adoption and implementation of International Computer Driving License standards by the Kingdom of Saudi Arabia highlighted efforts to convert to a digital society (Alhudhaif & Nalband, 2012). The government has also been proactive in the adoption of several other policies and plans to modernise Saudi Arabian life (Alhudhaif & Nalband, 2012). In 1997, in an attempt to expand the use of new technologies, steps were taken to make the Internet readily available in Saudi Arabia, despite its traditional roots. Thereafter, the Internet was integrated into daily life and function of Saudi Arabian society and its economy (Communication and Information Technology Commission, 2009). According to Simsim (2010), Saudi Arabia now has the largest Internet user population in the Arab world, having witnessed one of the fastest Internet service spread rates worldwide. There are restrictions placed preventing access to certain sites; although social networking is not blocked, certain freedoms of expression are limited. These include any writing that support the terrorist ideology, or Bin Laden, or the insurgents in Iraq and Afghanistan. Severe punishments from the government also apply against those who publically criticise the government, or slander public figures, or criticise the religious police (Al-Saggaf, 2011).

1.2 Research Questions

This thesis examines the attitudes of Saudi students and teachers towards computers. The main questions addressed in this research are as follows:

1. What are Saudi undergraduate students' attitudes towards computers?
2. Are there any differences based on gender in Saudi undergraduate students' attitudes towards computers?
3. Are there any relationships between attitudes toward computers and computer experience?
4. How does parental education level, school of study and English language knowledge affect Saudi students' attitudes to computers?
5. Are there any differences between students in different geographic areas in their attitudes towards computers, encouragement to use computers, computer skills and computer experience?
6. What are Saudi teachers' attitudes towards computers?
7. Are there any gender differences among Saudi teachers' attitudes towards computers?

1.3   Research Hypotheses

This research focuses on examining three hypotheses about the Saudi students' attitudes towards computers. These hypotheses were drawn from initial studies which are discussed in detail in the next chapter. These hypotheses are as follows:

1.   Saudi undergraduate students have positive attitudes towards computers, but male students have stronger attitudes than female, males are more confident and less anxious than females.

2.   The children of parents who have used computers and seem to have a positive attitude toward computers, or have high education levels, have stronger positive attitudes to computers, than children of parents who don't use computer.

3.   Students from the capital city have more positive attitude toward computers than students from other cities which are smaller and whose students who come from villages.

1.4   Contribution

1.   This is the first major study of KSA university students' attitudes toward computers. There have been many previous studies conducted around the world but, as discussed in the literature, different cultures produce different results. This study observes male and female Saudi undergraduate students with a sample of 1,073, from different fields of study and from different universities.

   There are two comparable studies which were conducted among Saudi students. One study by Oshan and Khudair, (2008), was restricted to undergraduate students at one university (King Saud University in Riyadh) and from the Science and Humanities College, considered measuring their attitude toward the Internet. This study adapted the Internet Attitude Scale (Tsai et al., 2001), which covers four subscales: perceived usefulness, affection, perceived control and behaviour, and each subscale include 5 statements. The other study was by Alharbi, (2010) which was conducted to measure attitudes of students at King Abdulaziz university (in Jeddah) toward E-learning, using the Perceptions and Attitude Toward E-leaning scale, which covered five

subscales: perceived ease of use, perceived usefulness, perceived flexibility, perceived interactivity and perceived accessibility.

2. This is the first study within KSA to examine the relation between the attitudes of students and their parents to computers, and the impact of parental encouragement.

3. This study is the first study whose sample includes university students from the capital city of Saudi Arabia (Riyadh) and from other small and non major cities (Majmaah, Kharj and Hail), to allow comparison between the two groups regarding attitudes toward computers.

4. This study is the first which includes qualitative and quantitative studies conducted among university students to find description and details of their attitudes to computers, computer use, experience, and their skills. This gives us a chance to compare the findings from both types of study and to find reasons and explanations behind the numbers.

5. This research in computer attitudes is a first collective study among university students and school teachers in KSA.

6. This study is the first to find that parents in KSA culture have a strong role in their children's use of and positive attitude to computers.

7. The study found differences between students from the capital city and students from other non-major cities in KSA in attitudes toward computers. The study suggests that these differences result from differences between parents' education and use of computer in the different kinds of city.

8. The finding of this study contribute to improving the education system in KSA and to increase the quality of learning that students can have using new technologies.

1.5 Thesis outline

This thesis is structured into seven chapters and twelve appendices. These chapters are organised as follows:

Chapter 2:

This chapter discusses the Saudi Arabia culture, education, women, and Internet and mobile phone use. Following that, some studies which examine students' attitudes toward computer, as well as the factors that can affect students' attitude such as computer confidence, computer anxiety, gender. The last section of this chapter contains studies that consider differences in attitudes towards computers based on culture.

Chapter 3:

This chapter explains and discusses pilot study based on interviewing Saudi postgraduate students who live and study in UK. It also presents another pilot study which was conducted with UK postgraduate students.

Chapter 4:

The fourth chapter presents a statistical study which was conducted among Saudi undergraduate students. Details are given of the instrument and methodology that were used to examine Saudi students' attitudes toward computers. Then, the validity and reliability of this instrument are considered. Subsequent sections discuss in details the statistical findings and then discusses these findings.

Chapter 5:

In this chapter a qualitative study with Saudi undergraduate students is reported. The reason and method of conducting this qualitative study are explained in this chapter, as well as the findings of this study.

Chapter 6:

This chapter includes details of the qualitative study which was conducted with Saudi high school teachers. The reason and method of conducting this qualitative study are explained in this chapter, as well as the findings of this study.

Chapter 7:

This last chapter discusses of the findings from all the studies with students and teachers. Relevant finding in all these studies are reported as well as differences in the findings and the reasons for them.

Also, this chapter includes the main contributions of this research and recommendations that come from the findings of this research. Also this chapter reports the answers to each research question with a summary of the main findings of this study.

CHAPTER 2.   LITERATURE REVIEW

The following sections will give brief information about Saudi Arabia, education in Saudi Arabia, women in Saudi Arabia and the integration computer and mobile phone in Saudi Arabia. This leads to discussion about Saudi culture and how it differs from that of other cultures and countries. These differences in culture affect the acceptance and integration of technology such as computers. Students' attitudes towards computers in schools and colleges have been measured and discussed in many previous studies in different countries around the world, but the results of such studies have varied. This may be due to the fact that many different methods have been used to measure students' attitudes in this regard. Some studies focus on factors related to computer attitudes, such as: computer anxiety, computer experience, computer confidence, and computer liking. In addition, many researchers have concentrated on how gender affects computer attitudes and computer confidence. The following sections discuss some of these previous studies on undergraduate students' attitudes toward computers, differences in attitudes toward computers based on gender and factors affecting computer attitudes (anxiety, confidence, cultural differences, and parents).

2.1   Women in Saudi Arabia

The Kingdom of Saudi Arabia has a legal system (Alhudhaif & Nalband, 2012), based on Islamic Shari'a law (Alhudhaif & Nalband, 2012; Islam, 2014). This provides many freedoms to women including the right to work. However, societal practices stipulate that women must only work within 'decent, appropriate environments', which avoid free-mixing with the opposite sex. Therefore, within educational and workplace environments there is gender segregation (Alhudhaif & Nalband, 2012, and Alahmadi, 2011). In Saudi Arabian culture, as is the case in many countries worldwide, the main role a woman assumes traditionally is that of wife and mother (Alhudhaif & Nalband, 2012).

A family's reputation and male honour is largely linked to female members of the family's actions and respect. For example, if a female member of a family commits adultery or has illegal sexual relations or contact with a man outside of marriage, this

damages the honour and reputation of the entire family. For example, a story emerged in the global media stating that a Saudi father had murdered his daughter for using Facebook to converse privately with a man outside the family (Al-Saggaf, 2011). In part, these biased gender-based cultural beliefs explain the additional difficulties introducing technology into female only classrooms (Amoudi & Sulaymani, 2014). The Saudi legal system appears to be more lenient in its treatment of males than females, setting more regulations to govern the behaviour of women than men, including placing limitations on accessing and using technology, especially the Internet and other resources that might facilitate contact forbidden in Saudi Arabia (Amoudi & Sulaymani, 2014).

Despite efforts to improve and modernise the Saudi country, the representation and employment of Saudi Arabian women in the private sector remain limited. This is mainly caused by a lack of opportunities, the prevailing cultural traditions and legal constraints. An additional barrier to women working is the fact that it is illegal for a women to drive in Saudi Arabia, which makes it difficult to commute to work. This also helps to explain the significantly higher unemployment figures for Saudi women than men (Alhudhaif & Nalband, 2012). However, recent trends have shown a rise in employment amongst Saudi women; for example since 1992, the employment rate for Saudi women almost tripled, from 5.4% to 14.4% (Alhudhaif & Nalband, 2012). Most Saudi employed women were employed in the public sector; 30% in the civil service. 85% of these worked predominately in the education sector, as teachers or administrators. 6% of the female labour force worked in public health and 4% in administration (Alhudhaif & Nalband, 2012). According to Islam (2014), 90% of Saudi women currently involved in the workforce are educated, but their qualifications will not necessarily lead to employment: Nearly 80% of unemployed women in the country have university level education or more. More than 1 million Saudi women are unable to enter the workforce because of their lack of education or appropriate skills. These women, some of whom lack the support of a husband or family, suffer heavy social and economic repercussions (AlMunajjed, 2009).

More recent figures on women's employment suggest the advancement of technology has increased opportunities for Saudi women; this in turn will hasten the socioeconomic development of the country. An increasing number of Saudi Arabian women now are able to use modern tools such as computers and the Internet, and this has affected their

productivity to society, without compromising cultural norms and religious beliefs. An increasing number of Saudi Arabian women have taken full advantage of technology, by working from home in professions such as writers, translators and designers, since this work can be carried out remotely via a home office with IT equipment, which enables them to communicate and collaborate with their clients (Alhudhaif & Nalband, 2012). Female employment in Saudi Arabia is increasing cumulatively, as the roles available to women as a result of computer technology, and opportunities to work in exclusively female only work environments for a female clientele, are increasing (Alhudhaif & Nalband, 2012).

In online social forums, women are well represented on typical issues that relate to women, e.g. 'women only issues' and 'beauty and fashion'. Women are underrepresented in forums of that are political in nature, possibly because Saudi women are less interested in these topics, but maybe also because Saudi men are intolerant of women discussing politics. There are also social barriers to engagement in such forums, as they can involve "talking back" and arguing one's case, which are outside the norms of prescribed female behaviour (Al-Saggaf, 2011). Indeed, Saudi culture places many expectations on public female behaviour. Women are expected to be "shy, reserved and modest", which in turn ensures they are less engaged with the opposite sex and lack the ambition to contravene established norms (Al-Saggaf, 2011).

As mentioned above, gender inequality in Saudi Arabic is fuelled by religious beliefs, rules and traditions that impose restrictions on women's mobility and public activity. This also influences media and technology use (Miliany, 2014). Saudi women are restricted from using technology by a prohibition on entering Internet cafes, unless accompanied by a male relative, and on exposure to pornography unintentionally via the Internet. Despite this, the number of Saudi Arabian women using the internet is rising, empowering them by providing a public space for interaction, including anonymous roles in chat rooms, as well as access to helpful information and discussions in online forums (Miliany, 2015).

2.2   Computers in Saudi Arabian Schools

Countries such as the United States of America, Britain, France, Australia, Japan, and Russia, as well as some developing countries, have expended money and effort to train

teachers, establish laboratories and provide equipment, books, programs, and educationally appropriate means of communication to facilitate technology use in the classroom (Aldail, 2003). In comparison with those in the developed world, students in Saudi Arabia have lower levels of knowledge and skills. This could be explained by the lack of skilled teachers in Saudi Arabia, since the education system is only as good as its teachers. In the short-term there is a need to deal with the acute shortage of teachers. Authorities have resorted to hiring inadequately qualified teachers who are unfit to teach, thereby resulting in less knowledge and skill levels among Saudi students (MENA, 2013).

Coughlan (2015) notes that, as per the school global ranking based on maths and science, schools in Saudi Arabia were at number 66 out of 76 countries. The observation is that those with such a low ranking, such as Saudi Arabia, have a tendency to push away from actual learning in the direction of repetitive rote learning. Education policies and practices are not ideal, and are what leads to perpetual economic recession, but the theory is that if all students in the country have at least a basic level of education, this situation can improve.

The education system in Saudi Arabia is comprised of three types of schools: elementary, intermediate, and secondary. There is also adult education if one then wishes to climb the education ladder. As is also the case in several Western educational institutions, schools are single sex. The Ministry of Education has tried to adapt the way education is delivered in schools to reflect societal, economic and technological advances.

The initial introduction of computers to the curriculum in public schools first took place in 1984, within the remit of the secondary education developer programme, which included three components. These were computer introduction, teaching the programming language BASIC, and introducing information systems; however, in 1990 this was discontinued. In 1993 a new department was added to the secondary stage, known as the Science and Technology Department. It had its own curriculum design, but this was limited in its deployment, since a limited number of schools applied to join, because of the costs of operations and requirements. In 1996, there was an increase in the number of lessons teaching how to use computers, from once to twice a week at secondary level, and core exams were introduced, following ten years of theoretical

assessment only. Based on recommendations made by National Family Computers (organisation at Saudi Arabia), modified computer platforms were introduced in 1999 to secondary schools, and on average these were made available to pupils from second-grade secondary by the year 2000 (Alrashed, 2003).

In 1997, the Ministry of Education decided to introduce computer use as part of its curriculum for secondary school students (Aldail, 2003, Alshumaim & Alhassan, 2010). This led to each secondary school being given a computer lab, and teacher training courses were provided for selected and able teachers. More recently, this policy was extended to include primary schools. However, due to the shortage of teachers and trained maintenance staff, this initiative was discontinued (Alshumaim & Alhassan, 2010).

The curriculum was built and led by the Ministry of Education, and relied on establishing computer labs in schools to be provided for centrally by the Ministry; these were launched in 2001 at the secondary level only. Every secondary school must have at least one computer lab, as should intermediate and secondary schools. Computer labs should ideally contain 17 computers, if two conditions are met, i.e. that the school has 12 classes or more and takes place in a government building (not a rented building). The ministry has introduced special functions and qualifications to prepare teachers to use computer labs: these are the Bachelor of Computer secondary stage and Diploma in Computer for intermediate and primary school (Alfaleh, 2007). The high school computer curriculum includes two parts: The first part covers fundamental topics in computer science and an introduction to programming. The second part is called "Technologies and Programing for Smart Devices (Henne, 2015). Computer labs were initially built in schools to enable students to learn how to use computers, and so they were not linked to general learning, which leads to an ineffective use of computer labs (Amoudi & Sulaymani, 2014).

Saudi Arabia faces several difficulties in terms of its information technology development; these arise from cultural, social, political, economic, and educational factors, with research showing that most will be referred to as technical and socio-cultural factors (Al-Maliki, 2013). To date, in Saudi Arabia, technology development and implementation have been hindered by infrastructural inadequacies, poor

management, poor maintenance services and technical support, and a lack of suitably qualified and skilled human resources staff (Al-Maliki, 2013).

The slow implementation of technology in classrooms results from a lack of resources, which means technology tends to be focused on a single subject, instead of being accessible across the entire learning system (Amoudi & Sulaymani, 2014). Aldail (2003) conducted a study to determine computer availability and training among computer teachers in High School in the city of Riyadh. The results of that study revealed that computer teachers felt that their training was not suitable, for example in terms of the number of people trained, or the training itself (i.e. the number of training hours, and material and moral incentives) and the support offered subsequently. These results suggest that the programmes and courses fail to meet the real needs of the trainees (Aldail, 2003 & Oyaid, 2009).

According to CITC, (2009) in Saudi schools about 50% of computers are used to carry out daily activities and maintenance for administration staff. However, in 2009 58% of educational organisations failed to provide IT related training to staff. Training for staff on database management and accounting were the most frequently utilised training packages (21% and 18% respectively). In 2014, Internet usage within educational institutions in Saudi Arabia was reported to be relatively high; only 25% of the educational organisations which had computers with Internet access provide the service to 81% of its students, while 19% of educational institutions don't provide Internet access to their students (CITC, 2014). The lack of Internet access was due to: 'it is not available,' 'it is not necessary for school' and 'we don't know how to use the Internet'. 33% of teachers' use the Internet at educational institutes, with secondary students being the most frequent users than students in primary and intermediate level. 40% of educational institutes have their own website. This is less true of lower grade institutions, and their hosting is limited within Colleges and Universities (CITC, 2009). Almulhim, (2014) discovered other barriers linked to teacher or school related problems. Teachers' attitudes towards technology, resistance to change, lack of time, lack of confidence, skills and knowledge to use technology could also create barriers to using technology. However, a schools' inability to offer access, effective training, or technical support and the high cost of hardware and software also present potential barriers to technology use in schools (Almulhim, 2014). Similarly, Sabti & Chaichan (2014), who conducted a study to examine Saudi high school students' attitude toward

28

computers in relation to learning English, found three barriers which affect student attitudes. These are: lack of motivation; lack of skills; and lack of equipment. Based on the CITC (2009) research findings, it is interesting to note that teachers were the least likely staff members to use the computers at their institutions.

2.3   Higher Education in KSA

There are attendant economic, social and political benefits when a developing country chooses to invest in and give greater importance to its education sector (Alturise & Alojaiman, 2013). This is of particular importance to Higher Education, since it aims to generate the most specialised and professionally focused individuals. Students spend 3 to 4 years studying a special topic or topics which help them to become experts in their chosen field.

Saudi educational policy is aimed strategically at eliminating illiteracy; this improves educational efficiency as well as meeting the religious, economic and social needs of the country (Al-Maliki, 2013). Saudi Arabia's petroleum exports have given the country a well-developed economy, helping it to develop quickly in other spheres (Alturise & Alojaiman, 2013). Saudi Arabia established its Higher Education in 1950s, with the foundation of King Saud University. Higher Education is free for every student and the government issues a monthly grant; this has led to a rise in the number of students (Alturise & Alojaiman, 2013).

Saudi Arabia's universities segregate the genders in the same campus, excluding the Colleges of Medicine and King Abdullah University of Science (Alturise & Alojaiman, 2013). Because of the division of the universities by gender, male and females do not usually receive equal opportunities. Male students have a wider range of educational and specialist choices available to them, since the public and private sectors are dedicated to men, whereas most women study and work in the education or health care fields (Almunajjed, 2009 & Elsherbeeny, 2014). As a result of the restrictions of culture, and the biased expectations of the societal role of females discussed above, the education system has consistently reinforced the cultural norms of a gender-segregated society (Alahmadi, 2011). A consequence of this is that the majority of females graduate from humanities and education departments, and many women choose to enter the field of education when they graduate, as teaching is seen as a job suitable for females, extending the perception of what a woman's role should be beyond mother and

housewife (Almunajjed, 2009). A significant issue is the availability of jobs for educated women, but this is by no means the only challenge. Further to this is the issue of the fields of education and training, at university standard, for women being restricted. It seems to make no sense that the fields open to women have nothing to do with the needs of the labour market, and most fields, such as architecture, science and technology, engineering and agriculture, for example, are dominated by men (Islam, 2014).

In terms of Higher Education, education and training opportunities were limited for women, as the available specialisations do not reflect the needs of the labour market. Then women in Saudi Arabia tend to gain degrees in education and teaching, human sciences, natural sciences, and Islamic studies (Almunajjed, 2009). According to the Ministry of Higher Education in Saudi Arabia (2010), in the country at present, in addition to universities, there are over 300 higher education colleges especially for females. Moreover, women make up over 56.6% of the Saudi university student population and over 20% of the number of students on scholarship programmes abroad. These figures are expected to rise in the near future as the result of the formation of several new universities in the country's main cities. The 2009 global gender gap report placed Saudi Arabia at number 25 in a list of countries in relation to the gender gap for university registration, meaning that figures were better than those in countries like the United States (Ministry of Higher Education, Saudi Arabia, 2010). However, it is still the case that women have less access to engineering courses, which have been and still are traditionally filled by men (El-Sherbeeny, 2014). Furthermore, female students are disadvantaged by the lack of equal opportunities to win scholarships abroad. They are limited by the condition imposed by the Ministry of Higher Education that requires the consent of their closest male relative to be granted a scholarship to study abroad (Almunajjed, 2009). As Saudi Arabia law is based on Sharia, a Saudi female need male guardian, such as her father or her husband if she is married, to make decisions. This forbids females to travel, get married, or study and work abroad unless her guardian approves.

Lack of ICT skills are an obstacle to introducing and institutionalising technology within the Saudi Arabian education system. This is less true of developed countries (Alturise & Alojaiman, 2013). Even though technology is available and educators may have the competence to use technology (Alturise & Alojaiman, 2013), there is great

resistance to technology in the classroom (Alfahad, 2012) and it is rarely used (Alturise & Alojaiman, 2013). Moreover, "professors and students at the university level have grown comfortable with e-mail and Web pages, but less than 10% of faculty use these technologies for teaching" (Alfahad, 2012). Barriers preventing the use of technology in the classroom include: lack of availability of technology and support (Alfahad, 2012) and insufficient time to acquire technical skills. Cultural norms and community attitudes also play a role in preventing technology use at Saudi universities (Alturise & Alojaiman, 2013). The pressure of staff shortages could be alleviated if students could access lectures remotely (Alturise & Alojaiman, 2013). The differing attitudes of members of staff can affect learning and teaching, since a lack of confidence can fuel feelings of inadequacy, insecurity and failure. It can also cause resistance to change, negatively affecting use of technology systems at universities (Alturise & Alojaiman, 2013). Moreover, a lack of access to resources at home discourages students and teachers from integrating new technologies into university courses. International students experience language barriers, since most software and applications use English and are worded in unfamiliar jargon. Therefore, before students can use technology to complete their assignments, they must first learn the basics of a language used for relevant software applications (Alturise & Alojaiman, 2013).

2.4   Internet Use in the KSA

As stated above, Internet services were officially made available in the Kingdom of Saudi Arabia (KSA) in 1997 (Miliany, 2014; Simsim, 2011 & Sait et al., 2007). The penetration of Internet in Saudi Arabia increased significantly since then (CITC, 2014). Simsim (2011) reported that the use of the Internet in Saudi Arabia is popular among both men and women. However, access to the Internet from Internet cafes and work environments is not equitable for males and females, as public access to these facilities is not available to women (Sait et al., 2007; CITC 2014). According to the Internet world state (2014), use of the Internet is continually rising amongst Saudis; in 2013, 49% of the population had access to Internet, and in 2014 this further increased to 66%.

The increased use of games, videos, and social networking among Saudi Arabians led to an increase in the demand for Internet services and broadband. This increase is expected to continue in the coming years as a result of expanding availability, improvement in

Internet quality, the continual increase in content, and the growing use of smart applications and devices (CITC, 2013).

Previous studies have reported that new technology, such as the Internet, has influenced young adults and teenagers the most (Miliany, 2014, Warf & Vincent, 2006 & Simsim, 2011). According to CITC, (2014), in Saudi Arabia the majority of his participants used the Internet, and only 9% of respondents did not. Most Internet users were found to be between 12 and 29, but a large percentage of Internet using respondents were over 45 (CITC, 2014).

According to CITC (2014), web browsing, social networking and communication have been the main reasons prompting Saudis to use the Internet at home. CITC (2014) reported that Saudi Arabians were accessing the Internet for basic purposes, such as entertainment, information searching, communication, and browsing. Therefore, the majority of participants reported four important reasons for using the internet: browsing websites 87%, social networking 67%, communication with people 55%, and looking for information 54%. The largest group of users, within the age range 15 to 25, used the Internet for chatting, browsing and emails (Miliany, 2014). Similarly, Simsim (2011) found that a major reason for using the Internet was to access email. Emailing helps to maintain relationships with partners, colleagues, relatives and friends. The majority of Internet users in Saudi Arabia also use social networking sites like Twitter and Facebook, among others (Al-Saggaf, 2011).

In terms of education, 55% of participants use the Internet for learning and education purposes (CITC, 2014). Previous studies reported that a majority of Saudis over the age 26 tended to use the Internet for cultural purposes (Simsim, 2011); that is for work, business, banking and information collection. Females use the Internet more than males, and singles more than marrieds (CITC, 2014). In addition, students were the highest rate Internet use for more than 8 hours daily.

According to the CITC (2008) study 79% of Saudis had not used the Internet for online shopping. The main reason for this was that 52% of participants believed shopping online to be unsafe, and 35% did not feel a need to use electronic shopping when everything is available in stores, and 36% do not like online shopping (CITC, 2008).

The data collated here reveals that the Internet is considered a vital communication tool by young Saudi people, due to its socially enhancing dimensions, the opportunities it offers to expand social circles by providing opportunities to meet new people online and keep people connected at all times, regardless of time or location (Miliany, 2014). Sharing information around the world in this way was also found to be appealing (Miliany, 2014). However, this type of use can have negative effects, such as isolation, since using computers increases the desire and inclination of young Arabs to spend time alone; reducing the likelihood of social interaction (Miliany, 2014).

The home was the first point of access to the Internet, and the one most frequently reported by participants (CITC, 2014). About 55% of younger adult (age between 20 to 29) accessed the Internet from educational institutions, while 83% of the same group accessed Internet at home (CITC, 2014). There is a gender difference regarding places to access the Internet. Males have greater opportunity to access the Internet from outside, such as cafes, libraries and work place, but such opportunities are limited to females, as discussed above in relation to gender (CITC, 2014).

According to CITC, (2014) in 2014, about 91% of people in the Kingdom of Saudi Arabia use the Internet. People who did not use the Internet, gave as reasons their inability to use a computer (CITC, 2014; Simsm, 2011), don't know how to use the Internet (CITC, 2014), the unaffordability of Internet access (CITC, 2014 & Simsm, 2011), or restrictions imposed on them by family members limiting their Internet access (CITC, 2014). Insufficient time (Simsm, 2011 & CITC, 2009) and lack of interest or willingness to do so (CITC, 2009).

In similar studies by Al-Kahtani et al. (2006) and Ageel (2011), respondents mentioned the absence of Internet skills and computer literacy as a barrier, also. Their qualitative research studies examined facilities at a university and female attitudes to the Internet. The studies reported that the more conservative elements of society fear that it is dangerous, and that its dangers outweigh its benefits. However, all participants from different departments, both users and non-users strongly agreed on the importance of the Internet as a research tool (Al-Kahtani et al., 2006 and Ageel, 2011). Therefore, women have a strong opinion concerning the Internet, even if they do not use it, or have access to it. The studies also found some female students were prevented from using the Internet by their parents (Miliany, 2014). Interestingly, females from scientific faculties

searching for new knowledge were more likely to see the Internet as an important resource to develop their skills, whereas other participants emphasised the Internet as an easy to use tool to communicate with colleagues (Al-Kahtani et al., 2006 and Miliany, 2014).

Although, has been a sharp increase in the penetration of computers and Internet in Saudi Arabia, the majority of Internet users in 2009 were located in the major large cities, and in some areas increases are not reflected (CITC, 2009). In cities, accessibility to the Internet is greater; it is high quality and this impacts the high levels of education in the cities (Sait et al., 2007).

The study by CITC (2014) reported that 84% of their Saudi responses used computer devices such as laptop, desktop and tablets, while 16% don't use any of these devices. The main reason for not using computers was 'I don't need a computer device'.

A further issue considered of importance is the availability of Arabic language search facilities and Arabic content on the Internet. The study by CITC (2014) reported that a large percentage of Saudis prefer to use an Arabic operating system and web contents. According to Al-Kahtani et al. (2006), most users access email using Arabic versions and Arabic Internet facilities were preferred. However, there are limited Arabic websites and Arabic online resources, which prompts users to move toward preferring English websites, which have valuable and diverse contents and sources. In relation to the problems facing Arabic Internet users, difficulties were found as Arabic websites lacked content (Al-Kahtani, 2006 and Alismaiel, 2013). Therefore, knowledge of the English language is an important component determining successful and regular Internet use. A wider range of developed Arabic websites would increase Internet usage to corresponds with the growing accessibility across Saudi Arabia.

2.5   Smartphone usage in Saudi Arabia

The integration of smartphones and their effect on daily life has been steadily increasing. Saudi Arabia has been reported as one of the six leading countries in the adoption of smartphones (Google Mobile, 2012), with 60% of the Saudi population using smartphones in 2012 (Google, 2012). This increased to 79% in 2013 (Mcilhone, 2014; Emarketer, 2014). In 2013, the "total number of mobile subscriptions in Saudi Arabia reached around 51 million, with a penetration rate of 170%" (CITC, 2014, p1).

Research by the Arab Adviser Group (2014) found that Saudi Arabia tops the list as the most competitive Arab cellular market in that year, and smartphone utilisation was expected to grow by 39% in the Middle East by 2015 (Amgoo, 2014). A study by Nielson (2014) states that in Saudi Arabia, 67% of the population above 16 years of age uses a smartphone. This percentage is even higher among youths (73%), with a large population of users under the age of 15. Saudi Arabia will thus remain a key growth market for smartphone manufacturers. The Arab Adviser Group (2011) also found that 8.2% of users in Jordan and the UAE prefer to use applications in the Arabic language, while about 47% of Saudi participants use applications in Arabic. McIlhone (2014) found that 84% of smartphone users accessed the Internet with their mobile phones in 2013.

A study conducted in Saudi Arabia by Google (2012) found a 60% overall adoption of smartphones, with 47% using their smartphones every day and 75% who claim to not leave home without their devices. 86% of the participants in this study said they use smartphones at home, 66% at work, 65% on-the-go, and 41% in educational institutions. 60% access the Internet on their smartphones at least once a day. Regarding the purpose of using a smartphone, 73% use them to access search engines, 71% use email, 63% use video sharing sites, and 62% use social networking sites. 72% use their smartphones for communication by making phone calls, sending messages, emails, or/and social networking. 62% use smartphones for access to up-to-date news and information from news websites, blogs, or message boards. 85% of Saudi smartphone owner use smartphones for entertainment, including browsing the Internet, watching videos, listening to music, and playing games (Google, 2012). The study also demonstrated the extent to which users consider their smartphones essential: 28% of participants would rather give up TV than their smartphone (Google, 2012).

Smartphones and tablets are also becoming cheaper, and because they are mobile devices, they provide access to the Internet on-the-move, unlike desktop computers. Tablets and phones thus boast a great degree of functionality over desktop computers (Nassuora, 2012).

The use of mobile phones provides opportunities for improving both learning and teaching methods, especially because many students may be interested in using them to enhance their education.

Nassuora (2012) surveyed 80 students from Al-Faisal University in Saudi Arabia, which is a private Institute of Higher Education. All students claimed to use mobile devices, with more than 47.5% using Blackberry devices and more than 86.2 using mobiles to access the internet. However, 82.5% of the participants said they do not use their mobiles for learning.

2.6   Urban and Rural Areas in Saudi Arabia

A country may experience the digital divide as the result of a resource gap between urban and rural areas, or within urban centres between richer and poorer educational establishments. The digital divide may also be present within these establishments due to only some families having access to the internet at home, which can influence expectations in relation to homework. Further to this, it may also be present between males and females at home as the result of parents giving preferential access to ICT to their sons over their daughters, or in school as the result of boys monopolising ICT. Finally, it can also be present between age groups where, for example, older people may not be accustomed to ICT (Anderson, 2010).

The population of Saudi Arabia was 30,770m in 2014 (Central Department in Statistics and Information, 2015). By 2010, 82.1% of the Saudi population lived in urban areas while 17.9% lived in rural areas (GEOHIVE, 2015). A large number of Saudi have thus migrated from rural to urban areas in recent years. This is partly because larger cities tend to offer higher salaries and increased access to social services, such as medical centres, education institutions, entertainment, and modern amenities.

Perhaps the most important of these factors is access to education. It has been estimated that a quarter of the country's rural population fails to get any kind of formal education, and half of that number cannot read or write. In urban areas, the percentage of those who do not get a formal education is only between 8 and 9%, and all of them can read and write (Alsakran, et al., 2009). Most large Saudi Arabian cities have a multicultural population with varied backgrounds. This differs from the typical population of smaller cities, towns, and villages, which contain many Bedouin families who have special practices and different customs (Al-Silami, 2010), they used to live in tents and their main career was rearing animals.

Greater challenges are faced by women in rural settings, where illiteracy and both patriarchal and conservative social norms are more common. Regional unemployment rates highlight the fact that there are far fewer employment opportunities in rural settings. Hail city in the north of Saudi Arabia has the highest rate of unemployment at 35% (Almunajed, 2009). The Saudi Arabian government has developed various programmes to promote rural women's rights, particularly for those who live in areas with especially poor conditions. Saudi women in urban and rural areas should thus have similar opportunities to access resources such as schools, universities, and health care (Sbarahmeh, 2011). The process of meeting the demands of rural areas is not easy, however, as access to technology is necessary, and this, in turn, requires rapid and widespread implementation to be successful (Hollifield, et al., 2003).

Moreover, encouraging the implementation of information technology is complicated among demographic groups who oppose the idea of integrating technologies (Hollifield, et al., 2003). Living in rural area often means having fewer opportunities to access technology and other resources than for people who live in areas with multi-ethnic populations and other groups, which are associated with successful use of information technology and greater availability of resources (Menachemi, et al., 2007). The size of the city and population are the main causes of the differences between urban and rural areas, and most people who live in rural areas have poorer attitudes toward using technology in general, with many of them not even using technology for communication, such as sending emails (Menachemi, et al., 2007).

Certain areas of the Kingdom of Saudi Arabia are more accepting than others of the idea of implementing technology in education. Urban centres, in particular, tend to have a different mentality as a result of globalisation. This includes a more moderate perception and understanding of the Quran as it affects women's rights and autonomy. Urban areas also have groups of female activists who campaign for greater rights, especially in terms of morality and education. This may have contributed to several educational institutions for women integrating technology into their classrooms. However, in rural areas of Saudi Arabia, the mentality of the population is less progressive, the application of the culture and customs is more traditional and strict, and women are expected to abide by old-fashioned rules. Women in rural and small cities often believe that they don't have to study and work. They just wait to be a house wife

and mother staying at home, and therefore technology is not applicable to them as they think they will not need it in the future (Amoudi & Sulaymani, 2014).

Many young adults from the rural areas of Saudi Arabia try to find work in the cities, leaving an increasingly elderly population in the rural areas, so schools also tend to accumulate in urban areas. Rural students consequently tend to have lower achievement than students in urban areas (Al-Silami, 2010). Urban schools have more resources than rural schools, and their teachers are more experienced (Al-Silami, 2010). Students in urban areas come from more varied ethnicities and backgrounds and are stronger in both learning and creative thinking, which is neglected and unrecognised in traditional education. Another reason for the difference in the level of success between rural and urban areas is that the parents of urban students also tend to be better-educated. This many make them more likely to encourage their children to develop creative thinking abilities than rural parents, who have less experience with education (Al-Silami, 2010). So urban and rural environments could differ in custom and norms, educational support, using ICT, access to internet, and range of employments.

2.7 Definitions of Attitudes

The concept of 'attitude' has been constantly changing over the years (Schwarz, 2001). The word 'attitude' can be defined as "a complex mental state involving beliefs and feelings and values and dispositions to act in certain ways" (The Free Dictionary, 2015). Edwards (1983) defined attitude as "the degree of positive or negative affect associated with some psychological object" (p.2). Attitudes can differ greatly from person to person. A person who likes or has a positive attitude toward something will generally experience positive feelings about it, and vice versa (Edwards, 1983).

Jowell's (2005) definition of attitude is "a psychological tendency to view a particular object or behaviour with a degree of favour or disfavour" (p.1). In general, attitudes are shaped by a self-assessment of individual processes, including a coherent evaluation of benefits versus drawbacks. Attitudes may also be influenced by related beliefs and emotional and affective reactions. Attitudes concern behaviour or goals, whereas beliefs are more general, relate to a broader outlook, and tend to be consistent (Jowell, 2005).

Attitude is defined by Ajzen (2005, cited in Larbi-Apau & Moseley, 2012) as "a disposition to respond favourably or unfavourably to an object, person, institution, or

event" (p.222). This definition links attitude to behaviour through beliefs, including control beliefs which relate to the existence of factors that can help or block behaviour performance, normative beliefs, which relate to perception of social normative pressures, and behavioural beliefs, relating to the outcomes of certain behaviour,which all drive the behaviour of the individual.

The combination of all these belief systems creates the intention of behaviour, and attitude is thus able to affect factual behaviour (Larbi-Apau & Moseley, 2012). Martino and Zan (2003) also suggested that attitude is associated with emotion and beliefs, which interact deeply to build the affective domain.

Bock and Kim (2001) proposed that the performance of any specific behaviour can be determined by different behaviour intentions. Attitudes and subjective standards together determine the intentions of the behaviour. Therefore, evaluating beliefs about the consequences of a behaviour can determine a person's attitude toward that behaviour. Moreover, a person's combined reactions and standard beliefs determine their subjective position (Bock and Kim, 2001). Attitudes can develop as the consequence of imminent experience or because they are expressed by others. They act as a demonstration of how people think, feel and plan to respond in certain situations.

2.8   Undergraduate Students' Attitudes toward Computers

According to Selwyn (1996), a "fundamental outcome measure of students' computer use is their attitude toward using the technology". Having an understanding of how using computers is related to students' attitudes concerning effective teaching has become more important as the role of technology in education has broadened. Understanding students' attitudes and beliefs about computers is essential in designing effective computer related courses (Yalcinalp, 2005). Students' attitudes have an impact on their responsiveness to the resources made available to them during the course of learning and teaching. Attitudes have been known to predict individual differences in many educational goals (Timothy, 2008). Attitudes toward computers are an essential element in computer use for education because attitude has an effect on information technology acceptance as well as an effect on performance in the work sector (Selwyn, 1996). Optimistic attitudes can accelerate learning, accomplishment and the success of the programme (Kutluca & Baskan, 2013). When students are interested

and motivated, this has a substantial impact on their learning attitudes (Liu, 2009). If a negative attitude towards computers exists, it is more likely to cause higher rates of error and slower learning and can lead to little or no participation in computer activity when linked to high anxiety (McIlroy, et al., 2001). This can lower the effectiveness of teaching and also achievement because the overall success of the programme is negatively affected (Kutlucai & Baskan, 2013). The use of ICT in the classroom has proven challenging for teacher education, which involves preparing teachers to use ICT in their teaching practices (Sang et al, 2009).

Several studies in different countries have focussed on investigating undergraduate students' attitudes toward computers. Most studies found that students hold a positive attitude toward computers (Stephens & Creaser, 2002; Eyadat, 2006; Teo, 2008; Pamuk & Perker, 2009; Korobili, et al, 2010; Yusuf & Balogun, 2011; Sabti & Chaichan, 2014). However, they differ in relation to the factors making a student's attitude to computers positive or negative. Several factors such as computer confidence, computer experience and gender, have been identified that enable a greater understanding of computer attitudes (Smith, et al., 2000).

Powell (2013) conducted a systematic review to compare results of previous studies in relation to computer anxiety and attitude. This compared the results of 20 previous studies pursuant to computer anxiety (CA) and attitude. The majority (70%) found a negative correlation between CA and attitudes toward computers. Higher CA equated to more negative attitudes towards computers. Lower CA is linked with better attitudes. One study found CA to be the strongest forecaster of attitudes for both genders. The link between the two was found to double between 1986 and 2005, but the relationship remained negative throughout this time period. One study by Brosnan & Lee (1998), using two samples, found a negative relationship between the two: there was a negative link in relation to UK undergraduates, but a positive one for Hong Kong undergraduates, which can be explained by males in the latter being more anxious using computers than females. Whereas in 2000s, fewer research studies were conducted in relation to attitude than in the 1990s, the variation was of no real importance. The outcomes of the attitude and CA correlation were so alike that no disparity between the 1990s and the 2000s or sample sources were noted.

Some previous studies (Eyadat, 2006; Korobili, et al, 2010; Kutluca & Baskan, 2013), found that computer attitudes and anxiety did not relate significantly to age. Other studies (Hashim and Mustapha 2004; Dincer, 2012; Rhema & Miliszewska, 2014) found age to be significant for attitude and computer ability, with younger students having stronger attitude and ability than older students, while experience in computer use had a positive effect on computer attitudes (Eyadat, 2006; Korobili, et al, 2010; Kutluca & Baskan, 2013). Popovich, et al. (2008) indicated that computer experience and computer skills courses had positively affected the students' attitudes. Similarly, the studies by Hashim and Mustapha (2004), and Teo (2008), found that students who had more experience with computers had more computer skills and less anxiety, and liked computers more. The more students used computers, the better their development of a range of techniques and skills that resulted in an overall improved computer knowledge (Hales & Fura, 2013). Alaba et al (2012) and Eyadat (2006) also have shown that students who reported negative attitudes to computers did not have regular access to computers. Those with a greater deal of experience with computers reported more positive feelings to computers, less anxiety and more confidence in using them. Moreover, those with more internet experience were happier working independently to solve problems (Oshan & Khudair, 2008). Socio- economic background differences were found to be irrelevant to attitudes (Alaba et al, 2012). Although, Alharbi (2010) reported that there is no relation between Internet experience and perceived usefulness: experience did not mean that the students would perceive the Internet's usefulness, although increasing Internet experience was associated with perceived ease of use.

Moreover, studies suggested significant relations between attitudes to computers and perceived usefulness (Bebetsos & Antoniou, 2009; Eyadat, 2006), effectiveness (Bebetsos & Antoniou, 2009), confidence (Appianing & Van Eck, 2015), liking, knowledge, and computer skills (Eyadat, 2006). Pamuk and Perker (2009) suggested a negative relationship between computer anxiety and computer self-efficacy, and self-efficacy correlated positively to computer liking, confidence, and perceived usefulness.

Two key elements of the attitudes of students towards technology in relation to their everyday lives are usefulness and ease of use, but the most positive perceptions of ICT relate to its use in the workplace (Edmunds et al, 2012). The degree to which both

computers and the Internet are used by students depends on their perceived usefulness for good communication and access to information.

AL-Hunaiyyan et al (2008), Korobili, et al. (2010) and Antonio & Tuffley (2014) also investigated a new factor as an influence on student attitudes: knowledge of the English language. Students who had knowledge of English reported more positive computer attitudes.

Another factor that affects students' attitudes to computer suggested by Yalcinalp (2005) indicates a relationship between students' attitudes, self-efficacy and performance. A study by Blum et al. (2006) also found a strong relation between programming skills and confidence: people with more programming skills had a greater degree of confidence. In addition, having more computer related skills increases positive attitudes towards computers and confidence in using them (Chang et al, 2012).

Appianing & Van Eck, (2015) argue that some students are interested in studying computer science but this can change when they gain more knowledge about what it really involves. According to Galpin & Sanders (2006), following the first year of computer studies programmes, the positivity of students' attitudes towards their studies declined, and most students reported that they thought the programme was dull, uninteresting and not what they had expected or hoped for. However, positivity in relation to gaining knowledge about ICT increased. Nevertheless, Liu (2009) argues that some students realise what they learn will be important for their future, because it means they already have the necessary technology skills early in life without having to learn them later in life. It is also argued that the negative attitude to learning computer science may relate to the worry by students that their body of knowledge following the course will not be good enough to equip them for the workplace. (Liu, 2009)

Sam, et al. (2005) found differences between the university students' faculties in terms of the level of computer usage. Computer science and applied and creative arts students were found to spend more time using the Internet than other students from other faculties. There was also a difference between students in the faculty of computer science and students from applied creative arts in terms of self-efficacy. Computer science students reported greater self-efficacy than applied creative arts students. These findings suggest that self-efficacy does not relate to high levels of Internet use. Rather, a

student's subject may be a more relevant factor in determining their computer self-efficacy. It may be the case that undergraduates who study computer-related disciplines display greater internet and computer self-efficacy. In addition, Hales & Fura, (2013) found in their study the subject of the students was the strength in relation to computer competence. Similarly, Alharbi (2010) found that attitudes towards E- learning differed significantly based on subject.

Findings by Pamuk and Perker (2009), Teo (2008), and Ozyurek et al, (2015) suggested that computer ownership had an effect on computer attitudes: students who had stronger attitudes owned computers. In addition, students who owned computers reported a greater degree of computer confidence, perceived usefulness, liking, self-efficacy and lower levels of computer anxiety, and this implied that distinct differences exist relating to the amount of access to computers and the components of attitude. On the other hand, Fancovicova & Prokop (2008) and Kutlucai & Baskan, (2013) found that attitudes toward computers are not affected merely by ownership of a computer, but instead by the amount of time the owners spend using that computer. Hales & Fura (2013) and Rhema & Miliszewska (2014) suggest that students' attitudes towards computers are strongly affected by how much they use technologies for learning purposes, the skills they develop, and how content they are with technology. How available and reliable technology is has a direct effect on how much a student will use it to assist them with their learning (Rhema & Miliszewska, 2014).

Nonetheless, when students are characterised by better motivation, they are more likely to have better attitudes towards computers (Wong et al, 2012). Learning strategies are vital to the creation of positive attitudes toward computers. Students with beneficial learning strategies, particularly in relation to information processing, the selection of key ideas, and testing are more likely to have better attitudes (Wong et al, 2012).

Comparing year of study, Pamuk & Perker (2009) and Owolabi et al, (2013) concluded that between first year students and fourth year students the older students reported more confidence, self-efficacy (Pamuk & Perker, 2009), and perceived usefulness (Owolabi et al, 2013) than the younger participants. The general relationship between computer anxiety and computer experience was positive. First year students had less experience than fourth year students but did not differ significantly in their levels computer confidence (Pamuk and Perker, 2009; Owolabi et al, 2013). In contrast,

Rhema & Miliszewska, (2014) and Korobili, et al (2010) didn't find any differences based on year of study.

2.9   Effect of parents and schools

Shashani and Khalili (2001) found a positive correlation between the occupations and education of students' parents and their attitudes, and the effect was greater regarding the mother's education. Students whose parents were highly educated tended to have greater confidence and knowledge of using computers, perceived computers as useful, and tended to hold fewer stereotypical views of people who use computers. Similarly the study by Ozyurek et al, (2015) found females students whose mother have a university degree and who have computer access have stronger positive attitudes to computers. Likewise, the study by Liu (2009) found that home computer access as in conjunction with parental support helps students build their computer knowledge. Younger children, especially males, spend less time on computers at school than older children and make up for this at home (Fancovicova & Prokop, 2008). Moreover, students using computers at home are generally more experienced for obvious reasons (Dyncer & Sahykayasi, 2011).   On the other hand, Fancovicova & Prokop (2008) found that schools' play activities using ICT, which result in better ICT compensations for extra-curricular activities. Good ICT learning is not just shaped by the provision of computers, but also by the provision of attention and support to students, which has the result of increasing confidence using computers (Liu, 2009). Most of the students in a study by Yusuf & Balogun (2011) were not skilled in the use of spreadsheets, presentations, databases, web authoring tools, and peripheral ICT equipment. This is due to the fact that these skills were not provided to students by universities, so they had to learn these skills externally. Moreover, it was suggested that greater encouragement should be offered by the university to students in relation to these skills (Alharbi, 2010).

Further to this, students can manage their learning better through online teaching, which means that they are able to manage their workload and work at a pace which suits them (Yusuf & Balogun, 2011). ICT use and availability in universities make learning experiences easier and more enjoyable (Gay et al, 2006).

The last two decades have brought about a substantial increase in day-to-day use and dependency on computers in many different areas of life. This may well explain the

nature of the changes occurring in attitudes toward computer use (Popovich et al. 2008). Now that ICT is cheaper, access to computers and the Internet is far more widespread.

2.10 Computer Anxiety

The use of computers can have unexpected adverse effects, such as negative emotions occurring before and during the use of the technology. People can become annoyed, confused, and anxious, which can have an impact on the use of the technology at the time, but also on effectiveness of learning, social interaction, and general happiness (Saade & Kira, 2009). Anxiety in this sense relates to students being scared of computers or the potential for them to use them, as they do not know what they are doing with them (Kannan et al, 2012). People who develop a negative attitude to a new form of technology have higher levels of anxiety. To find out why computers or computer-related tasks make people experience anxiety, it is necessary to look at the factors which correlate with this.

There is a strong relationship between computer anxiety and student attitudes towards computers (Eyadat, 2006; Korobili, et al, 2010; Kutlucai & Baskan, 2013). Popovich et al. (2008) found that the correlation was twice as great in as it was in 1986, but both were substantially negative. Those who displayed a high degree of computer anxiety are more inclined to use traditional methods and prefer to sidestep change where possible so as to avoid strong adverse emotions (Maricutoiu, 2014). Additionally, anxious users will automatically have negative feelings in relation to their abilities for ICT problem solving in the future (Maricutoiu, 2014).

Shashaani and Khalili (2001) found that a strong relation exists between computer anxiety and attitudes towards learning more computer skills. Less anxiety led to a greater preference for learning. A study by Korobili et al. (2010) and Tekinarslan (2008) showed that students' levels of computer anxiety varies with their experiences of computers and how frequently they use it. The researchers Korobili et al., (2010) and Tekinarslan (2008) found that students who own PCs, and use them more frequently and at a higher level, had significantly reduced anxiety levels towards computers.

Similarly, Eyadat (2006) suggested that students who had positive attitudes towards computers had regular access to computers and did not experience computer anxiety. In

addition, students who had positive initial experiences reported less anxiety, higher confidence and more positive computer attitudes. The results show a significant link between computer anxiety and the recognized ease of use in computer usage and also a significant link between computer anxiety and the intention of computer use (Maricutoiu, 2014).

Beckers and Schmid (2003) suggest that computer experience was also shown to have influence on anxiety. As a result of a greater level of experience, a higher computer literacy was achieved with less arousal. It should be noted that no direct relationship between the level of experience and self-efficacy was found. This indicates that self-efficacy may not arise solely from computer work and may be influenced by other life experiences as well. Therefore, it is not necessarily the case that people avoid gaining computer experience as a consequence of computer anxiety. A student's belief in their ability to succeed is influenced by anxiety levels so much so that lower levels of anxiety and more frequent use can better performance indirectly by improving their ability to succeed. Moreover, they suggest that such self-belief is vital in buffering the negative effect of anxiety on the recognised ease of use. No link was found between computer anxiety and either perceived usefulness or perceived benefits.

Also Beckers and Schmid (2003) suggested that a person's age when they had their initial computer experience also significantly contributed to their total experience or anxiety. This essentially proposes that a perception of control during the first experience can result in a person gaining more experience and consequently developing more of a liking for computer use.

2.10.1 Powel's Systematic Review

2.10.1.1 Computer Anxiety (CA) and Age

Powel (2013) found that 12 computer anxiety scales have been invented for study purposes. Of these studies there was an even divide between those that found age to be positively correlated to CA and those that found no such correlation. In the former, nine were from the 1990s, while seven were from the 2000s. In the latter, thirteen were from the 1990s and three were from the 2000s. CA negatively correlated with age, such as in one study in relation to a computer literacy course. A positive correlation between age and CA has been found for women, while no correlation between the two was found for

men. While the 2000s studies found more positive correlations between age and CA than the 1990s studies, the difference was not considered to be substantial. Similarly, the difference between sample sources is not substantial; for example, college students and adults, and seniors. On the other hand, in the 2000s, a substantial positive correlation between the two (students and adult) was found. In the 1990s, employees had not had access to computers at school or work, even for younger adults. It is possible that by the 2000s, young adults' exposure to computers at school was more likely, therefore CA was lower in young adults than older ones, who did not have the same exposure to computers at school level.

2.10.1.2 Computer Anxiety and Level of Education

Most studies investigating the relationship between education level and CA found a negative correlation between the two, in that, in general, the higher the education level, the lower the CA. Graduates have lower CA than undergraduates. Conversely, one study found that seniors have higher CA than freshmen, and the year of study for undergraduates was unimportant, and also found a negative correlation between the two for men, but no correlation for women. Some studies found no correlation between the subject studied and CA, but others found different levels of CA depending on the subject studied. There was no difference between the 1990s and the 2000s and between sample sources. Adults with a higher level of education in the 2000s had been exposed to computers more during education. Most studies considered the link between the use of computers and CA, as opposed to mere exposure to and availability of computers. Most found a negative link between the use of computers and CA, but some found none. Significant statistical differences were noted between the decades though, but not between sample sources.

2.10.1.3 Computer Anxiety and Computer Ownership

The majority of studies investigating the correlation between ownership and CA found a negative correlation between the two, ten of which were conducted in the 1990s and six of which were conducted in the 2000s. No substantial difference was noted between these time periods, even though all those conducted in the 2000s discovered a negative correlation, one third of those conducted in the 1990s found a negative correlation, and two thirds of those conducted in the 1990s found no correlation at all. In the 1990s, correlation between ownership and CA in college students was found, but in the 2000s,

a negative correlation was between these was found. Possibly, in the 1990s families might have owned a computer, but not the student personally, meaning that although a student reported owning a computer, they themselves did not actually own one and may not have had access as regular as someone with personal ownership of a computer. However, this changed by the 2000s, meaning that if ownership was reported, the likelihood of personal ownership of and regular access to a computer was greater.

2.10.1.4 Computer Anxiety and Computer Self-Efficacy

Powel's systematic review found that in the 1990s those with some kind of training were less prone to computer anxiety, but this negative correlation was weaker in the 2000s. Many studies found that computer self-efficacy was the best indicator of CA, and that people characterised by lower CA could improve self-efficacy better than those characterised by higher CA. Only a small number of studies found no negative correlation between the two; no correlation was found between post-training self-efficacy and CA, neither was one found between the specific self-efficacies of word processing, spreadsheets, databases, and the web and CA. However correlations between CA and the following were found: ability, intellect, knowledge of computers, literacy, and math and logic skills. A negative correlation between CA and self-efficacy was found with no differences in relation to the decade studies or the sample sources.

2.10.1.5 Computer Anxiety and Perceive Ease of Use and Usefulness

All studies investigated the correlation between CA and perceived ease of use. A negative correlation between CA and perceived usefulness was found in most studies, but one third found no relationship. Almost equal numbers of studies were from the two decades. Due to the low volume of studies investigating the correlation between these two constructs, their results are not considered to be reliable. By the 2000s, even if someone has CA, the perceived usefulness of technology increased. Studies finding no correlation between CA and perceived usefulness have also found a negative correlation between the two constructs indirectly through another variable.

2.10.1.6 Computer Anxiety and Computer Experience

Previous studies have thus found that computer anxiety is often correlated with lack of computer experience. A good deal of experience working with computers can lead to less anxiety and may improve performance when using them.

2.11   Gender Differences in Attitudes toward Computers

According to "The World's Women 2010" report, the United Nations Department of Economic and Social Affairs indicated that the gender digital divide still exists (Chang et al, 2012), not only in the less developed countries with lower Internet access rates, but also in the developed countries with high access rates (Chang et al, 2012, & Sainz, 2014). The fact that women are under-represented on technology and ICT-related courses has attracted a great deal of attention over the years (Sainz, 2014). In many countries there is a prevailing belief that the computer is for men to use only (Moghaddam, 2010). Studies point towards the fact that ICT subjects are taught in schools in such a way that it perpetuates the myth that computers are the reserve of men (Oshan & Khudair, 2008). Of course, if this is true, then it explains why so few women are interested in computer science courses (Oshan & Khudair, 2008; Baser, 2013). Such studies suggest that regardless of the computer anxiety discussed, before that can develop there needs to be some form of interest in trying to use computers, which has not traditionally been the case. Again, the likelihood is that this stems from the way women are made to view computers and their role as women.

According to Kay (2008), the gender-based digital divide has decreased over time due to the popularity of computer use in daily life. This has been confirmed by more recent studies, such as those by Alaba et al (2012), Kar et al (2014), Suri & Sharma (2014) and Rhema & Miliszewska (2014), which show no significant difference between male and female students in relation to computer attitudes. However, some recent studies, such as those by Colley & Maltby (2008); Bebetsos & Antoniou (2009); Mahmood (2009); and Sainz (2014) show gender differences with regards to ICT, with males having more positive attitudes toward computers.

Females, traditionally and worldwide, are less likely to study or work in scientific fields, such as maths, engineering, technology (Almarzouqi & Forster, 2011 & Sainz, 2014). In addition, gender usually plays a vital role in the use and integration of technology in the home (Miliany, 2014). In modern times, women achieve great things, but many are still unable to really participate in the design and creation of technology (Sainz, 2014). Miliany (2014) confirms that "gender was the significant factors in most of the domestication technology" (P.3105). Most of the previous quantitative and qualitative studies had examined the use of technology in homes or other places, such as schools,

universities and internet cafes, and they found differences regarding gender (Miliany, 2014).

The increased use of computers in the 21st century requires people to be confident in using them (Blum et al., 2006). Despite the importance of computers to learning, there exist differences in attitudes towards them between genders. According to studies carried out in the last thirty years, women have less involvement in the field of computer science as either a subject to study or a job in which to work (Appianing & VanEck, 2015). Having lower confidence in using computers may limit females' chances of making progress in a high-paying career.

In developing countries, it seems that most females do not use the Internet as much as males, even where there is access (Antonio & Tuffley, 2014). Evidently, gender socialisation affects the differing attitudes towards computers between males and females (Avraham, 2005). Avraham (2005) proposes that women's choice to remove themselves from computers is caused by the role of gender specialisation that is shaped by teachers and parents. It appears that the greatest and most direct impact on ambitions comes from parental encouragement and the intentions of a person's peer group. Based on the results of his study, Shashaani (2001) suggested that students' attitudes are affected by differences in the treatment of the genders by teachers and parents.

Male children still tend to be more encouraged by their parents and teachers to use computers, and more encouragement should be given for girls to do likewise (Avraham, 2005). Similarly, Othman and Latih (2006) reported that young women's beliefs that computer science is a difficult and technical subject is one many develop in childhood. Appianing & Van Eck (2015) gave two explanations for why the number of women in computer science is small: low self-confidence and negative stereotypes associated with the field. Beckers and Schmid (2003) suggest the quantity of experience is a key factor that determines the extent to which anxiety is affected by gender, and females may experience a higher level of computer anxiety than men.

Young people's use of the Internet is often controlled by parents, who may grant permission to use them for only limited periods at a time, something which may vary based on culture. However, these restrictions and limitations from parents regarding the use of technology in the home may be more serious with girls than boys (Miliany,

2014), and it appears that such rules are utilised based on gender and that some young adults may experience a lack of privacy and freedom regarding the use of the Internet (Miliany, 2014).

A list of previous studies between 2001 to 2014 in table (2.1) examined gender differences in attitudes to computers: 23 studies found no gender differences, while 24 studies did find gender differences, irrespective of whether they are older or more recent studies. While some studies have shown no gender differences in computer attitudes (e.g. Beyer et al., 2003; Sam et al., 2005; Wong & Hanafi, 2007; Popovich et al. 2008; Teo, 2008; Tekinarslan, 2008; Sang et al, 2009; Yusuf & Balogun, 2011; Alaba et al, 2012; Kar et al, 2014; Agut et al, 2014; Suri & Sharma, 2014 and Rhema & Miliszewska, 2014), others have shown that female students have less positive attitudes to computers and are more anxious about computers than male students (e.g. Beckers & Schmid, 2003; Othman & Latih, 2006; Eyadat, 2006; Bebetsos & Antoniou, 2009; Kannan et al, 2012; Dincer, 2012; Hales & Fura, 2013; Maxwell & Maxwell, 2014; Appianing & VanEck, 2015), and have a less positive attitude toward programing than male (Baser, 2013). Four recent studies conducted found females to have a more positive attitude towards computers and e-learning than males (Mahmood, 2009; Rhema & Miliszewska, 2014; Osman & Alfred, 2014; and Ozyurek et al, 2015).

Table 2-1) List of previous studies which has conducted to measure attitude to technology since 2001 until 2014

Research	Instrument	Sample	Location	Gender difference
Shashani & Khalili, 2001	Four subscales: computer interest, computer confidence, computer stereotype, and perceived computer usefulness.	375 college students	Iran	no
Schumacher & Martin, 2001	Internet use and attitudes toward computers	619 American first year students.	America	yes
Stephens & Creaser, 2002	Compartions of 51 attitude items devised in Canada (Temple & Lips, 1989)	all new Computer science Undergraduate students in the university	UK	yes
Durndell and Haag, 2002	Computer Self Efficacy Scale, a Computer Anxiety Scale, an attitude to the Internet Scale	150 university students	Romania	yes
Beyer et al., 2003	computers experience;	56 university students	USA	no

	stereotypes and knowledge; confidence; personality; support and encouragement.	52		
Lee, 2003	Computer skills & attitudes toward computers	University students	China	yes
Beckers & Schmid, 2003	computer anxiety and computer experience (Beckers & Schmidt, 2001)	229 first year students in psychology 225 students first year and third year	Netherlands	yes
Hashim & Mustapha, 2004	Loyd & Gressard (1984)	300 university students	Malaysia	yes
Sam, et al., 2005	Attitudes toward the Internet Scale', the 'Computer Anxiety Scale', and the 'Computer Self-Efficacy Scale'	148 university students	Malaysia	no
Yalcinalp, 2005	self-efficacy	88 first year students taking the first semester computer literacy course	Turkey	no
Othman & Latih, 2006	Computer Attitude Scale	students	Malaysia	no
Eyadat, 2006	Computer attitudes scale (CAS).	700 undergraduate students	Jordan	yes
Galpin & Sanders, 2006	Galpin & Sanders, 2005	46 students attending university for the first time to study CS	South Africa	no
Gay et al, 2006	self-administered questionnaire, Dorup's (2004)	300 students of Management Studies	India	no
Li & Kirkup, 2007	self-report survey questionnaire	220 Chinese and 245 British students	UK & China	yes
Wong & Hanafi, 2007	Wong, 2002	102 student the Faculty of Educational Studies	Malaysia	no
Al-Doub, et al, 2008	Attitudes to e-learning	85 university students	Kuwait	yes
Fancovicova & Prokop, 2008	Students' attitudes toward ICT (ATICTQ), utilization of computers questionnaire (UCQ)	11 elementary schools	Slovakia	no
Kay, 2008	Meta-analysis	71 studies		no
Tekinarslan, 2008	The computer anxiety rating scale	106 university students	Turkey and Holland	no
Oshan & Khudair, 2008	Internet Attitude Scale (IAS)	790 university undergraduate students Science Humanities	KSA	no

Popovich, et al. 2008	Attitudes Towards Computer Usage Scale	254 undergraduate students	USA	no
Teo, 2008	Computer attitude questionnaire (Knezek, et all., 1998)	183 students' post-secondary	Singapore	no
Pamuk & Perker, 2009	Computer attitudes scale and computer self-efficacy scale.	605 first and fourth year pre-service science and mathematics teachers	Turkish	no
Bebetsos & Antoniou, 2009	Selwyn, 1997	165 freshmen university students	Greek	yes
Liu, 2009	self-efficacy and anxiety	235 Full time freshmen of vocational and technology institutes	Taiwan	Inconclusive
Mahmood, 2009	Havelka (2003)	625 postgraduate students	Pakistan	yes
Sang et al, 2009	'Constructivist teaching beliefs' (CTB) scale of Woolley (2004). Ohio State teacher efficacy scale' (OSTES) (Moran & Hoy, 2001). The Computer Self-efficacy Scale (CSE), Attitudes toward Computers in Education Scale (ACE).	727 universities in three cities of China	China	no
Saade & Kira, 2009	perceived ease of use, anxiety, and self-efficacy	645 university students	Canada	Inconclusive
Korobili, et al. 2010	computer and internet experience, the Computer Anxiety Rating Scale (CARS), and the Computer Attitudes Scale (CAS)	800 undergraduate students	Greece	Inconclusive
Alharbi, 2010	Attitudes toward e-learning	531 male and female university students	KSA	yes
Yusuf & Balogun, 2011	self-report	382 student-teachers	Nigeria	no
Edmunds et al, 2012	The Technology Acceptance Model (TAM) (Davis, 1989)	421 university students	UK	Inconclusive
Chang et al, 2012		204 women	Taiwan	Inconclusive (only women)
Alaba et al, 2012	ICT Attitudinal Scale (ICTAS)	600 students in secondary schools	Nigeria	no

Wong et al, 2012	Computer Attitude Scale (CAS)	149 secondary school	Malaysia	no
Dincer, 2012	computer and Internet use, and computer competency	480 sixth, seventh and eighth grade pupils of primary with their parents	Turkey	Yes with parents
Kannan et al, 2012	Computer Anxiety scale	370 secondary schools students	India	yes
Powell, 2013	Meta analysis			yes
Owolabi et al, 2013	The computer attitude scale (CAS) Selwyn, adapted by Soh	520 Business education students	Nigeria	Inconclusive
Kutlucai & Baskan, 2013	Computer Attitudes Scale, by Loyd and Gressard (1984)	137 vocational college students'	Diyarbakır, Turkey	no
Baser, 2013	Computer programming scale by Korkmaz &Altun, 2013	179 students in introductory computer programming course	Turkey	yes
Hales & Fura, 2013	Computer skills and competence	420 university students	Poland	yes
Kar et al, 2014	E-learning attitude scale	308 university students	India	no
Rhema & Miliszewska, 2014	Attitude to ICT and E-learning	348 undergraduate engineering students	Libya	yes
Krishna & Sachan, 2014	Students' knowledge and experience of using ICT	150 students undergraduate students	Fiji	no
Bozdogan & Ozen, 2014	Open-ended questions	241 Pre-service ELT students	Turkey	yes
Maricutoiu, 2014	Meta analysis			Inconclusive
Osman & Alfred, 2014	Osman & Alfred, 2014	340 school students	Ghana	yes
Suri & Sharma, 2014	Scale on computer and w-learning attitude	477 university students	India	no
Maxwell & Maxwell, 2014	Descriptive survey	474 university students	Nigeria	yes
Agut et al, 2014	attitudes towards ICT and computer competence	200 university students	Spain	no
Antonio & Tuffley, 2014	Literature in gender digital divide		Developing countries	yes
Ozyurek et al, 2015	Computer technology attitude scale	764 health science students	Turkey	yes
Appianing & Van Eck, 2015	Value, interest, and expectations for success	184 college students	USA	yes

The study by Appianing & VanEck (2015) observed significant gender differences within university students. Their results suggested a general belief that males have more computer skills and more experience in computer programming.

There is some evidence that male students are more confident in their computer ability than female students (Beyer et al. 2003; Othman and Latih, 2006; Appianing & Dakota, 2015). Also, the study by (Stephens & Creaser, 2002) suggests that there are notable disparities in the self-perceptions of ability of men and women, with men rating their ability higher. Pamuk and Perker (2009) concluded that male and female students had similar computer attitudes and computer self-efficacy, and the only difference related to gender was in the computer liking variable. Females were found to be less likely to use computers, but no difference was demonstrated in their beliefs about computer usefulness, computer confidence, experience, and self-efficacy.

Wong & Hanafi, (2007) propose that the correlation between gender and computer experience is an indirect one affecting confidence in using computers. The lack of differences in gender-based attitude towards computers could be explained by the fact that both gender groups had roughly equal amounts of computer experience prior to beginning their programme of studies, with the majority holding a minimum of a year of experience.

Kannan et al, (2012) observed computer anxiety in relation to gender. Male undergraduate students were found to be generally less anxious when they use computers than female undergraduate students. Females had a greater tendency to experience anxiety (Kannan et al, 2012)

In Powell's (2013) systematic review, 80 studies evaluated the impact of gender on computer anxiety (CA). There was a notable divide between studies reporting no gender-based difference in computer anxiety. 21 of 35 were conducted in the 1990s, while 14 were conducted in the 2000s. 20 out of 40 of those that found females to have greater CA were conducted in the 1990s and 19 in the 2000s. 5 found males to have higher CA. One study found that gender was an important predictor of CA in 1986 but not in 2005. Todman (2000) found the gender gap in relation to CA increased between 1992 and 1998 because men became less CA during that time, while female CA levels remained unchanged. It was found that psychological gender was a significant predictor

of CA, but that biological gender was not. 50% of the studies found no correlation between gender and CA and 50% found higher CA in females than men. Almost all studies in both decades which used child participants found girls to have higher CA than men. Moreover, most studies using adult participants found women to have higher CA than boys. To the contrary, those using college students varied: in both decades, the likelihood was greater that no difference in CA between genders would exist. On the whole, two thirds of the studies using college students found no difference in CA between genders. College women could have been more goal-orientated or could have had better opportunities to use computers than other women. A comparison between college students and the other categories shows that there is a substantial difference between college students, who are less likely to display differences in CA between genders, and less educated children, adults, and seniors, the women of which are much more likely to have greater CA than men.

Maxwell & Maxwell (2014) suggest that despite the increase in access to computers, gender differences are still noted among female university students who reported less computer use. In terms of Internet use, Colley & Maltby (2008) suggest that women use the Internet more than men, and that they differ in relation to their purpose for use. Their research proposes that the more practical approach taken by women is obvious in relation to their access of the following: online education, therapeutic advice, booking travel and shopping. With regards to interpersonal interactions, the Internet can have a greater impact for women than men, opening up domestic information, online shopping and employment opportunities. Moreover, men seem more aware of the global impact of technology. Both men and women use computers, but their approach differs massively (Sainz, 2014). Bebetsos & Antoniou (2009) found that there are significant differences in relation to gender, perceived usefulness and affective demine. Men were particularly different with regards to positive attitude towards computers.
Sainz (2014) found that young males receive more encouragement in terms of computer use than young females, which could explain this.

A few studies were found which produced the finding that men have a less positive attitude to computers and experience anxiety over computer use more than women (Mahmood, 2009; Rhema & Miliszewska, 2014). The more recent study was conducted by Rhema & Miliszewska, (2014): female students were found to have more positive

attitudes towards computers than male students, the latter of whom had greater confidence and attained more enjoyment from using ICT facilities than the former, while the former had a greater belief that computers improved their learning experiences. These results suggest that holding a positive attitude towards computers is not necessarily mutually exclusive to being confident in terms of computer use. Moreover, research by Al-Doub et al. (2008) in Kuwait highlights the fact that the use of an appreciation for ICT based learning is higher among female students, who use computers in university more than male students. Again, cultural reasons can explain this. In Kuwait, more female students use their free time to access the ICT skills on campus while male students tend to leave the campus for other activities and therefore access the university's ICT facilities less.

Two studies were conducted among Saudi university students (Alharbi, 2010; Oshan & Khudair, 2008). One of them (Oshan & Khudair, 2008) measured attitudes toward the Internet and found no gender differences. The other study (Alharbi, 2010) examined students' attitudes toward e-leaning and found males to have stronger positive attitudes than females. Such a difference in the result may be related to different measurements: one measures attitude to the Internet and the other measures attitudes to e-learning. Also this could be related to the sizes and the places of the sample that they used, as Saudi Arabia is a large country and each study is restricted to one university in one major city (Riyadh and Jeddah).

2.11.1 Gender Differences in Access to Computers

A study by Mahmood (2009) which was conducted in Pakistan confirms that gender differences in computer access still exist. It was reported that males have better access to computers at home and at university. The results underline the fact that men use computers far more than women at home and at university (Mahmood, 2009; Li & Kirkup, 2007). Male students use computers more than female students, but the latter have better access to computers at home (Mahmood, 2009; Li & Kirkup, 2007). Mahmood (2009) believes that there are cultural explanations for this difference. In Pakistani Muslim society, female students spend less time at university. They mostly just attend classes and are do not access the ICT facilities of the university before going home. Similar results were found in the UK (Li & Kirkup, 2007). This can be explained by lack of computer experiences as in younger years, males use computers from a

younger age than women (Li & Kirkup, 2007). Internet, email and chat are the three ICT services for which gender-based differences are particularly notable (Mahmood, 2009).

2.12   Teachers' Attitudes Towards Computers

Computers enable students to be more creative in learning, which can lead to better achievement in terms of learning objectives (Will, et al., 2005). Methods of teaching have changed and developed since teachers have begun to integrate computers into their teaching (Ermer & Leftwich, 2009 & Sabzian & Gilakjani, 2013). The use of information technology in the classroom, with its variety of features including applications, software, etc., can make a class more exiting and lead to successful interaction between the teacher, subject matter, and students (Alturise & Alojaiman, 2013 & Wong et al, 2012). Computers are especially viewed as a useful tool which can change the face of learning (Wong et al, 2012). In addition, information technology has made distance learning possible and makes all types of information readily available to anyone with access to a computer (Alturise & Alojaiman, 2013). The issue of teacher motivation is a vital one (Liu, 2009).

2.12.1 The Importance of Teachers Attitude Toward Computers

Educators and researchers mention that the attitudes of teachers toward information technology are a key issue for the successful use of computers in education (Yushau, 2006 & Abedalaziz et al, 2013). The use of computers in the classroom is not only a tool for improving the learning process: it can also show students how they can use computers to learn (Drent & Meelissen, 2008). Because educators can shape the thoughts of students, it is essential to understand the ways in which both the positive and negative attitudes of educators can be instilled in the minds of students (Sabzian & Gilakjani, 2013). It can thus be argued that children should learn to use technology from convenient persons who are confident in their technological skills. Teachers, like parents, have a strong effect on children (Alahmadi, 2011). They have the most important role when it comes to using computer technology in the classroom, and consequently teachers require more knowledge about the technology so they can efficiently use it and teach their students about it (Ermer, 2009 & Abedalaziz et al, 2013).

As computers become more common in the classroom, it is essential to measure the response of teachers toward using such technology (Albirini, 2006). The mere existence of computer technology in the classroom does not mean that it will be utilised to support learning (Albirini, 2006). In order for educational quality to be attained, educators should be supported with the use of ICT as part of the current teaching environment. Even though computers have become more available in school classrooms, some teachers do not use them effectively in their curriculum (Ermer, 2009). Teachers with intensive use of computers and positive attitudes, apparently did not guarantee that they often adopted computers as tools of learning and teaching in the classroom (Yushau 2006).

According to Ermer and Leftwich (2009), "teachers will need to change, with differing degrees their (a) beliefs, attitudes, or teaching ideas; (b) content knowledge; (c) teaching knowledge of instructional practices, strategies, methods, or approaches; and (d) novel or altered instructional resources, technology, or materials when they are asked to use technology to teach some material to students" (p.258).

2.12.2 Factors Affecting Teachers' Attitude to Computers

Hardy (1998) proposed that there may be a positive relationship between teachers' attitudes toward computers and using them in the classroom and their computer experience and knowledge. Yushau (2006) stated that positive attitudes toward computers and using them for academic purposes suggest a high degree of computer acceptance as well as willingness to adopt computers as important tools in learning and teaching. In addition, years of teaching experience was positively correlated with computer attitudes, but no relation was found with regard to age and computer experience. Agbatogun (2010) reported no differences were reported between teachers with regard to teaching experience, or age in terms of their attitudes toward computers or computer cognition.

The degree to which teachers believed in their own abilities in relation to ICT has an effect on the effectiveness of their teaching (Bozdogan & Ozen, 2014; Sang et al, 2009). Perceived usefulness and ease of use can really affect the degree to which computers are used (Bozdogan & Ozen, 2014). Those teachers with more experience of using computers are more likely to use them and they have more positive attitudes and better

computer-related skills (Bozdogan & Ozen, 2014; Sang et al, 2009). Other factors such as availability of computers, skills and training are discussed in the following sections.

2.12.3 Availability of Technology at Schools

The availability of technology in the school is an important factor to encourage teachers to use them during their teaching approach (Alharbi, 2013; Ermer, 2009 & Oyaid, 2009). Oyaid, (2009) and Knezek & Christensen (2002) confirms that the needs teachers believe they have depend heavily on how accessible ICT resources are and the extent to which the technology has been adopted for education. Teachers who have risen to higher stages of computer use have made technology an integral part of their classroom and use it to develop pupils' higher cognition, and this has been accompanied by a predictable change in their attitudes and requirements (Knezek and Christensen, 2002). Researchers found some barriers that can limit the use of computer technology in the classroom. The most significant of these were limited availability of technology in schools (Oyaid, 2009; Almekhlafi & Almeqdadi; 2010, Alharbi, 2013; Almulhim, 2014), lack of motivation to use technology in the classroom (Almekhlafi & Almeqdadi, 2010), and the high average numbers of the students in each class (Almekhlafi & Almeqdadi, 2010). Oyaid (2009) and Baylor and Ritchie (2002) suggested that administrators who encourage technology use promoted a culture of technology. Despite the contributions of administrators to encouraging the use of technology, however, the key determiner in the extent of computer use in the classroom was the individual teacher (Baylor & Ritchie, 2002). Teachers' self-confidence in using information technology may be directly impacted by a number of factors, including the availability of the technology, individual access to the technology, and the availability of training for teachers (Almulhim, 2014).

2.12.4 Teachers' Computer Skills and Training

Computer anxiety is the main factor affecting the attitudes of educators towards ICT. Because technology is a comparatively new learning tool in educational settings, a number of teachers become nervous and confused while working with computers (Agbatogun, 2010) since they are not able to make compatibility between information technology and their teaching approaches (Albirini, 2006). Agbatogun (2010) reported that the reason teachers sometimes avoid using computers for personal purposes or in the classroom with students is the high degree of anxiety and feelings of discomfort they

associate with using computer technology. Some teachers may be unfamiliar with using and interacting with new technology. Some educators were unsure the place computers have with their curricular goals (Albirini, 2006). Despite the general availability of technology in schools, teachers will not be able to interact with it successfully unless they have a positive attitude towards it and sufficient skills to use it (Sabzian & Gilakjani, 2013). Abedalaziz et al, (2013) argue that if negatives attitudes were prevalent, ICT as part of the teaching process would be avoided at all costs.

Teachers need skills using such technology in order for successful learning to be transferred to students via computers (Ermer, 2009). Combining computer skills with a belief in the importance of computers will allow the technology's full potential to be reached for teachers as well as students (Ermer, 2009). However, to effectively widen the range of educational opportunities that can be offered to students, teachers should maintain a certain level of technological ability. This will allow teachers to be more effective in their work, helping them to communicate easily with students' parents, maintain records, and prepare efficient research and presentations (Baylor & Ritchie, 2002).

Teachers need to know more than simply how to use a piece of hardware or a particular software application in order to use technology effectively in the classroom (Ermer & Leftwich, 2009). They must have a wide-ranging knowledge involving planning, implementation, and evaluation processes (Ermer & Leftwich, 2009 & Sabzian & Gilakjani, 2013). Teachers must also have in-depth knowledge of how to use technology to teach parts of the curriculum in order to enhance student learning, such as in student-centred instruction (Ermer & Leftwich, 2009). Will et al. (2005) and Almekhlafi & Almeqdadi, (2010) emphasised the importance of training teachers effectively as this provides more experience and competency with computers, which can, in turn, enhance their ability to use computers. Teachers will need high levels of computer skills, knowledge, competency, experience and attitudes in order to use technology creatively for learning. Sabzian & Gilakjani, (2013) and Ermer (2009) confirm that the effective use and integration of technology in teaching requires teacher training in computer use, and decisions about who and when computers will be used during the teaching process.

2.12.5 Gender Differences in Computer Use among Teachers

Regarding gender differences among teacher attitudes to computers, the study by Almekhlafi and Almeqdadi (2010) in the United Arab Emirates found that significant gender differences existed. Female teachers seemed to use a variety of programs and applications and seemed to be more experienced and knowledgeable in using computer programs and resources than male teachers. Female teachers in this study also had more computer experience than male teachers. However, both genders had high computer self-confidence and abilities to use technology effectively in the classroom. On the other hand, the study by Agbatogun, (2010) in Nigeria and the study by Abedalaziz et al, (2013) in Malaysia and Jordan did not find gender differences between teachers based on attitude to computers and using them at school.

From previous studies, it is clear that students are strongly influenced by their teachers to accept technology as a learning aid, and positive attitudes toward computers on the part of teachers will increase their technological abilities and computer expediency. However, teachers' positive attitudes toward computers and the availability of technology in schools may not necessarily mean that teachers will use computers in classroom training. More experience with computers will make teachers more comfortable with them and will lower their computer anxiety levels. In addition, interactions between teachers regarding sharing their knowledge and how they can present the technology to their classes can motivate students to use technology more in the classroom.

2.13 Cultural Differences in Computer Attitudes

Table 2-2) List of previous studies conducted to compare different cultures with regards to attitudes to technology

Research	Instrument	Sample	Location	Culture difference
Omar, 1992	20-statement computer attitudes scale.	Two hundred eighty-six university students from United States and 130 students University of Kuwait	Kuwait and the United States	yes
Will and Rosen, 1994	ATCS, CTS and CARS	3,392 in 38 universities	23 countries	yes
Blum, et al, 2006	Women-CS fit. Discussion	Inconclusive	USA Jewish & Arabic Israeli Qatar	yes

Tekinarslan, 2008	Computer anxiety rating scale	106 university students	Dutch and Turkish	yes
Dincer & Sahykayasi, 2011	open-and closed-ended questions	440 undergraduate students	Turkey, Poland &Czech	yes
Abedalaziz et al, 2013	Computer Attitude Scale (CAS) by Troutman (1991)	369 Malaysian and 342 Jordanian English teachers	Malaysian & Jordan	no

ICT use is now widespread and can be found in all cultures across the world (Calhoun et al, 2010). When there is a strong acceptance of ICT in a culture, the anxiety experienced as the result of using ICT will be reduced (Yeganeh, 2007). However, the body of existing research could be enhanced by undertaking more cross-cultural comparisons, which would help researchers develop a better comprehension of students' use of ICT in different cultures to ascertain how culture can affect attitudes towards computers (Li & Kirkup, 2007 & Lee et al, 2010). This is essential for global organizations if they wish to use ICT successfully (Yeganeh, 2007 & Lee et al, 2010).

To discover a society's perceptions regarding the use of information technology, knowledge of that society's culture is necessary (Al-Saggaf, 2011). Culture relates to thinking, feeling and acting, learned from childhood onwards (Calhoun et al, 2010). Differences in the influence of culture on males and females have led to global concerns about the separation between the sexes and the lower representation of females in the field of computer science (Lee, 2003).

 Differences in information technology skills and development could be affected by cultural differences. Different cultures may have different religions, customs, ways of thinking, beliefs, and language, and all of these factors can have an impact on understanding and using information technology (Al-Maliki, 2013). Li & Kirkup, (2007) suggest that the introduction of ICT in education adds to the national cultural context. Paramount are the social and cultural groundings for education. Hofstede (1991, cited in Calhoun et al, 2010) describes culture as the collective programming of the mind that distinguishes the members of one category of people from those of another'. He sets out four factors, which are: power distance, uncertainty avoidance, masculinity and individualism. The first relates to how a society feels about power inequality. The second relates to the way people feel about uncertain circumstances. The third relates to the degree to which a society values decisive and assertive action.

Finally, the fourth relates to societies where relationships are loose, people are more independent and less reliant on others. On the other hand, collectivism relates to societies where group dynamics are considered to be vital.

In table 2-2 a list of studies were conducted to test culture differences in computer use. Tekinarslan (2008) conducted a study comparing the Dutch and Turkish cultures in terms of computer attitudes. He found significant differences between the two countries regarding computer anxiety. Both samples reported moderately high anxiety levels, but the Turkish university students had significantly higher levels of computer anxiety than the Dutch. However, it is likely that the explanation for this is related to experience with computers rather than factors associated with culture, since almost all of the students from Holland had PCs, whereas half the Turkish students did not.

Omar (1992) compared the attitudes of college students in Kuwait and the United States towards computers. Students were found to possess positive attitudes towards computers, and these were stronger amongst US students than Kuwaiti students. No significant association between gender and attitudes to computers was found in the US, while the relationship in Kuwait was significant, with female Kuwaiti students reporting less positive attitudes compared to males. These differences between the USA and Kuwait relate to these countries' cultures, as mentioned in the Hofstede culture study. The basic idea is that the US has a culture of innovation in which new products and ideas are constantly being created and tried. In other words, the US has a great willingness to try new things, but in Kuwait, it is more difficult for new ideas to be accepted.

Omar's (1992) results also showed that there was not a significant relationship between attitudes towards computers and computer education for the Kuwaiti students, but such a relationship did exist with the US students: the more computer-based courses that the students took, the more these attitudes improved. In addition, no correlation was found between age and computer attitudes for the students from Kuwait, while such a correlation did exist with the American students. Students from upper-level classes had more positive attitudes compared to those in lower-level classes. Because of differences between the educational systems in these countries, US students tend to get lot of experience with both theoretical and practical knowledge of computers every year. In Kuwait, however, there is some difference in the educational system, so they do not

tend to receive as much exposure. This study also showed that there was not a significant correlation between computer experience and attitudes toward computers in Kuwait but that such a correlation existed regarding the American students.

In the first study of Blum, et al. (2006), the evolution of a micro-culture within an academic computer science department in the USA was investigated. No gender differences were found in attending computer science courses, appreciating programming, or in computer science proficiency. It was found that males and females act in a similar way to communicate in software development teams, and these findings are consistent with Omar's (1992) finding that there was no difference between genders in the USA sample.

Blum et al.'s (2006) second study, based within an Eastern culture, focussed on Jewish and Arab Israeli high school students. Arab female high school students were found to receive greater encouragement from their mothers, fathers, siblings, friends/acquaintances who had studied computer science, and their teachers to take computer science compared to their Jewish peers. It may be the case that Arab students receive strong encouragement from their parents to achieve academic success and improve their social status, as these students belong to an Eastern collective culture (Hofested et al, 2010) and represent a minority group in Israel. Additionally, Arab students perceived their family environment as more authoritarian in its nature than the Jewish students. The typical Arab family has a hierarchical structure that is based on age and traditionally demands that the young follow the commands of their elders and conform to their expectations. According to the Hofstede dimensions comparing Arabs and Jews, Arabs belong to a tight-knit group known for strong relationships amongst its members with a great degree of mutual respect and support.

Blum et al. (2006) conducted a study of the situation of computer science in Qatar. Carnegie Mellon University opened a campus in Qatar (CMU-Q) in the autumn of 2004, which offered an undergraduate major in computer science that followed the same curriculum as its Pittsburgh campus. The majority of students that take the Qatar computer science programme are female. The reasons for this majority are not completely known but may be partly a consequence of the tradition for families to allow their sons to study higher education overseas while encouraging their daughters to complete their studies in Qatar. Computer science may also attract more women as

anecdotal evidence indicates that Qatari women perceive the subject as a way to experience and interact with the world, without defying the traditions of their culture. The decision of males and females to study for a degree in computer science was not influenced by prior programming experience: many of them did not have this, but females had greater experience of programming from their high school background.

Dyncer & Sahykayasi (2011) compared students from three universities in Turkey, Poland and the Czech Republic. The study found that Turkish students have more positive attitudes towards computers, even though they started to use computers and the Internet later than students from Poland or the Czech Republic, but levels of competency were the same for students of all three countries. Turkish students were found to use computers and the Internet less than Polish students but more than Czech students. Both Turkish and Polish students use computers and the internet to access various websites, including those that relate to social networking. This could be explained by the social organization in Turkey, because Hofested et al, (2010) notes that Turkey is a collective culture of people looking after each other, where communication is indirect and group solidarity is essential. Also, he discusses the fact that Turkish people hold leisure time in high regard, because that is when friends and family can gather to take part in activities and spend time together. Therefore, they use social websites to ensure they remain connected with each other. The situation is different for Polish students, whose culture is rooted in individualism rather than collectivism. 17% of all participants reported dissatisfaction with computer related courses taken in the university. Turkish students argued that the following reasons explained this: computers which do not work properly, teachers with a lack of skills, and courses which are mandatory yet irrelevant in later life. The main reason cited by Polish and Czech students was the provisions or little or poor information pertinent to computer subjects. (Dyncer & Sahykayasi, 2011)

Abedalaziz et al. (2013) conducted a study comparing Malaysian and Jordan English teachers related to computer usage. On the whole, educators from each nation have positive attitudes in relation to computers. The results showed that anxiety in relation to future internet use was not so likely. The attitudes of teachers in both have no link with gender. This similarity can possibly be explained by the similarities of these countries, in that both are Islamic, developing and do not have English as their first language.

However, many studies seem to arrive at contrasting conclusions. For example, the work described here by Sam et al. (2005) in Malaysia conflicts with the study by Durndell (2000) in Romania in terms of how Computer Self Efficiency is affected by gender. These differences can be explained by the introduction to technology in the countries (Li & Kirkup, 2007), the introduction of ICT instruction in education, the dominant religion and the economics of the nation. Language can also be a factor affecting attitudes towards technology, which essentially serves to divide groups. It is a major hurdle for the portability of educational software. Programs are useless unless users can understand the language in which they are provided. Moreover, national and cultural identities are vital for interaction with software. Designers should be aware of all of this.

2.14   Summary of the Literature

Many studies across various countries have been conducted to measure school and university students' attitudes towards computers. The majority of the studies have found that many factors can affect computer attitudes, including age, gender, faculty, confidence, experience, and liking.

However, since the spread and popularity of smart phones and smart devices there is a lack of recent studies that focus on measuring student's attitude toward computer in KSA. Also, few studies across culture have considered parental attitudes as a factor in shaping students' attitudes to computer. In addition, there is a lack of studies that focus on identifying the differences in technology use between large cities and small cities and towns, or between rural and urban. Such areas studies will help to find factors that affect students' attitudes and then recommend some improvements to the education system to support the use of technology for students especially for learning.

A review of the literature concludes that females in Saudi Arabia are less frequently in employment than males and most of them are involved to work in education. This due to the culture in Saudi Arabia: females can only work in a segregated environment and they have to get permission from their guardians in making decisions. Moreover, the literature shows increasing use of ICT, Internet and smart phone among Saudi nationals and private and government sectors. However, these increases do not include the

education sectors which are reported as having lower computer adaption and use among students and stuff.

In addition, the review of the literature shows that students with more computer experience and confidence have more positive attitudes to computer. Computer experience is a major factor in reducing computer anxiety. People with less experience are more anxious when using computers. In general, females were found to be less confident, and have less experience using computers than male students. This was almost not the case of college educated women, however. One possible reason for such differences might be the different methods and instruments used for assessment in each study.

In terms of cultural differences, studies have been performed in two or more different countries, and differences in computer attitudes have been found between them, even when the same methods and instruments were used. These differences could be related to varying levels of economic development, such as between Kuwait and the USA, or to differences in customs and traditions, such as between Jewish Israeli, Arab Israeli, and Qatari. Some cultures have more difficulty accepting and adopting new ideas, while others adapt much more easily to innovation.

Some studies have shown differences in education and availability of technologies and general facilities between people in the large major cities and non-major cities, town and villages. These people living in large cities have higher income, are more educated, and are more open to development and improvements than others who live in town, village or rural areas.

Teachers' attitude to computers and their effective use of them at school have a strong effect on students' learning and attitude. If teachers have a strong attitude toward computers, are aware of the importance of technology in teaching and learning, have good access and motivation to use computers in the classroom, have effective training in the methods of using technology at classroom, then this will result to successful learning for students, and will make students have a positive attitude toward computers and awareness of the valuable role of technology in learning.

The findings of previous studies have addressed the main questions to answer and the main hypotheses to test in this research. These studies, together with the information

given about Saudi Arabia culture, economy and education, suggested questions and hypotheses which need qualitative and quantitative studies to address.

CHAPTER 3.   PILOT STUDIES

After reviewing the previous studies about students attitude toward computer it is helpful to conduct pilot studies to explore some ideas about Saudi students' attitudes towards computer and to help build the main study questions and hypothesis.

This chapter includes two pilot studies examining the attitudes of international and home students' studying in the UK towards computers. The aim of these pilot studies was to find descriptive information about postgraduate students' computer attitudes and usage. An additional aim was to identify relationships amongst students' computer experience, computer confidence and preference for computers. Identifying these relations is helpful to determine students' attitudes to computers. The studies were based on individual interviews with Saudi and UK postgraduate students, studying in the UK. The following sections will describe the methodology, results, discussion and conclusion of the two pilot studies.

3.1   First Pilot Study: Attitudes to Computers Among Saudi Postgraduate Students Studying in the UK

3.1.1   Methodology

3.1.1.1   Study procedure

In this study a series of fourteen individual interviews consisting of open questions were conducted, each lasting from 30 to 40 minutes. The questions focused firstly on personal information: age, field of study and sex. After that, open questions were used to find information about first time computer use. It was then possible to compare the collected information about past use with current use. Questions were also included about computer confidence, computer experience and preference for computer use. The final questions investigated attitudes towards computers in both Saudi Arabia and the United Kingdom. In order to make the discussion easier and more effective the interviews were carried out in Arabic, as the interviewees were native Arabic speakers. Each interview was then translated into English for data analysis and discussion. The

NVivo (Qualitative data analysis software) program has been used to analyse this qualitative data using thematic analysis. These themes were branched from importance of computers, computer experience, use, purpose of use, and encouragements.

3.1.1.2 Participants Sample

Each participant has signed a consent letter before starting the interview. The participants in this sample were Saudi PhD students in Edinburgh in the United Kingdom. Their government has given them scholarships to continue their study in the UK. Fourteen students were interviewed, seven female and seven male. The participants were selected from different fields of study: Mathematics; Computer Studies; Engineering; Management; Life Sciences; built enviroment, education and Languages.

All of the students were 27 years old or over and had lived for more than two years in the UK. All participants had a bachelor degree from KSA, and some had a Masters' degree from KSA, and were continuing with their studies in the United Kingdom. All the students therefore had experience studying in both countries. Table 3-1 shows participants' details and table 3-2 shows the questions participants were asked.

Table 3-1) Participants by Demographic Information

Participant Code	Sex	Age	Subject
A	Female	30	Maths
B	Female	27	Computer
C	Female	30	Languages
D	Female	27	Computer
E	Female	32	Life science
F	Female	33	Computer
G	Female	32	Biology
AA	Male	35	Engineering
BB	Male	30	Computer
CC	Male	40	Engineering
DD	Male	43	Engineering
EE	Male	29	Math
FF	Male	31	Built Environment

	GG	Male	33	Education

Table 3-2) Questions Asked of Saudi Postgraduate Students

No	Interview Questions
1	How old are you?
2	What is your subject?
3	Where did you use a computer for the first time?
2	When did you use a computer for the first time?
3	What did you use it for the first time?
4	How did you learn to use a computer?
5	How did you learn using computer?
6	How did you feel when you worked with a computer for the first time (software/internet)?
7	How often did you use the computer at first?
8	Did you use a computer at school and university?
9	What or who encouraged you to use the computer?
10	Did you learn English language when you were in KSA?
11	What is your parents' opinion of computers?
12	Do they use one?
13	What are your parents' attitudes to you using a computer?
14	Parents' education level?
15	Do you enjoy using a computer?
16	What do you like about computers?
17	What do you dislike about computers?
18	How confident are you when using a computer?
19	What skills do you have? (e.g. Excel, Email, PPT, Word, Web browsing, Programming, Endnote, Outlook)
20	How do you feel when you work with computers (software/internet)?
21	What do you use computers for now?
22	How often do you use one?
23	What would you feel if you were unable to use a computer?
24	Is the computer important for student learning?
25	Would you like to work in a job that depends on computers?
26	Do you have a smartphone?
27	What do you use it for?

28	What do you like about smartphones?
29	How would you compare your experience of using computers for learning in the UK and KSA?
30	Can you comment on differences in attitudes to computers generally in these countries?

3.1.2 Results

Gender Differences

There are three results in this study where there are differences between the sexes.

The first finding is that gender is connected with the daily time spent using a computer. Female participants reported spending more time using computers than male participants in all fields of study. The female participants' replies to the question "How often do you use a computer per day?" included: "*12 hours per day*" (C); "*All day except sleeping time*" (D); "*18 to 20 hours per day*" (F). Only one of the male participants spent 8-10 hours (CC), and the other males spent 7 hours or less per day.

The second finding relating to gender differences is that male participants had less anxiety in using computers than female participants. Women seemed to be worried and annoyed when using computers: "*Worried about viruses when I surf the internet and making mistakes; difficult when I use new software for the first time. Warning windows make me scared*" (C); "*Not comfortable with the camera, privacy, and sometimes hackers and viruses*" (F); while men on the other hand felt comfortable using computers and thought they were easy to use.

The final finding related to sex differences is about parents' opinions of their children's use of the internet. Some parents didn't allow their daughters to use the computer. For example they replied to the question "What are your parents' attitudes to you using a computer?" with "*My mother did not allow me to use the internet for any purpose. Because she heard it's bad for children she thought it is for playing and wasting time and a strain on my eyes*" (C); "*It is ok to use the computer but not using the internet: they don't allow me to use the internet a lot, just for studying not for other [purposes]. They allow me to use it but under strict control*" (E); "*I wanted to use it to chat to my friend or browsing the internet but I couldn't, my parents didn't allow me*" (G). Two of them had used the computer after marriage when they felt that they had freedom to use it in any way: "*When I got married I used it; my husband allows me to use it*" (G); "*I*

got married so my parents don't tell me anything about it" (F). Male participant do not suffer from these issues: "*They don't encourage me or prevent me*" (DD), and only one male stated that their parents preventing them if he stayed for long time "*Sometimes they prevent me to stay for long time with the internet*" (GG). It seems to be that restrictions are with females more than males. The reason for the restrictions as one female mentioned in the interview: "*Because she (mother) heard it's bad for children she thought it is for playing and wasting time and strain my eyes*"(C);

One of the female interviewees said that "*They didn't allow me to use it in the past…now they [parents] allow my brothers and sisters to use it but under control*" (G). It could be that her parents now have knowledge about computers and their benefits from their first daughter's experience or from people around them, but they still make controls for their children.

Smartphone Use

Most of the participants in this study (ten out of fourteen) use smartphones. Participants who use smartphones and like them do so because they are like a small computer that they can carry and use everywhere: "*It is like a small computer. I move it everywhere*" (D); "*It is like a computer: we can find what we want if the computer is not available*" (DD); "*I feel that I have a small computer in my bucket*" (FF). Smartphones are used for the same purposes as computers, e.g. checking emails, communications, news, browsing.

Confidence Influences Feelings

Another finding is that confidence in using computers has impacted on the students' feelings about their use. Even students who are confident with computers do not necessarily feel that using a computer is easy and comfortable. Nine participants are confident and feel comfortable that computers are easy to use "*(confidence) excellent…Easy to use and I feel comfortable*" (D); while three participants are confident but feel computers are not easy to use "*(confidence) Excellent…Not easy, always wearied about making mistakes specially in my study*"(B); "*(confident) Excellent…Comfortable but sometimes is annoyed*"(BB). On the other hand two participants are not confident, but one of them found using a computer isn't easy and

comfortable: "*Not much confident… If I use it for chatting or browsing easy and interesting, but for studding like searching about document disturbing*" (A); while the other one found a computer easy even though she is not confident "*Not much confident…easy and comfortable*"(E).

This finding suggests that there is no relationship between computer confidence and feeling when using computer. People who are confident in using computer do not necessarily find using a computer is easy and comfortable and the opposite is also suggested.

Also, the same finding is suggested with computer confidence and enjoyment. Most of the participants mentioned that they are confident in using computers (12 participants), but not all of these enjoy using computers; three of them reported a negative impression: "*I have to use it but I don't enjoy*" (B); "*not enjoyable when it is waste my time*" (G); "*sometimes (Enjoyable)*" (GG); "*it is not enjoyable when i use it for my study*" (D), while there is one female even is not confident, she enjoy using computer.

Encouragement to Use Computers (Parents)

Parents are also an important factor in influencing their children to choose a field of study. Students who are studying Computer Science in this research had encouragement from their parents to do so. "*They encouraged me to study computers as they are important in our life and it was a new department when I finished High School so they wanted me to study a new field*" (D); "*They encouraged me to apply for computer science*"(B); "*They believe that computer is important technology …They encouraged and supported me to learn the computer*" (BB). From the result of this study we can say that the parents' education level, use of computers and their attitudes to computers have an impact on the students' study preferences. Parents who have a positive attitude towards computers and their use consider them important, and encourage their children to use them and learn more about the technology "*They believe that computer is important… they encourage us to use it*" (A).

From the study we can see that most encouragement that has a positive effect on a student comes from male family members and friends. For example some of the students' replies to the question "What or who encouraged you to use the computer?" included: "*My brother. I just copied my brothers: they use the computer and they have*

emails" (A); "*My brother, and my friends*" (D); "*My husband: he bought it for me to use*" (F); "*My father, teacher and some of my friends*" (BB); "*The community*" (FF); "*My friends*" (GG). Therefore, the environment that surrounds a student plays an important role in building their attitude towards computers and technology in the future. There is also an associated relation between the place of first time use and encouragement. Participants who used the computer at home for their first time did so due to encouragement from family, friends or from personal desire. However, students who used computers for the first time at university did so due to encouragement or a requirement by their universities.

Computer Experience

Another finding is that students who have positive experiences using computers are more confident than students who do not. Students who have used computers from an earlier age "15, 16 or under" and spend a long time using computers are more confident. Also, the time that students spend using a computer is influenced by their field of study. Computer Science students use computers a lot for long time periods, while students of education subjects don't need to spend so much time using them.

Purpose of Use

Users' age the first time they use a computer seems to be associated with the purpose of use. Participants who used the computer for the first time when they were 19 years old and over tended to use it for studying, learning and news, while students who began using it from 16 and under tended to use it for communication, socialising and entertainment.

Computer Usefulness

In addition to the previous findings, participants have a strong positive attitude towards computers. They feel that a computer is important in their life and that they can't live without it. This attitude is perhaps affected by the advantages and benefits of computers. Participants have noted in their interviews that there are a variety of advantages to using computers: "*Rapid access to information, making study easy*" (A); "*Makes my life easy; keeps me in touch with my family and friends even when they are in a different places. Saving time: I ask Google about anything and it brings the answer fast*" (C); "*Quality of*

the project: the speed and the accuracy" (BB); "*Easy to return to the information which I store. It is able to store lots of files and programs*" (DD); "*Some applications are useful; I don't need to use pen and paper*" (FF).

Computer Disadvantages

On the other hand, this study shows that the disadvantages of computers have a strong effect on users' feelings about computers. Nine student interviewees noted that they feel annoyance and fear of computer viruses, hackers, and other causes of damage. These kinds of damage cause discomfort to the users when they work on computers. They also find some software complex and difficult to use. For example, about computer disadvantages, participant C noted: "*Viruses make the computer move slowly even when I add anti-viruses*" (C); she then said about her feeling when she uses computers: "*Worried about viruses when I surf the internet, and making mistakes; difficult when I use new software for the first time. Warning windows make me scared*" (C). Another example is participant BB who expressed his feeling when using a computer thus: "*Sometimes it's annoying*". He then explained the disadvantages of the computer: "*When it suddenly stops working and doesn't leave time to save my work, and I have to switch it on to start work again*" (BB). So these disadvantages induce negative feelings, which could affect students' computer attitudes.

Culture Can Change Attitudes

A student's moving to a new society where the level of development and the culture are different cultural can change their attitude to computers. The students who participated in this study developed a more positive attitude toward computers when they moved to the UK, where they use computers more compared to those in KSA. This study shows that participants spend more time now using computers than in the past when they were in KSA: "*I use the computer now [in the UK] more in my study...I depend on the computer in the UK more than in KSA for shopping and studying*" (B); "*In KSA I didn't use it in my study. But in the UK I use it a lot to find information, searching about books or journals and emailing the university stuff*" (GG). One of the students believed that "*In the UK using a computer is important for all ages, and it is part of their life. In KSA it is hugely different: nobody uses it unless they know how to use it, or they need it*" (AA). This finding may be a result of the difference in culture between the UK and

KSA. This study shows that Saudi students use the computer more since they move to the UK, for learning and studying, and for other services such as shopping online, and looking for accommodations or schools. In KSA most students use computers for communication, browsing and a few of them for studying. This finding has a similar perception from participants, as one of the participants pointed out that "*In KSA people often use it for fun, watching TV or video clips. And some people use it for studying and searching. In the UK, in addition to the previous purposes, computers assist people's lives and affect their lives and activities*" (DD).

These differences are as a result of facilities that have been provided online and the position of the government on the use of technology. Participants said that: "*The UK has heavily adopted the computer in all places, for different purposes, whereas in KSA it is not adopted in all areas*" (GG); "*In the UK it is common to use emails or go online to apply for all services (schools, university, shopping, estate agents, banks...)*" (CC). Another reason is a lower awareness about computers: "*It is a cultural problem in KSA: they use it for social purposes and they are not aware about academic uses. They spend lots of time for chatting or playing. But in the UK there are many things that encourage me to use it: for example the online services, learning websites for adult and children*" (FF). People in Saudi Arabia do not have knowledge or the variety of skills connected with using computers for beneficial purposes. Also, there are insufficient resources to allow access to Arabic information, books and journals and there are limited learning websites for children and adults. One of the students compared her study now in the UK with the situation when she was in KSA as a student and as a university lecturer: "*I used to work in university (lecturer) without a computer! It is important... Here, every student has a computer - how about that stuff! Research can be online here, but in KSA I have to search books in the library. In KSA there was no electronic communication by email. Any notes, we had to put on the wall board, not like here: any notes or advertising is by email*". She concluded that: "*Studying here is better and easier for a researcher*" (G).

Students have strong attitudes toward computers so they can feel lost, annoyed and isolated as they expressed: "*Annoyed, Computer is part from our life*" (A), "*frustrated, my life will be difficult*" (C), "*Annoyed, disable to do anything. It is important in my life especially for studying*" (E), "*Isolated from the world*" (BB), "*I feel that I miss something very important*" (DD). One participant explains he now can't live without a

computer, whereas in the past he didn't care about it "*In the past it is ok because I didn't know about the important and advantages of the computer. But since i know the advantage it is difficult*" (AA); another female participant thought computers are difficult to use and there is no need to use one "*I thought it is difficult to use and not beneficial*" (C). Only one participant who is a male doesn't care if people are not able to use computers "*I will feel good, I don't care if the computer is not available*" (GG).

3.1.3   Discussion and Conclusion

3.1.3.1   Discussion

3.1.3.1.1 Differences between Gender

The results from this study show that all students, both male and female, have strong positive attitudes towards computers, as found by Korobili et al (2010); Aljabri and Alkhaldi (1994); Teo (2008); Eyadat (2006); Pamuk & Perker (2009); Shashani and Khalili (2000); Yusuf & Balogun (2011); Stephens & Creaser (2002). Males and females both believe in the importance of computers in their lives, and their importance in learning for both adults and children. This finding supports that of Shashani & Khalili (2000); Tekinarslan (2008); Sam et al (2005); Beyer et al (2003); Coreston & Colman, (1996); Wong & Hanafi, (2007); Kar et al (2014); Alaba et al (2012) that there is no sex difference in computer attitudes in their study. Students find computers to be enjoyable and useful devices. In addition, both male and female students in our sample have used computers for the same purposes. This finding is similar to Sam et al (2005).

There are some sex differences shown in the result of this study. The first difference is that women spend more time with computers than men. It seems to be that females are more conscientious than men about studying using the computer. The second difference is that male students show less anxiety and are more comfortable when they use computers, whereas women are more anxious and scared, and more worried about making mistakes when they use the internet or new software. Studies by Chua et al (1999); Schumacher & Martin, (2001); Lee (2003); Othman & Latih (2006); Bebetsos & Antoniou (2009); and Kannan et al (2012) support this with the finding that male undergraduate students are generally less anxious when using computers than female undergraduates. Though female students do have good computer experience and are equally confident when using computers compared to males, and spend long time

79

periods with computers, they still worry about using them and making mistakes. This finding is inconsistent with the systematic study by Powell, (2013) who concluded that there are no gender difference with college students regards to computer anxiety.

3.1.3.1.2 Experience

The improvement in students' feelings about using computers from their first use might be caused by their long and frequent experience using computers and their increase in skills relating to computers and computer software. This supports the finding by Coreston & Colman, (1996); Tekinarslan (2008), who reported that there is an association between computer anxiety and computer experience: as computer usage time and frequency increase, computer anxiety decreases. Previous studies (Tamar et al, 1998; Popovich et al, 2008; Hashim and Mustapha, 2004; Teo, 2008; Beckers and Schmid, 2003) also indicate that computer confidence and computer experience positively correlate. This suggests that students who use computers for long periods and more frequently are more confident, have more computer skills, suffer less anxiety, and like computers more. Another finding is that computer confidence doesn't reflect students' feelings when they use computers. Students who are confident in using computers not necessarily feel that they are easy and comfortable to use.

3.1.3.1.3 Attitude

Another finding is that some of the participants had a strong positive attitude towards computers, believing them to be important in their lives and that they cannot live without them. This attitude may be influenced by the perceived advantages of using computers, with the interviewed participants noting the benefits of their use. Previous studies suggested significant relations between perceived usefulness of computers (Bebetsos & Antoniou, 2009; Eyadat, 2006; Aljabri and Alkhaldi, 1994), and their actual effectiveness (Bebetsos & Antoniou, 2009). Conversely, the disadvantages of computers also have a strong effect on users' feelings. When the user faces problems with a computer they feel bad, nervous, annoyed and worried.

3.1.3.1.4 Study Area

Additionally, students' fields of study are also associated with their computer experience and confidence. Some subjects require more intensive work with computers than others. Aljabri and Alkhaldi (1994), Sam et al (2005) and Alharbi (2010) confirm

that students who had taken more courses related to computer use had higher levels of confidence with computers, were more aware of the usefulness of computers, and had more positive attitudes towards computers compared with students who had taken fewer computer courses.

3.1.3.1.5 Age

The purpose of using computers is also related to the age of the user. Young people's computer activities differ from those of adults: they use them for entertainment such as browsing the internet, playing and chatting, while adults prefer to use computers for watching the news, searching and reading. This finding supports studies by CITC (2009) and Miliany (2014). According to Simsim (2011) a majority of Saudis over the age of 26 tend to use the internet for cultural purposes, i.e. for work, business, banking and information collection.

3.1.3.1.6 Parents

Families and parents are other important factors that influence students' attitudes toward computers. Avraham (2005) suggests females are strongly affected by their parents' opinions about computers. This is related to the culture in Saudi Arabia, where some parents prevent their daughters from using the internet, and it has a negative effect on female attitudes and their experience of computing. According to Shashani & Khalili (2000) less confidence and interest in computer work are displayed by students, particularly females, who feel that their parents hold stereotyped views on computers. The reason for this could be that parents are not educated enough, do not have knowledge about the benefits of computers and are not aware of their importance in daily life and in learning.

Students' study preferences are also affected by their parents' level of education and use of and attitude towards computers. Parents with a positive attitude, who deem the use of computers important, encourage their children to learn more about the technology by using them. The attitude of the parents was also a key factor that influenced the students' course selections. Additionally, a relationship exists between parental occupational and educational status and students' attitudes. Students had greater confidence in using computers, were more positive towards their utility and were more highly educated if they had parents with a higher level of education. This finding

supports that of a previous study by Badria (1998), which indicated that students who have positive attitudes to computers, have computers at home, their parents give them computers, and they start to use them and experience the benefits. Moreover, Shashani & Khalili (2000) report that such students also displayed less stereotypical attitudes about computer users.

3.1.3.1.7 UK and KSA

There is a big difference in students' attitudes when comparing their attitudes in the UK and their attitudes when in KSA. In the UK computers are used more widely in learning and in general. There are many reasons involved in this difference in attitudes. One reason could be the facilities and services provided online in the UK, such as shopping, finding houses, and directions. Also there are rich educational online sources in English, whereas these are not available in Arabic. These facilities stimulate students to use computers more and make it more important in their lives, especially in learning. Another reason is that education systems in Saudi Arabia, even in schools or universities, don't give students a chance to gain knowledge of the importance of computers and computer skills. Amoudi & Sulaymani (2014) report slow implementation of technology in Saudi classrooms which results from a lack of resources, meaning technology tends to focus on a single subject, instead of being accessible across the entire learning system. Students therefore have limited information about and access to computers in their institutions. When students moved to the UK they found a different situation, with computer labs that are accessible at any time and that can provide unlimited use of the internet and programs and free online electronic books or journals.

3.2 Second Pilot Study: UK Postgraduate Students' Attitudes towards Computers

3.2.1 Methodology

The main aim of this study is to investigate the attitudes of UK postgraduate students towards computers. As in the previous pilot study, this one aims to identify relationships amongst students' computer experience, computer confidence and preference for computers. However, the main aim of this study is to identify similarities and

differences between Saudi and UK postgraduate students in terms of attitude and usage of computer.

3.2.1.1 Study procedure

In this study a series of fourteen individual interviews consisting of open questions were conducted to investigate the attitudes of UK students toward computers. Each interview was conducted individually and took from 30 to 45 minutes. The questions focused firstly on personal information: age, field of study and sex. After that, open questions were asked to find information about first computer use. It was then possible to compare the collected information about current computer use with that on past use. The NVivo (Qualitative data analysis software) programme has been used to analyse this qualitative data using thematic analysis.

3.2.1.2 Participants Sample

The participants in this sample were British PhD students in Edinburgh in the United Kingdom. Fourteen students were interviewed, six female and eight male. The participants were selected from different field of study: Computer Science; Engineering; Built Environment; Psychology; and Life Sciences. The age of the students was between 24 and 29, but two of the participants were 35 and 44 years old respectively. Table 3-3 shows participant's details and table 3-4 shows the questions they were asked.

Table 3-3) Participants by Demographic Information

Participant Code	Sex	Age	Subject
A	Female	44	Engineering
B	Female	28	Built Environment
C	Female	28	Built Environment
D	Female	28	Psychology
E	Female	29	Psychology
F	Female	26	Life Science
AA	Male	25	Computer Science
BB	Male	25	Computer Science
CC	Male	29	Computer Science
DD	Male	26	Engineering

EE	Male	24	Engineering
FF	Male	35	Engineering
GG	Male	24	Life Science
AA	Male	28	Engineering

Table 3-4) Questions Asked of UK Postgraduate Students

No	Interview Questions
1	How old are you?
2	What is your subject?
3	Where did you use a computer for the first time?
2	When did you use a computer for the first time?
3	What did you use it for the first time?
4	How did you learn using computer?
5	How did you learn using computer?
6	How did you feel when you worked with computer for the first time (software/internet)?
7	How often did you use the computer at first?
8	Did you use a computer at school and university?
9	What or who encouraged you to use the computer?
10	What is your parents' opinion of computers?
11	Do they use them?
12	What are your parents' attitudes to you using a computer?
13	Parents' education level?
14	Do you enjoy using computers?
15	What do you like about computers?
16	What do you dislike about computers?
17	How confident are you when using the computer?
18	What skills do you have? (e.g. Excel, Email, PPT, Word, Web browsing, programming, Endnote, Outlook)
19	How do you feel when you work with computers (software/internet)?
20	What do you use computers for now?

21	How often do you use them?
22	What would you feel if you were unable to use a computer?
23	Is the computer important for student learning?
24	Would you like to work in a job that depends on computers?
25	Do you have a smartphone?
26	What do you use it for?
27	What do you like about smartphones?
28	What applications do you use often?

3.2.2 Results

Gender Differences

Three results in this study show gender differences.

The first is that five female participants learned how to use a computer in the beginning by themselves "*Mostly by myself, trial and error*" (F). Only one of female mentioned that she learned to use the computer at work "*At work before 18 years ago i used to work in engineering company*" (A), and other females who mentioned learning to use the computer by themselves mentioned as well their parents (1 participant), and school (2 participant). Whereas two male participants learned how to use computers by themselves and two with their fathers: both are Computer Science students "*The school and by my dad*" (AA); "*By myself and my dad sometimes help, he is a computer engineer*" (BB), and two learned to use the computer from their friends "*My friends show me how i can use it*" (HH). Some of the males had a mixture of teachers and friends or themselves and teachers "*I taught myself, my computer teacher*" (CC); "*The first step was by teacher at school initially then by myself*" (EE); "*I can remember at the beginning my teacher and my friends*" (DD); "*By myself just trying, practicing, and sometimes teacher at school*" (FF).

 The second difference between the genders is that males use computers for a longer time than female students as they reported "*Every day definitely most of the day*" (AA); "*Spend most of the day*" (BB); "*Between 14 and 18 hrs per day, too many for my physical health*" (EE).

85

Thirdly, there is a gender difference in terms of preference to do a job that requires working with computers. Only two females were happy to do this: "*Yes, it's important*" (D); "*It's fine*" (E); while the rest of the females didn't want to work with a computer in a future job: "*No, it is too much; I don't want to work with computers after finishing my PhD*" (A); "*I already do, but in the future, no, I don't want to*" (B); "*In terms of processing information yes, otherwise I don't like programming*" (C); "*Not ideally, but I will not reject a job because it requires a computer*" (F). On the other hand male students were more positive about doing a job requiring working with a computer, with six out of eight happy to do that: "*Yes I will be happy to do*" (AA); "*I like that*" (GG). Two males were not happy to have the kind of job requiring computer work: "*Indifferent; it's something unavoidable*" (DD); "*I wouldn't mind. Although I wouldn't want to sit in front of a computer screen every day*" (EE).

Feeling and Confidence

The participants had a positive feeling when they used a computer for the first time; they felt excited, comfortable and that they were doing something new, even if it was difficult at the beginning for some of them: "*Something exciting and new. I was not good with computers but I never felt worried; good fun to use*" (AA); "*I was quite comfortable and happy to explore*" (F); "*Easy, and felt comfortable*" (D); "*Easy, interesting, no problem*" (CC).

Some of the participants had mixed feelings between worry, difficulty and excitement at the same time: "*Slow, frustrating training, and exciting programs*" (A); "*Initially worried in case I broke the computer. Then I was excited about using it*" (EE); "*Comfortable but I worry about trusting technology*" (B); "*Difficult at the start but exciting, something new*" (DD).

A majority of participants expressed their feelings when they using a computer currently as comfortable, relaxed and easy: "*Easy to use, and makes everything easy*" (E); "*Very comfortable even if the software is new*" (F); "*Confident, easy and comfortable*" (FF); "*Comfortable and relaxed*" (EE). One male student related the feeling to the type of work and program: "*Comfortable, easy, and difficult depending on the work and program that I use it for*" (DD)".

This positive feeling could be because all students participating in this study reported being very confident in using a computer, and all of them reported having good skills in programs such as Microsoft office, Endnote and Outlook. Engineering and Computer Science students had additional programming skills.

However, only two females still had a negative feeling when using a computer and even they were confident with computers, as they express: "*It's easy but it makes me annoyed sometimes*" (A); "*Comfortable but scared; difficult and frustrated with certain software*" (B).

Encouragement to Use Computers

With regards to encouragement to use computers all female students replied that it is required and every one must use it: "*My work depends on computers so I have to work with a computer*" (A); "*Stuff we couldn't complete without it as we were modelling*" (B); "*Every student has to use it at school and we need it to do our work*" (D); "*No-one: it was a must; no pressure*" (F); "*It was required at school for assignments, and word processing*" (F). Some male students relate their encouragement to use computers to friends, teachers or family members: "*Friends had encouraged me, and probably my High School computing teachers*" (AA); "*It was my friends first and my dad*" (BB); "*My uncle and teacher as well*" (CC); "*My school teacher initially, because it was the first time, and teacher gave us information and the benefits of using a computer, and helped me to work with computers*" (EE); "*My father bought a PC and let me use it*" (GG). Some students used computers just because it was important and required: "*I only used it when I had to for school work and homework*" (DD); "*At university it was compulsory*" (FF); "*By myself, course content*" (HH).

All participants mentioned that their parents had a positive attitude toward computers: "*They feel it's important*" (A); "*They have a positive opinion and use computers frequently*" (F); "*See it as an important part of life in these days; they're both always informed about computers*" (AA); "*My dad was interested. It is important; my mother as well*" (CC); "*They found it very useful and a time saver*" (EE); "*They believe the computer is useful and makes life much easier*" (GG). However, some of participant find it difficult to use, as participants mentioned: "*Useful tool but complex*" (HH); "*Difficult and frustrating*" (DD); "*Reliant on using computer but less comfortable*" (C); "*Use them as they make things easier, but they're unreliable*" (B).

Moreover, a majority of parents have a positive or neutral attitude to their children using computers: "*They encouraged me to use it; they didn't prevent me from using computers*" (A); "*Positive; they are happy for me to use computers a lot*" (F); "*I wouldn't say that my parents necessary encouraged me but they didn't discourage me*" (AA); "*Encourage me to use and learn computers*" (BB); "*Happy, but they didn't encourage me*" (CC); "*They didn't encourage me but they didn't mind if I used it*" (FF). This positive attitude from parents is because all the participants mentioned that their parents, both mothers and fathers, use computers at home or work or both. All have a higher or postgraduate education apart from three parents who attained High School education.

Computer Experience

All students apart from one female student have used computers in school and university, and all of them started using computers at an early age: 10 years old and under. Most of them started using computers at primary school to play games: "*From Primary, very frequently from age 12*" (F); "*I think the first time was in Primary 3*" (HH); "*At Primary school for games; High school to do homework; and at university*" (CC). Also, they all use computers in their universities but changed their activities later to do homework and assignments with them: "*At school just playing games: educational games in primary school, then in university to study, to do assignments and programming*" (BB).

One female student started using computers later than the other participants: "*About 16 years old, since 1983…When I was in Secondary School*" (A). That may be related to the age of this participant as she is 44 years old. At that time computer education did not exist in schools.

Starting using computers in early years is a positive factor that can make students like them. Participants in this study from the Computer Science school started using computers at an early age - 5 and 6 years old - and did so at home and school: "*When I was 6 years old. I had my personal PC; it was a Windows PC*" (BB); "*When I was 6 years old I had my personal computer. My uncle bought it as a gift*" (CC); "*The start was when I was 5 years old at school. When I was 10 years old we had a PC both home for all the family*" (AA).

Seven participants started using computers at school and then used them at home. Six participants started using computers at home, and one female started using computers at home and school at the same time.

Regarding the duration of computer use in these early stages, students would spend a few hours per week, the approximate time being between 1 and 10 hours per week. One female said that she used computers all day from the beginning, though she started using them at a later age.

Now all participants use computers a lot, but males spend longer than females and Computer Science students spend a longer time than students of the other subjects; as they express, they spend their whole day with a computer.

Purpose of Computer Use

Students who used a computer at an early age - 5, 6 or 7 - were using computers for the first time for playing games, and seven of them were doing school tasks: "*Playing educational games, mostly maths based*" (F); "*I think it was just for games actually, like a main activity even in the school and home*" (AA). Other students who used a computer at age 10 or later tended to use it to do tasks: "*School: learning games and activities, writing documents, and then instant messaging in High School*" (D); "*Just writing documents; there was no internet*" (A); "*Writing documents, chatting, searching*" (DD).

In the meantime all participants use computers for studying as their main purpose and for playing, communication and shopping as well.

Smartphones

All participants in this study have a smartphone. Two females and one male student don't like using smartphones: "*I think I don't need it*" (A); "*I like to use a simple phone; it's enough*" (CC); "*I don't need it seriously*" (E).

Students who use smartphones treat them like computers because they connect with the Internet and can help them to do tasks; it's like a computer, to "*feel so connected*" (D); "*A small computer helps you stay connected when you are on the move*" (AA); "*Many things in one device, camera, email*" (BB); "*It has many uses: communication, internet, note, lots of things*" (DD); "*Information on the move*" (FF); "*Portable device: access to the internet and as a phone*" (GG).

They use smartphones for calls and texts, and use it like a computer to access the Internet, checking emails and playing games. Three females use social networking applications while the other participants don't use them with their smartphones. Moreover, participants use them for the other functions such as bus tracker, camera, timer, alarm, notepad, maps and music. Three students, two from Computer Science and one from the Engineering school, have smartphones but use them only for calls, texts and checking emails.

Computer Affection and Usefulness

All participants in this study feel affection for computers and they enjoy using them, apart from one female who replied*: "No. I have to use it a lot at work"* (A). Her dislike could be for two reasons: she is 44 years old, and she started using computers at a later age.

A majority of the participants feel that a computer is important in their life and that they couldn't live without it. This attitude is perhaps affected by the advantages and benefits of computers. Participants have noted in their interviews that there are a variety of advantages of using computers and the majority of them mention three main ones. These are communications, speed of information and making work easier: "*Speedy information, finding papers, references, communication*" (A); "*Speed, ability to look things up, wide range of applications*" (B); "*Communication with friends and family, easy to write documents. I like socialising*" (D); "*Large monitor with good graphics, fast processing and intuitive interface*" (F); "*Most important? Probably the ways it helps with communication*" (AA); "*They allow computation that would be impossible without a computer. Many benefits make me like it: communication, information*" (FF); "*Speed of accessing information, ability to write neat documents, flexibility and speed for mathematical problems*" (EE). In addition all participants suggested that computers are important in adult and children's learning.

In addition, a majority of participants explained that their life would be difficult if they were unable to use computers any more, and they feel that they will be lost and, especially, worried about their study and work: "*I can't imagine that, my work will be difficult: drawing, painting. I will be lost*" (A); "*Progress with work would be significantly slowed down*" (C); "*Life will be difficult*" (CC); "*I couldn't do any work; I properly wouldn't do a PhD*" (EE); "*Annoyed at losing all touch with the work and*

people" (GG); "*Dislike, no Internet connection*" (HH). Only two male participants are not worried if they would become unable to use a computer: "*Indifferent; it doesn't matter*" (DD); "*Happy, my life would change but I will not die*" (EE).

Computer Disadvantages

On the other hand, six out of fourteen students suggested disadvantages of computers, such as errors, viruses and bugs: "*Error messages, crashing, unexpectedly slow, unfriendly software packages*" (B); "*Slowness*" (F); "*When I don't know what to do with the computer; I mean, when I face a problem or get stuck*" (BB); "*Losing files; computer crashing*" (EE); "*Bugs, crashes annoy me*" (GG). Some students think of different disadvantages of computers, such as social isolation: "*Less personal communication… just sit at the computer rather than go outside to play. People send email rather than talk on the phone or meet up face to face*" (AA); or time issues: "*Can be very time consuming*" (D); and effects on health: "*Focused attention makes the screen hurt my eyes*" (E).

There is a relation between confidence in computer use and getting disadvantages from the computer. Four students suggested disadvantages of computers based on low confidence in doing part of their work or when they feel they are less knowledgeable: "*Java programming: Java is the worst program*" (BB); "*Installing and using software and hardware*" (DD); "*Not fully understanding the background workings*" (C); "*The number of different languages*" (B). While the majority of participants suggested some disadvantages of computers, three participants (one female and two males) said that they don't find any computer disadvantages: "*Nothing*" (A, CC, HH).

3.2.3   Discussion and Conclusion

3.2.3.1   Discussion

The findings of this study indicated that all UK postgraduate students, both male and female, have a positive attitude toward computers, that all students are very confident in computer use and have good computer skills. This is consistent with Korobili et al (2010); Aljabri and Alkhaldi (1994); Teo (2008); Eyadat (2006); Pamuk & Perker (2009); Shashani and Khalili (2000); Yusuf & Balogun (2011); and Stephens & Creaser (2002). In addition, all students are aware of the importance of computer use in their life as well the importance of computers in learning.

Gender Differences

There are no gender difference between UK students as regards computer attitudes, confidence and affection. Both males and females enjoy using computers and have similar computer skills. There are three points where males differ from females regarding usage. The first difference is that female students start using computers by themselves and no-one without encouragement from others. Females start using computers as they are required for some tasks at school. In addition, females seem to learn how to use computers by themselves, while male students have diverse ways of learning computers: by themselves, with teachers, friends, and fathers. It could be that those males have more chance to get help from others than females, or maybe that females are more likely to have curiosity for themselves.

The second difference is that males use computers more than females. It could be that males like using computers more.

The third difference is that males are more likely to do jobs that depend on computers, in contrast to females who don't want to have a job based on using computers. Females, traditionally and worldwide, are less likely to study or work in scientific and technical fields, such as Maths, Engineering and Technology (Almarzouqi & Forster, 2011; Sainz, 2014). Male students receive encouragement to use computers from their friends, teachers and parents, especially fathers. Avraham (2005) support this finding and suggest that women's choice to remove themselves from computers is caused by the role of gender specialisation that is shaped by teachers and parents. It appears that the greatest and most direct impact on ambitions comes from parental encouragement and the intentions of a person's peer group, so students' attitudes are affected by differences in the treatment of the genders by teachers and parents.

Parents

Student whose parents are educated and have positive attitudes toward computers will influence their children to use computers. They may provide their children with access to a computer at home, or at least they will be happy if their children use a computer. This finding is consistence with that by Shashani and Khalili (2000) and Liu (2009) who argue that home computer access in conjunction with parental support helps students build their computer knowledge, and that students whose parents are highly

educated tend to have greater confidence and knowledge about using computers, and perceive computers as useful.

Computer Experience

Students' positive feelings when they use a computer for the first time are a result of using it at an early age so they are interested to use new technology which provides lots of activities. Also, they continue to have positive feelings when using computers as they have good computer skills and experience. Eyadat (2006) and Alaba et al (2012) confirm previous finding that students with greater experience with computers have positive feelings about them and are less anxious and more confident using them. Students who start using computers at an early age and gain longer computer experience are very confident and enjoy using computers. This finding supports Aljabri and Alkhaldi (1994), Eyadat (2006), Korobili et al (2010) and Kutlucai & Baskan (2013) who all find that experience in computer use has a positive effect on computer attitudes. Similarly, studies by Beckers and Schmid (2003), Hashim and Mustapha (2004) and Teo (2008) show that students who had more experience with computers had more computer skills and less anxiety, and liked using computers more.

Developed countries such as the UK integrate computers into the school curriculum at all levels from Primary to High School. This allows students to gain benefits from computers, and become aware of their importance and how they can benefit from them. Popovich et al (2008) indicate that computer experience and computer skills courses had positively affected the students' attitudes. All UK students use computers for studying and learning and start using computers at school. The more students used computers, the better their development of a range of techniques and skills that resulted in improved overall computer knowledge.

3.2.3.2   Conclusion

Comparison of UK and KSA Students

These two pilot studies conducted among Saudi and UK students show positive attitudes toward computers among postgraduate students. Similarities and differences between the two groups were found. UK students have gretter computer experience than Saudi students as they start using computers from childhood. Also, the education system in the UK integrates technology in the early stages of education and treats it as a part of

the curriculum so students use computers to do homework and assignments. Therefore, UK students have more computer experience, more confidence, and have a variety of computer skills compared with Saudi postgraduate students. When Saudi students move to study in the UK, computers become more important to them and their attitude to computers become stronger, while UK students are accustomed to using computers for different tasks including using the internet for its many interesting sources and materials which help them in their study and daily requirements. However, not only schools affect students' attitudes to computers. Parents' education level and attitude towards computers also influences children to use computers and to have positive attitudes. The difference between UK and Saudi students suggests that parents of UK students are educated and that they use computers as well, while not all parents of Saudi students are educated and few of them use computers. This situation could make UK students use computers earlier and have more and better computer experience and skills than their Saudi counterparts.

With regards to gender differences, in the UK study males spend more time using computers than females, while in the KSA study females were found to use computers for a longer time than males. Although Saudi female students have higher computer anxiety than male students, this gender difference does not exist in the UK sample. The only gender difference in both samples is that females didn't receive encouragement from their parents. The situation is more marked in the KSA sample where females said that their parents used to prevent or restrict them from using computers, while in the UK sample there are no restrictions, though no positive encouragement either.

Therefore, with regards to this finding a set of hypotheses about Saudi students' attitude toward computers need to be investigated. This study suggests gender differences with regard to students' attitude toward computer. Also, this study suggests some factors that affect students' attitude toward computer which are computer experience, skills, liking, confidence and usefulness. As well as these factors, parents and the education systems have a strong effect in encouraging student and building a positive attitude towards computers.

CHAPTER 4.   UNDERGRADUATE SAUDI STUDENTS' ATTITUDES TOWARD COMPUTERS: A QUANTITATIVE STUDY

The literature about the importance of investigating students' attitudes toward computer and the interesting finding from the pilot studies which consider gender differences, cultural differences, and the factors which make positive or negative attitudes. A set of hypotheses and questions have been drawn from the literature and pilot study. The appropriate method to test these hypotheses is by collecting quantitative data with a large sample.

In this study three sets of questionnaires are presented to Saudi undergraduate students from different universities, three in the capital city and three located in small towns. The questionnaires addressed beliefs about gender differences, computer attitudes, and computer experience. The study was conducted among different types of cities to compare students' attitudes toward computers within communities of different size and location. This chapter will discuss the questionnaire design, questionnaire translation, data analysis procedure, the validity and reliability of the questionnaires, the participants in the study, and finally the analysis of the data and the discussion of the findings.

4.1 The Study Hypotheses

This study has been designed and conducted to test the following hypotheses:

1.   Saudi undergraduate students have positive attitudes towards computers, but male students have stronger attitudes than females; males are more confident and less anxious than females.

   From previous studies conducted with different samples in different countries, students' attitudes toward computers are positive. Some conclusions by previous studies were based on gender differences in computer attitudes. Some studies found differences in gender and others did not report any gender difference. When considering studies that were conducted within Saudi Arabia or in countries with cultures and economic levels similar to Saudi Arabia such as Malaysia, Turkey, Pakistan, Jordan and Kuwait any significance of gender differences is not clear.

However, the culture of Saudi Arabia gives males more attention and more opportunity for education and employment. As people may gain exposure to computers in schools, universities and work-places, women's experience with and attitudes to computers may be less positive than men's. In this case we expect that students' attitudes toward computers would differ based on gender, with males having more positive attitudes toward computers than females.

2. The children of parents who have used computers and seem to have positive attitudes towards them, or who have high education levels, will show stronger positive attitudes to computers.

Saudi Arabia is a Muslim culture in which the members of the family, children or adult, and especially females, have to follow their parents, and they have a tight relationship. Therefore parents' knowledge and positive attitude to technology can be a strong factor influencing their children's attitudes towards computers; however, the opposite is also true: a negative attitude from parents could instil negative attitudes toward computers in their children.

3. Students from the capital city will have a stronger positive attitude toward computers than students from smaller towns and cities whose students come from villages. Differences in people's cultural norms are shaped in part by their area, their region and their local community. People in the large cities in Saudi Arabia experience mixed culture and their area is full of access to many facilities and services. As discussed in Chapter 2, they have in general higher incomes and they are more educated than people living in towns and villages. In addition, people living in the smaller cities have less access to computers and Internet services. Students from the capital city should therefore have a more positive attitude to computers than students in the small cities because they are likely to have had more experience of technology at home or at school.

4.2 Methodology

4.2.1 Instruments

4.2.1.1 Participants

The sample of this study was undergraduate university students, who have been chosen from six universities. King Saud University, Imam Mohammed University, and Princess Noura University (for females only), are located in the capital city of Riyadh. Majmaah University and King Salman University, are located in small cities which are not far from Riyadh as Table 4-1 describes. Hail University, is located in Hail city in the north of Saudi Arabia. These collections of students are chosen to make comparison between students from different cities in different areas. Table 4-1 shows the universities which have been chosen and the number of students and educators in each university.

Table 4-1) Demographic Information of Cities which Take the Participant from

	Riyadh	Hail	Majmaah	Kharj
Population 2010	5188286	310897	47743	40114
City size in sq.km.	404,240	103,887	1500	1500
Distance from the capital city	The capital city	640	180	90
Number of universities	13*	1*	1*	1*
People involve in higher education (age 18-24)	%35- %30	%30- %20	Calculated within Riyadh area	Calculated within Riyadh area
People involve in higher education (age 18-24) Male only	%38- %28	%38- %28	Calculated within Riyadh area	Calculated within Riyadh area
People involve in higher education (age 18-24) Female only	%37- %30	%37- %30	Calculated within Riyadh area	Calculated within Riyadh area

Source: Central Department of Statistics & Information (2010). *Ministry of Education, Saudi Arabia (2015)

Table 4-2 shows the differences between the cities with regards to how far they are from the capital, city size, population size, and education. Participants were chosen randomly from different subjects, different years of study and with different ages. These allowing to compare groups to find similarities and differences. Written consent was gained from each institution and from each participant.

Table 4-2) Demographic Information of the Cities which the Study has Conducted in

	King Saud University	Imam University	Princess Noura University	Hail University	Majmaah University	King Salman University

Location	Riyadh city	Riyadh city	Riyadh city	Hail city	Majmaah city	Kharj city
Establishment year	1957	1994	2007	2005	2009	2009
Number of students	61,704	119,538	46,776*	31,651*	17,072*	27,843*
Number of Educators	7,614	3,387	2,099	2,121	1,225	1,964

* These were colleges then the governments decide to establish them as universities

4.2.1.2 Questionnaire Design

The questionnaires have been designed to allow measurement of the hypotheses, which arose from the findings of a number of previous studies. Table 4-3 shows how each questionnaire allows us to measure one or more hypotheses.

Table 4-3) Which Questionnaires Examine which Hypotheses?

	H1	H2	H3
Q1	√	√	√
Q2	√	✕	√
Q3	√	√	√
Q4	√	✕	√

The first set of demographic questions is about the participants' age, field of study, parental education, whether they use a computer, the place where they use computers most often, and encouragement they receive to use computers. This set of questions is designed to test the first and second hypotheses which focus on examining the factors that help shape students' attitudes toward computers.

Questionnaire set 4-1) Demographic Questions

Age: Gender:

Field of study: Year of study:

_____

1.What is your English Language level?
Excellent   Very good   Good   Limited   No English knowledge

2.Parents' Education Level
Uneducated   Primary school   Intermediate school   High school   University

3.Do your parents use computers?
Yes   No

4.Do your parents encourage you to use computers?
Yes　　　　　No

5.What other factors encourage you to use computers?
School　　　Parents　　　Friends　　　Community　Other

6.Where do you use a computer?
Home　　　University　　　Internet café　　　Library　Other

7.Where did you first use a computer?
 At home　　school　　at university　　Internet café　　library　other

8.Please order these computer applications by how often you use them.

Social Networking　　　Education　　　Entertainment　　　Shopping

9.Would you undertake further study of Computer Science if you had the opportunity?
Yes　　　　　　　No

10.　　　Would you like to take a Computer Literacy course?
Yes　　　　　　　No

The second set of questions is chosen from Erickson (1987) to explore students' beliefs about gender differences in computer usage and confidence. This set of questions is designed to test the first hypothesis which considers differences between genders in computer attitude. This is a five Likert scale ranked from 1 to 5. The maximum score is 30 which mean higher belief of girls ability to use computer, and the minimum score is 5 which mean low or negative belief.

Questionnaire set 4-2) Students' Beliefs about Gender Differences in Computer Usage

1.It's hard to believe that women or girls could be computer geniuses. (Reversed)

2.Girls who enjoy using computers are a little weird. (Reversed)

3.Women certainly are logical enough to use computers.

4.I would trust a woman just as much as a man to figure out how to operate a computer.

5.In general, boys are better than girls at using computers. (Reversed)

6.Girls can do just as well as boys in using computers.

The third set of questions is a Computer Attitudes Scale (CAS). For more than 20 years, attitudes toward computers have been studied with different samples and instruments. The most used scale was developed by Loyd and Gressard (1984) for university students. In order to measure attitudes towards computers, the Likert type attitude scale was developed, validated, and used in much of the published research.

Loyd and Gressard's Computer Attitude Scale has four affective dimensions: computer anxiety; computer confidence; computer liking; and computer usefulness. Every section contains ten subscales, and is stable enough to be used separately, while the overall scale can be used to measure general attitudes towards computers (Lambert, 1991). This allows measurement of how every factor can affect computer attitudes. The total score for the four subscales is also used to measure attitudes (Loyd & Loyd, 1985): "Item responses were coded so that a higher score indicated a lower degree of anxiety and a higher degree of liking, confidence and usefulness. A higher score on any of the subscales or total scores indicated a more positive attitude toward using computers" (Loyd & Loyd, 1985). The highest possible score in the CAS is 200, while the lowest possible score is 40.

The Likert 5-point scale is used (strongly agree; agree; nature; disagree; and strongly disagree). CAS was developed by Loyd and Loyd (1985) and has been used on Arabic undergraduate student samples by Eyadat (2006) in Jordan. The coefficient alpha reliabilities for the four CAS subscales were reported as .90, .89, .89 and .82 (Loyd & Loyd, 1985). Gardener et al (1993) compared four computer attitudes measurements and they recommend CAS. This set of questions is the most important part of the questionnaire, designed to test the first, second and third hypotheses. This helps in determining the students' attitudes toward computers, then are supplemented by items in the other sets of questions about gender, parents and experience.

Questionnaire set 4-3) Computer Attitude Scale

Computer Anxiety:
1. Computers do not scare me at all. (reversed)
2. Working with a computer would make me very nervous.
3. I do not feel threatened when others talk about computers. (reversed)
4. I feel aggressive and hostile toward computers.
5. It wouldn't bother me at all to take computer courses. (reversed)
6. Computers make me feel uncomfortable.
7. I would feel at ease in a computer class. (reversed)
8. I get a sinking feeling when I think of trying to use a computer.
9. I would feel comfortable working with a computer. (reversed)
10. Computers make me feel uneasy and confused.

Computer Confidence:
1. I am no good with computers. (reversed)
2. Generally I would feel OK about trying a new problem on the computer.
3. I don't think I would do advanced computer work. (reversed)
4. I am sure I could do work with computers.
5. I am not the type to do well with computers. (reversed)
6. I am sure I could learn a computer language.
7. I think using a computer would be very hard for me. (reversed)

8. I could get good grades in computer courses.
9. I do not think I could handle a computer course. (reversed)
10. I have a lot of self-confidence when it comes to working with computers.

Computer Liking:
1. I would like working with computers.
2. The challenge of solving problems with computers does not appeal to me. (reversed)
3. I think working with computers would be enjoyable and stimulating.
4. Figuring out computer problems does not appeal to me. (reversed)
5. When there is a problem with a computer run that I can't immediately solve, I would stick with it until I have the answer.
6. I don't understand how some people can stand so much time working with computers and seem to enjoy it (reversed).
7. Once I start to work with the computer, I would find it hard to stop.
8. I will do as little work with computers as possible. (reversed)
9. If a problem is left unresolved in a computer class, I would continue to think about it afterward.
10. I do not enjoy talking with others about computers. (reversed)

Computer Usefulness:
1. I will use computers many ways in my life.
2. Learning about computers is a waste of time. (reversed)
3. Learning about computers is worthwhile.
4. I'll need a firm mastery of computers for my future work.
5. I expect to have little use for computers in my daily life. (reversed)
6. I can't think of any way that I will use computers in my career. (reversed)
7. Knowing how to work with computers will increase my job possibilities.
8. Anything that a computer can be used for, I can do just as well some other way. (reversed)
9. It is important to me to do well in computer classes.
10. Working with computers will not be important to me in my life's work. (reversed)

The final part of the questionnaire is about computer use, computer experience (from Brosnan & Lee, 1998), used and modified by Garland & Noyes (2004) adding computer skills (experience of most popular applications and programs). This set of questions is to examine the first hypotheses which considers how students' attitudes toward computers are related to their computer experience.

Questionnaire set 4-4) Computer Experience

1. For how many years have you used a computer?

2. For how many hours in a week do you use a computer at home?

3. For how many hours in a week do you use a computer at university?

Please complete the following:

	How many hours per week do you spend on each of these?	For how many years have you used each of these?	How would you rate your level of experience from 0=none, 1=novice, 2=good, 3=expert?
E-mail			
Internet			

Computer games			
Word processing			
Databases			
Spreadsheets			
Computer assisted learning			
Programming			
Social networking			
Other software			

4.2.1.3 Questionnaire Translation and Evaluation

The questionnaire has been translated professionally from English to Arabic. The CAS scales were then compared with the Arabic version by Aljabri & Alkhaldi (1997) and Eyadat (2006) to check the translation. The Arabic questionnaire was posted to three experts and specialists, who suggested some improvements in the vocabulary and options to make it clear. After that, the questionnaire was given to a group of students from King Saud University (five students), to test how they felt about it and to modify any unclear questions.

4.2.1.4 Method of Analysis

The data were analysed using SPSS. A number of tests were carried out, such as descriptive, reliability analysis, and correlations to analyse the quantitative data. In addition, ANOVA and Multivariate tests were used to find any relations between student attitudes and factors, that can be affected with an alpha value of (P=.05). The Bonferroni Correction was applied to control the Type I error rate across multiple tests (the resulting threshold value for 23 tests is 0.002).

4.3 Analysis of the Results

4.3.1 Questionnaire Validity and Reliability

To measure the reliability and validity of the questionnaire with the Arabic version before conducting the study, data were collected from sixty-five undergraduate students. This sample size, to test validity and reliability, has been chosen as the Institution for Health and Care Research (2010) recommends a sample between fifty and one hundred. The reliability test coefficient alpha result for attitudes scale (CAS, scales) was 90%

close to the English version by Loyd and Loyd (1985) (see table 4-4). In addition the questionnaire's validity was measured by identifying how the scale items correlate to each other: this showed high correlation with the Arabic version, with values between .666 and .914.

Table 4-4) The Coefficient Alpha for CAS English and Arabic

CAS Questionnaire	Computer Anxiety	Computer Confidence	Computer Liking	Computer Usefulness	Computer Attitude
Arabic Version	.82	.81	.79	.77	.92
English Version	.90	.89	.89	.82	.90
The Total Data Arabic Version	.80	.81	.73	.71	.90

In addition, the validity of five items: Gender, Beliefs about Computers, and Girls' Ability scale from Erickson (1987) used in this study was tested as .74 in Cronbach Alpha.

The reliability of the total data was measured too, and the result found that all attitude scale items are reliable (See table 4-4).

4.3.2 Descriptive Statistics

4.3.2.1 Participants in the Study

The study sample includes 82% (881) undergraduate students from three universities in the capital city of Saudi Arabia, while 17.9% (192) of the sample were from three universities located in small cities and where most of their students are Bedouin who come to study from rural villages. The total number of participants was 1073. 54.7% (587) female, 45.2% (485) male. The participants were from different subjects of study (see table 4-5). 44.5% (477) were in their first or second year, and 54.9% (589) were from third year of study and above. The ages of the participants range from 18 to 41 years (see table 4-6).

Table 4-5) Participants Based on Subject of Study

		Number	Percent
Valid	Islamic Studies & Education	275	25.6
	Medicine	74	6.9
	Computer Sciences	115	10.7
	Life Sciences	108	10.1
	Social Studies	100	9.3
	Preparation Year	37	3.4
	Business, Management & Maths	187	17.4
	Languages	167	15.6
	Total	1063	99.1
Missing	System	10	.9
Total		1073	100.0

Table 4-6) Participants Based on Age

		Number	Percent
Valid	Group Age 18 to 21	519	48.4
	Group Age 22 to 26	505	47.1
	Group Age =<27	27	2.5
	Total	1051	97.9
Missing	System	22	2.1
Total		1073	100.0

4.3.2.2 Computer Experience

Table 4-7) Computer Experience Based on Number of Years Using Computer

		Frequency	Percent
	1 year to 5 years	170	15.8
	6 years to 10 years	629	58.6
	11 years to 15 years	205	19.1
	16 years or more	22	2.1
	Total	1026	95.6
Missing	System	47	4.4
Total		1073	100.0

Table 4-7 shows the frequencies and percentage of students' computer experience. About 16% of students have been using a computer for only 1 to 5 years, whereas a small percentage of students reported using a computer for more than 11 years. The most common level of computer experience reported by participants was from 6 to 10 years.

4.3.2.2.1 Hours Per Week Spent Using a Computer

TABLE 4-8) Computer Use Based on Hours in a Week Using Computer at Home

| | | | Sex | | |
			MALE	FEMALE	Total
hours in a week using computer at home	Don't use computer at all	Count	9	16	25
		% within hours in a week using computer at home	36.0%	64.0%	100.0%
		% within Sex	1.9%	3.3%	2.6%
	from 1 hour to 7 hours	Count	175	233	408
		% within hours in a week using computer at home	42.9%	57.1%	100.0%
		% within Sex	37.8%	47.4%	42.7%
	from 8 hours to 14 hours	Count	98	90	188
		% within hours in a week using computer at home	52.1%	47.9%	100.0%
		% within Sex	21.2%	18.3%	19.7%
	from 15 hours to 21 hours	Count	75	53	128
		% within hours in a week using computer at home	58.6%	41.4%	100.0%
		% within Sex	16.2%	10.8%	13.4%
	from 22 hours to 28 hours	Count	31	33	64
		% within hours in a week using computer at home	48.4%	51.6%	100.0%
		% within Sex	6.7%	6.7%	6.7%
	from 29 hours to 35 hours	Count	37	13	50
		% within hours in a week using computer at home	74.0%	26.0%	100.0%
		% within Sex	8.0%	2.6%	5.2%
	from 36 hours to 42 hours	Count	14	15	29
		% within hours in a week using computer at home	48.3%	51.7%	100.0%
		% within Sex	3.0%	3.0%	3.0%
	43 hours or more	Count	24	39	63
		% within hours in a week using computer at home	38.1%	61.9%	100.0%
		% within Sex	5.2%	7.9%	6.6%
Total		Count	463	492	955
		% within hours in a week using computer at home	48.5%	51.5%	100.0%
		% within Sex	100.0%	100.0%	100.0%

Table 4-8 shows that 2.6% of the participants don't use computers at all; 42.7% of the participants use computers at home from 1 to 7 hours per week, while 7% use computers for 43 hours or more per week. There is a difference between male and female students in the time spent using computers at home. Males (Mean=18.15) spend more time using a computer at home than females (Mean=9.43).

Table 4-9) Description of How Long Students Use Computers at University for per week Based on Gender

| | | | Sex | | |
			MALE	FEMALE	Total
Hours in a week using computer at university	Don't use computer at university	Count	148	259	407
		%	31.8%	49.0%	40.9%
	From 1 to 4 hours per week	Count	240	216	456
		%	51.5%	40.8%	45.8%
	From 5 to 10 hours per week	Count	61	42	103
		%	13.1%	7.9%	10.4%
	From 11 or more hours per week	Count	17	12	29
		%	3.6%	2.3%	2.9%
Total		Count	466	529	995
		%	100.0%	100.0%	100.0%

Table 4-9 shows that 41% of the participants don't use computers in the university at all, particularly 49% of females, while 46% of the participants use computers at university for 1 to 4 hours per week. Also, they show differences between male and female undergraduate students based on time spent using computers at university.

4.3.2.3 Purpose of Using a Computer

Figure 4-1 shows that about 42% of students from the sample reported social networking as their first purpose for using a computer and about 24% as their second purpose; 28% of students use a computer for learning and education as their first purpose, 39% of participants use them for education as their third or fourth purpose. Figure 4-1 shows that about 29% of the participants use computers for entertainment as their first reason (see figure 4-1).
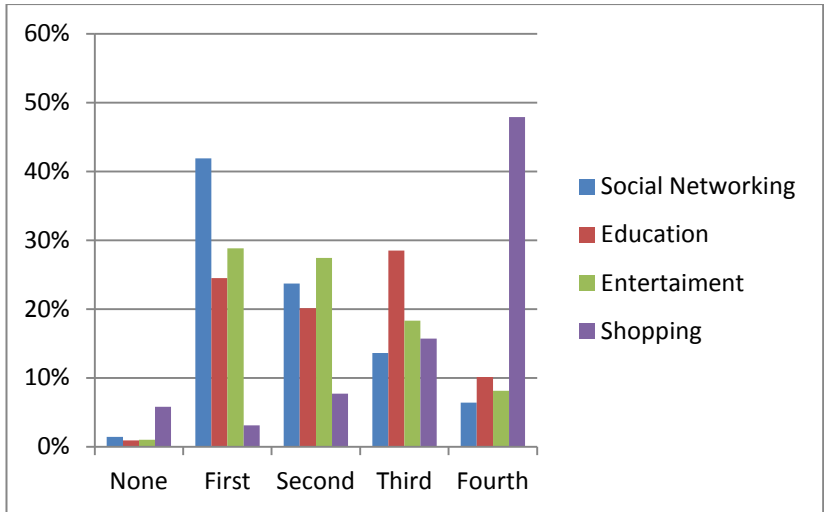
Figure 4-1) Purpose of Using Computers among Students from the Capital city

In contrast a larger percentage of students - 37% - from the small cities reported using computers for education purposes, while 32% used computers for social networking as a first aim (see figure 4-2). Using computers for shopping was ordered as a fourth reason for students in the capital city and in the small cities (see figures 4-1 and 4-2). Less than 10% of students use computer for shopping.
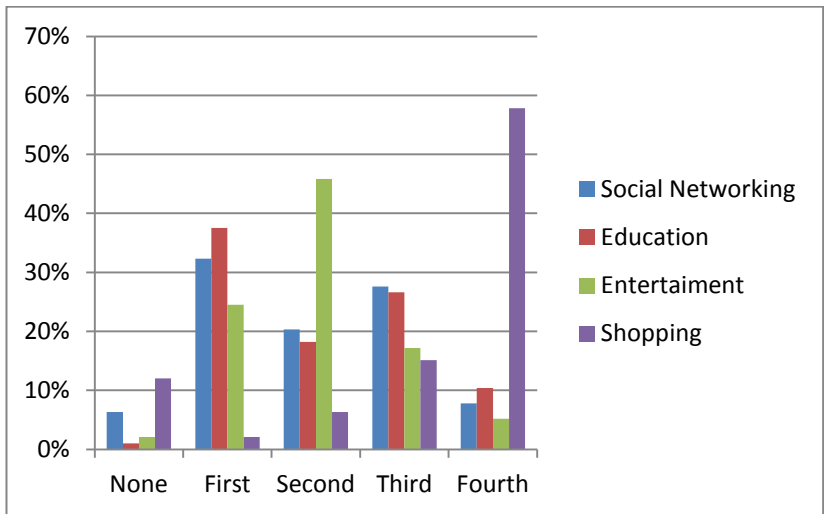
Figure 4-2) Purpose of Using Computers among Students from small cities
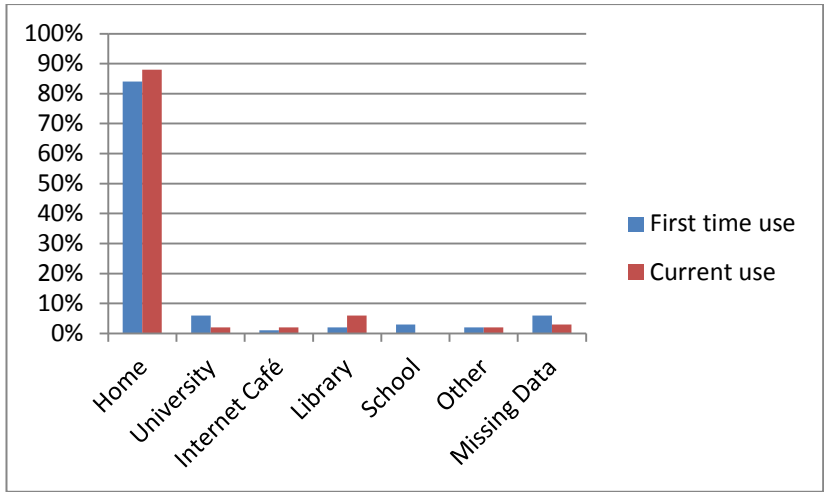
Figure 4-3) The Places where Computers are Used by Students, in the Past and Present

Graph 4-3 shows that home is where most students used computers for the first time: 84.3% (905), while 6.8% used a computer for the first time at university. Also, at the present time students still use computers most often at home: 88.7% (952), with far fewer reporting other places: university 2.7% (29), cafe 2.0% (21), or library .6% (6).

4.3.2.4 English Language Knowledge

To measure how students' attitudes toward computer relate to their self-reported English language skills, an ANOVA test was conducted.

Table 4-10) Students' Attitudes Based on their English Language Skills

Means of students' attitude to computers based on their English language level	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Excellent	160.584	2.142	156.381	164.788
Very Good	153.049	1.244	150.609	155.490
Good	148.548	1.039	146.508	150.587
Limited	145.884	1.466	143.007	148.761
No English Knowledge	139.098	2.830	133.545	144.651

Table 4-10 shows English language skills have a relation with students' attitude to computers. There are significant differences in attitudes between students who have excellent or good English language skills and students who reported less skills in English $F_{(4,967)}=13.765$, $P<.002$.

The study indicated that if students have good English language skills then they have less computer anxiety, more confidence when using a computer, and they like it more (see appendix 7).

4.3.2.5 Preference for Studying Computer or Developing some Computer Skills

Descriptive statistics have been applied to count how many students wanted to study Computer Science, and how many would like to learn computer literacy during their studies.
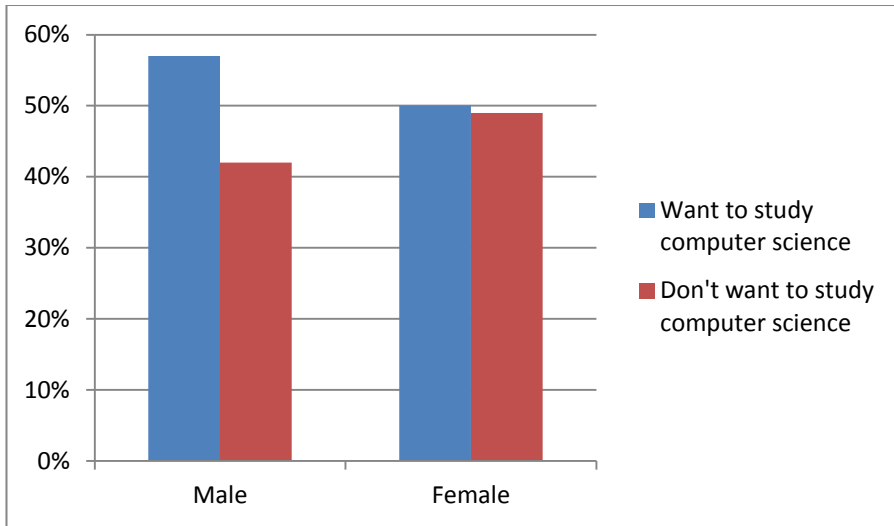
Figure 4-4) Percentages of Students Wanting to study Computer Science, Based on Gender

Figure 4-4 shows that 58% of the male students want to study Computer Science if they have the opportunity to do; in contrast 50% of females want to study it as a subject. So males show a higher preference for computer studies than females.
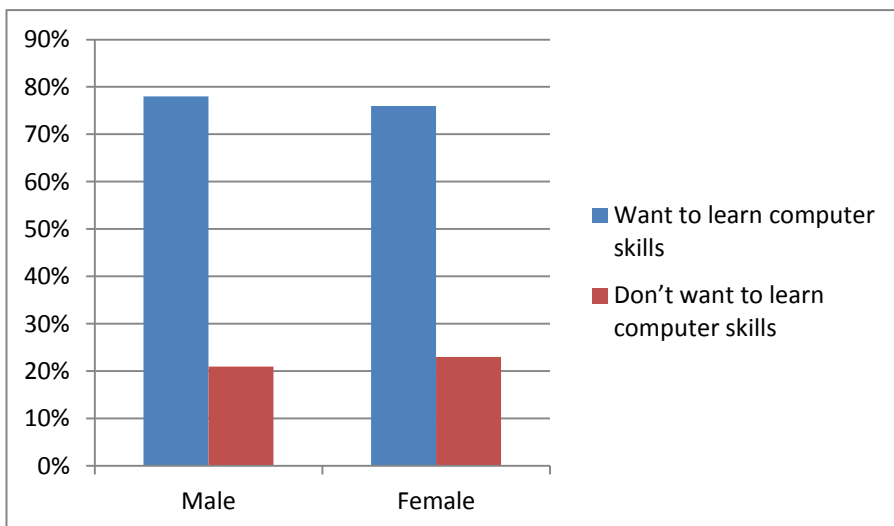
Figure 4-5) Percentages of Students who would Like to Have Computer Courses, Based on Gender

Figure 4-5 shows that most students, 79% male and 76% female, want to have computer courses during their study, and there is no gender difference reported. However, figure 4-4 and 4-5 report that a larger percentage of students want to have more computer skills through courses and workshops than want to study computers as a subject.

Table 4-11) Students' Attitude to Computer-Based on their Preference to Study Computers or Have Courses on Computer

Dependent Variable	Want to study Computer Science	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Attitudes toward Computers	Yes	155.727	.864	154.030	157.423
	No	143.100	.932	141.271	144.929
	Want to learn computer skills				
	Yes	152.532	.734	151.092	153.972
	No	140.824	1.374	138.128	143.520

In addition, there is a significant relationship between students who want to study Computer Science and their attitude to computers F(1,971)=98.689, P<.002; F(1,971)=56.513, P<.002. Students who want to study Computer Science if there is the opportunity or want to learn skills in computers have stronger positive attitudes toward computers.

4.3.2.6   Computer Experience and Attitudes toward Computers

To measure the relationship between computer experience (number of years using a computer) and students' attitudes toward computers an ANOVA analysis was applied.

Table 4-12) Students' Attitudes Based on Number of Years Using Computers

Number of years using computers	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1 year to 5 years	138.086	1.592	134.960	141.211
6 years to 10 years	151.038	.817	149.434	152.642
11 years to 15 years	158.043	1.432	155.233	160.853
16 years or more	153.056	4.627	143.974	162.137

The ANOVA shows a statistically significant relation between how many years students use computers and their computer attitudes: F(3,931)=29.745, P<.002. Table 4-12

shows that students who use a computer earlier have stronger positive attitudes toward computers than students who use one later. This result suggests a strong correlation between computer experience and all computer attitude subscales.

Table 4-13) Students' Attitudes to Computers Based on Length of Time Spent on Computers

Hours in a week using computer at home	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Don't use computer at all	130.880	3.952	123.124	138.636
From 1 hour to 7 hours	145.167	1.041	143.123	147.211
From 8 hours to 14 hours	150.782	1.477	147.883	153.681
From 15 hours to 21 hours	155.051	1.819	151.481	158.621
From 22 hours to 28 hours	157.017	2.551	152.010	162.023
From 29 hours to 35 hours	158.437	2.852	152.840	164.035
From 36 hours to 42 hours	153.111	3.803	145.647	160.575
43 hours or more	159.915	2.573	154.866	164.964

There is a significant relation observed in the ANOVA test between student attitudes to computers and how long they spend using one $F(7,868)= 12.111$, $P<.002$. Students who use computers for a longer time have stronger positive attitudes to computers.

To measure students' computer experience level in some tasks a descriptive table was analysed.

The result of the data also shows (figure 4-6) that Saudi undergraduate students have good experience of email (35% expert and 38% good), internet (40% experts and 35% good), Word (29% experts and 33% good) and social networking (41% experts and 28% good). They don't have good experience in other tasks, however, such as database, programming, spreadsheets and computer-assisted learning.

The ANOVA test in table 4-14 was conducted to test differences between male and female students in computer experience.

111

Figure 4-6) Students Self-reported Level of Experience
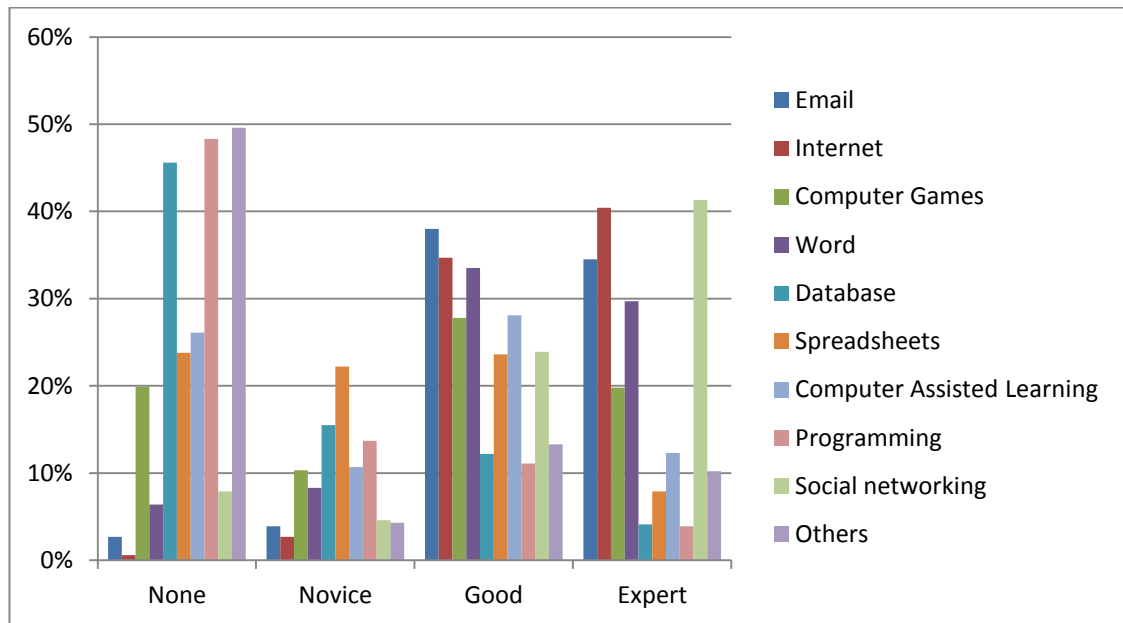
Table 4-14) Students' Computer Experience Based on Gender

Dependent Variable	Sex	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Number of years using a computer	MALE	2.035	.031	1.974	2.096
	FEMALE	2.098	.030	2.038	2.157
Hours in a week using a computer at home	MALE	2.513	.086	2.344	2.682
	FEMALE	2.288	.084	2.124	2.453

There is no significant gender difference based on computer experience $F(1,1023)=3.31$, $F(1,953)=2.77$, P>.05. Male and female students are quite similar in their computer experience.

To measure if there is a difference between male and female students based on experience of specific computer tasks a multivariate ANOVA test was conducted.

Table 4-15) Comparing Computer Tasks Experience Level, Based on Gender.

Dependent Variable	Sex	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Email experience level	MALE	2.246	.036	2.133	2.359
	FEMALE	2.389	.035	2.280	2.498
Internet experience level	MALE	2.416	.030	2.323	2.509
	FEMALE	2.523	.029	2.433	2.613
Computer games experience level	MALE	1.543	.056	1.368	1.718
	FEMALE	1.671	.055	1.501	1.840
Word experience level	MALE	1.924	.044	1.787	2.061
	FEMALE	2.291	.043	2.158	2.424
Database experience level	MALE	.576	.046	.433	.720
	FEMALE	.766	.045	.627	.905
Spreadsheets experience level	MALE	1.096	.050	.943	1.250
	FEMALE	1.313	.048	1.164	1.462
Computer-assisted learning experience level	MALE	1.203	.055	1.032	1.374
	FEMALE	1.487	.054	1.321	1.653
Programming experience level	MALE	.569	.046	.426	.711
	FEMALE	.668	.045	.530	.806
Social networking experience level	MALE	2.246	.048	2.096	2.396
	FEMALE	2.308	.047	2.163	2.453
Other software experience level	MALE	.822	.057	.644	1.001
	FEMALE	.778	.056	.605	.951

Table 4-15 shows there are differences in experience level between male and female students and that female students have higher experience in some computer tasks than males. These differences were significant - $P<.002$ - with experience on email (F=7.94), Internet (F=6.51), Word (F=35.59), Database (F=8.67), spreadsheet (F=9.81), and finally computer-assisted learning (F=13.61).

To measure if there is a relation between students' programming experience and their attitudes to computers an ANOVA test was conducted.

Table 4-16) Attitudes Toward Computers, Based on Programming Experience Level

Programming experience level	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
None	148.337	.916	146.540	150.135
Novice	153.584	1.719	150.209	156.959
Good	156.038	1.928	152.252	159.821
Expert	166.405	3.309	160.991	173.982

The ANOVA test shows a significant relation between programming experience and attitudes toward computers $F(3,762)=14.00$, P<.002. Students with greater experience in programming develop stronger positive attitudes toward computers.

An ANOVA test was carried out to examine the relation between students' attitudes and their experience level of some computer tasks: email, internet, games, Word, spreadsheets. The result shows a statistically significant positive relation between students' experience level and their attitudes to computers $F(1,755)=145.177$, P<.002. Students who have more experience report more positive computer attitudes.

4.3.3 Testing Hypotheses

4.3.3.1 Students' Attitudes toward Computers

Hypothesis 1: Saudi undergraduate students have positive attitudes towards computers, but male students have stronger positive attitudes than females.

Table 4-17) Students' Attitude toward Computers CAS

	N	Minimum	Maximum	Mean	Std. Deviation
Total of Attitude to computer	975	73.00	200.00	149.9046	20.74684

The result in table 4-17 shows that Saudi undergraduate students have positive attitudes toward computers.

An ANOVA test was carried out to find if there is a gender difference in attitudes toward using computers. The test shows there are no gender differences in student attitudes toward computers $F (1.973) = .134$, P>.002, P=.715.

Table 4-18) Students' Computer Confidence / Anxiety, Based on Gender

		Mean	Std. Deviation	Minimum	Maximum
Total of computer anxiety	MALE	37.88	6.23	18.00	50.00
	FEMALE	37.63	6.25	14.00	50.00
Total of computer confidence	MALE	37.63	6.25	17.00	50.00
	FEMALE	38.20	6.37	15.00	50.00
Total of computer liking	MALE	34.88	5.82	18.00	50.00
	FEMALE	34.80	5.76	18.00	50.00
Total of computer usefulness	MALE	38.90	5.29	22.00	50.00
	FEMALE	39.14	5.09	21.00	50.00

The analysis reported in table 18 shows there are no gender differences in students' computer anxiety F (1.1033) = .424, P>.002, P= .515, confidence F (1.1038) = 2.10, P>.002, P= .147, liking F (1.1041) = .048, P> .002, P= .827 and usefulness F (1.1023) = .546, P> .002, P= .460. Both women and men show the same level of computer anxiety, confidence, liking and usefulness. They have low computer anxiety, and a high level of computer confidence, liking and perception of usefulness.

Table 4-19) Belief in Girls' Ability to Use Computers, Based on Gender

	N	Mean	Std. Deviation	Minimum	Maximum
MALE	464	22.25	4.325	8	30
FEMALE	570	24.86	4.003	14	30
Total	1034	23.69	4.347	8	30

Even though there are no gender differences in students' attitudes toward computers, the result in table 4-19 shows a significant difference between the genders regarding belief in girls' ability to use computers, as reported in one way: ANOVA F(1.1032)=101.261, P<0.002. Women are more likely to believe in their ability to use computers like men (mean=24.86) than male students who reported less belief in girls' ability (mean=22.25).

4.3.3.1.1 Relationships between Computer Attitude Scales

To measure the relationship between the CAS scales (anxiety, confidence, liking and usefulness) the Pearson Coefficient Correlation was conducted.

Table 4-20) Correlations between Computer Attitude Scale Items

		Total of computer anxiety	Total of computer confidence	Total of computer liking	Total of computer usefulness
Total of computer anxiety	Pearson Correlation	1	.774	.734	.673
	Sig. (2-tailed)		.000	.000	.000
Total of computer confidence	Pearson Correlation	.774	1	.734	.713
	Sig. (2-tailed)	.000		.000	.000
Total of computer liking	Pearson Correlation	.734	.734	1	.660
	Sig. (2-tailed)	.000	.000		.000
Total of computer usefulness	Pearson Correlation	.673	.713	.660	1
	Sig. (2-tailed)	.000	.000	.000	
Total of Attitude to computer	Pearson Correlation	.903	.914	.881	.847
	Sig. (2-tailed)	.000	.000	.000	.000

Table 4-20 shows there is a significant correlation between Computer Attitude Scale items. This means higher levels of computer anxiety (the higher score of anxiety means less anxiety and the lower score means more anxiety), computer confidence, liking computers and perceived usefulness of computers lead to a more positive attitude toward computers. Also, less anxiety correlates with more computer confidence, liking computers more and greater perception of their usefulness.

4.3.3.2 Undergraduate Students' Attitude toward Computers, Based on their Parents

Hypothesis 2: The children of parents who have used computers and seem to have positive attitudes towards them, or who have high education levels, will show stronger positive attitudes to computers.

An ANOVA test was conducted to measure the relation between parents' education level and their use or non-use of computers, with students' attitude toward computer.

Table 4-21) Student's Attitudes toward Computers Based on Mother's Education Level

			95% Confidence Interval	
Mother's education	Mean	Std. Error	Lower Bound	Upper Bound
Uneducated	143.344	1.864	139.686	147.003
Primary school	149.188	1.449	146.345	152.031
Intermediate School	149.142	1.654	145.896	152.387
High School	150.695	1.379	147.989	153.401
University	153.093	1.253	150.634	155.552

The result in table 4-21 reports a significant relationship between mothers' education levels and students' attitudes to computers $F_{(4,967)}=4.910$, $P<.002$.

Table 4-22) Students' Attitudes toward Computers Based on Father's Education Level

Father's education	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Uneducated	144.533	2.649	139.334	149.732
Primary school	148.027	1.957	144.187	151.867
Intermediate School	143.134	1.881	139.443	146.826
High School	150.288	1.263	147.809	152.766
University	152.785	1.003	150.818	154.753

In addition, table 4-22 shows significant differences in students' attitudes to computers based on their fathers' education levels $F_{(4,967)}=6.582$, $P<.002$. So those students whose parents are educated to High School or university degree level have more positive attitudes to computers than students whose fathers are uneducated.

Table 4-23) Students' Attitudes toward Computers, Based on their Parents' Computer Use

	Mean	Std.Error
Mother uses computer	153.796	.959
yes	146.674	.895
no		
Father uses computer	151.854	. 855
yes	146.728	1.063
no		

As shown in table 4-23 the result indicates that there is a relationship between parents' computer use and their children's attitudes toward computers. Students who reported that their parents use a computer have a higher computer attitude score than those who reported that their parents don't use computers. This relation is significant for computer use by both mothers $F_{(1,967)} = 29.49$, $P<.002$ and fathers $F_{(1,960)} = 14.12$, $P<.002$.

Figure 4-7 Compares mothers and fathers who use computers, concluding that fathers use computers more than mothers.
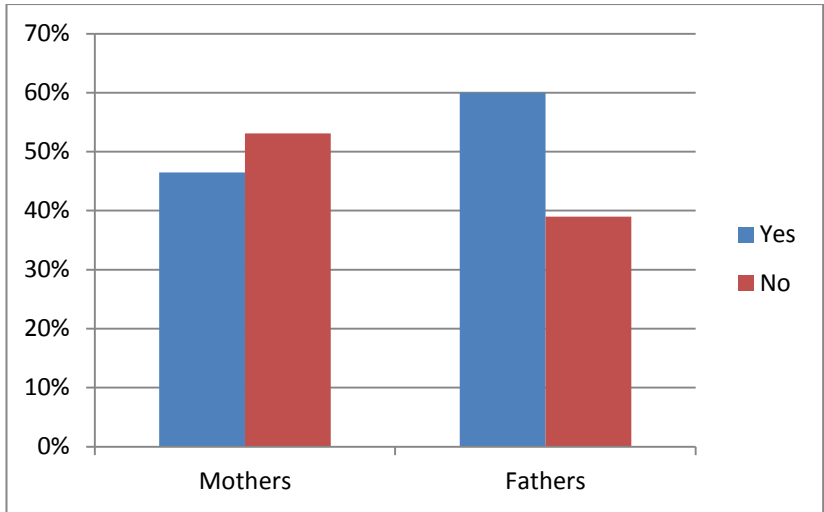
Figure 4-7) Percentages of Fathers and Mothers who Use a Computer

Table 4-24) Students' Attitudes toward Computers Based on Parental Encouragement

Do your parents encourage you?	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Yes	151.531	.731	150.096	152.966
No	142.979	1.498	140.039	145.918

The ANOVA test shows that there is a significant relation between parental encouragement and students' attitudes to computers $F_{(1,970)} = 26.327$, $P < .002$. Students who report that their parents encourage them to use computers have more positive attitudes toward computers. These differences are significant for all four attitude scale items: anxiety, confidence, liking and usefulness.

A cross tab display to find out if parents' encouragement to use computers differed according to their children's gender. (see appendix 7)

Table 4-25) Encouragement from Parents, Based on Student Gender

			Sex		Total
			Male	Female	
Do your parents encourage you?	Yes	Count	361	498	859
		% within Sex	75.1%	85.0%	80.5%
	No	Count	120	88	208
		% within Sex	24.9%	15.0%	19.5%
Total		Count	481	586	1067
		% within Sex	100.0%	100.0%	100.0%

In total 19% of the participants didn't get encouragement from their parents to use computers. In table 4-25 male students show they had fewer encouragement from parents to use computers than female students. 24% (120) of males didn't get encouragement and 15% (88) of females.

Descriptive frequencies have been analysed to find out who encouraged students to use computer.
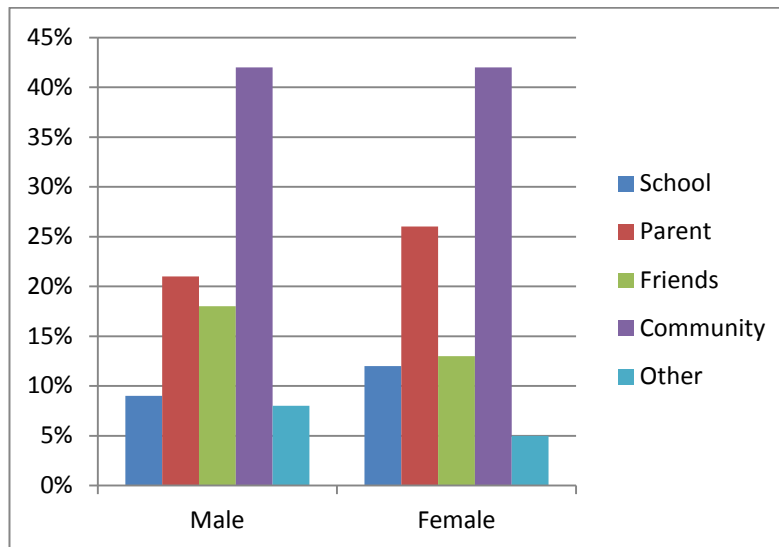
Figure 4-8) Frequencies for Who Encouraged Students to Use Computers

Figure 4-8 shows that the community is the most important element to encourage students to use computers for both males and females. Encouragement by a parent ranks second, and this is a little bit higher for females than males. The next ranked is friends, while school has the lowest ranking.

4.3.3.3 Differences Between Students from the Capital City and Students from Small Cities

Hypothesis 3: Students from the capital city have a stronger positive attitude toward computers than students from smaller towns and cities whose students come from villages.

To measure if there is a difference between students in different kinds of cities with regards to their attitudes toward computers an ANOVA test was conducted.

Table 4-26) Comparing Students' Attitudes to Computers, Based on City Types

University Location	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Capital City	152.346	.705	150.963	153.729
Small Cities	138.006	1.556	134.953	141.095

The finding in table 4-26 shows significant differences between students in their attitudes to computers based on the type of cities they live in $F_{(1,973)} = 70.49$, $P < .002$. Students from the capital city have a more positive attitude toward computers than students from small cities. This difference is significant for all computer attitude subscale items: anxiety, confidence, liking and usefulness.

Table 4-27) Undergraduate Students' Attitudes toward Computers, Based on Gender and City

Dependent Variable: Total of Attitude to Computer

Sex	University Location	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
MALE	Capital City	152.534	1.036	150.501	154.566
	Small Cities	132.969	2.481	128.100	137.838
FEMALE	Capital City	152.179	.959	150.297	154.062
	Small Cities	141.248	1.991	137.341	145.154

When comparing genders in small cities table 4-27 shows there is difference in student attitudes toward computers based on gender $F_{(1,164)} = 7.01$. Females (Mean=141.2) have stronger positive attitudes toward computers than male students (Mean=132.9). Females in the small cities have less anxiety $F_{(1,179)} = 5.08$, more confidence $F_{(1,178)} = 4.10$, and perceived usefulness $F_{(1,197)} = 6.094$, than male students there, whereas there are no differences in computer liking $F_{(1,186)} = 1.65$. However, these differences in means are not significant $P > .002$. On the other hand, females in the small cities are less likely to use computers than other females in the capital city: about 19% from small cities don't use email, 28% of them don't use social networking, and 4% don't use the internet.

Table 4-28) Students' Beliefs about Girls' Ability to Use Computers, Based on City Type

University Location	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Capital City	23.888	.161	23.488	24.288
Small Cities	22.768	.324	17.908	27.627

Also, from the ANOVA test in table 4-28 the result indicated significant differences in students' beliefs about girls' abilities to use computers $F(1,1033)= 10.19$, $P<.002$. Students from the capital city have more positive beliefs about girls' abilities than students in small cities; even while in the second group females have more positive attitudes toward computers. However, the difference in means is small which shows a small effect.

Table 4-29) Students' Computer Experience, Based on City Type

Dependent Variable	Universities Location	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Number of years using computer	Capital City	2.104	.022	2.059	2.149
	Small Cities	1.950	.055	1.853	2.047
Hours per week using computer at home	Capital City	2.480	.065	2.353	2.608
	Small Cities	1.988	.146	1.708	2.268

Table 4-29 shows differences between the capital city and the other cities in terms of students' computer experience. There are significant differences between students in the number of years of computer use $F(1,1024)=7.97$, $P<.002$ and the daily time spend with the computer $F(1,954)=9.87$, $P<.002$. Students in the capital city use computers years earlier and for longer times than students in the other cities. In addition, the cross tab test shows significant differences between students in the capital city and students in the small cities in terms of parents' education level (Phi Cramers V= 0.224 & 0.264 with the variables mothers' and fathers' education level). Parents of students in the capital city seem to be more educated than those from the small cities. (Appendix 7)

4.4 Discussion

4.4.1 Attitudes toward Computers

The study found that Saudi undergraduate students, male and female, have strong positive attitudes towards computers. This finding is similar to most previous studies, which have been conducted in different countries (Korobili et al, 2010; Teo, 2008; Eyadat; 2006; Pamuk & Perker, 2009; Yusuf & Balogun, 2011; Stephens & Creaser, 2002). The surprising finding in this research is that there are no statistically significant differences in student attitudes toward computers based on gender. Both genders have the same level of computer anxiety, computer confidence, and perception of computer usefulness. These findings support those of Beyer et al (2003); Sam et al (2005); Wong & Hanafi (2007); Tekinarslan (2008); Alaba et al (2012); Abedalaziz et al (2013); and Kar et al (2014), that there is no gender difference in computer attitudes. However, there is a gender difference in the sample from small cities: female students report less computer anxiety and more confidence than male students. This finding in the gender dimension is consistent with those of Mahmood (2009); Rhema & Miliszewska (2014); Osman & Alfred (2014); and Ozyurek et al (2015).

The study also suggests a significant correlation between the computer attitude elements of anxiety, confidence, liking and usefulness. Thus each element is important in building a positive attitude to computers and can affect other elements in the computer attitudes scale. This finding supports those of Korobili et al (2010); Eyadat (2006) and Popovich et al (2008).

4.4.2 Schools and Parents

In term of encouragement to use computers, most of the students reported that the community is the major source of encouragement, suggesting that students are influenced by the people around them. Parents are the second main source of encouragement. Blum et al (2006) made similar findings: Arabic females get greater encouragements from their families and friends than Jewish females. Therefore, students' computer use would be as a source of entertainment and to be in touch with their social community, more than for education.

In this statistical study schools have the least influence on students' computer use. Students didn't/don't access computers at school and university, therefore they are not accustomed to using computers to learn or find information in their institution. Also, according to the qualitative study there are no facilities to give students a chance to use computers with their teachers during class time, as the computer lab is restricted to basic lessons on how to use computers and not how they can be used for other learning.

According to Al-Maliki (2013), to date, in Saudi Arabia technology development and implementation has been hindered by infrastructural inadequacies, poor management, poor maintenance services and technical support, and a lack of suitably qualified and skilled human resources staff. The slow implementation of technology in classrooms results from a lack of resources, which mean technology tends to be focused on a single subject, instead of being accessible across the entire learning system (Amoudi & Sulaymani, 2014). In addition, according to the qualitative teacher study (chapter 6) and Al-Faki & Khamis (2014) teachers are not trained enough to be able to interact with the students and curriculum using technologies. However, Almulhim (2014) suggests that a school's inability to offer access, effective training, or technical support, along with the high cost of hardware and software also presents potential barriers to technology use in schools. As Alfahad (2012) and the teachers' focus group study (chapter 6) suggest, lack of availability of technology and support and insufficient time to acquire technical skills are considered barriers preventing the use of technology in schools.

Parents have been ranked as a second source of encouragement of student computer use. Parental encouragement of children to use computers is important to build a positive attitude toward computers.

Females in this study received more encouragement from their parents in terms of computer use than males. This finding is contrary to the finding by Sainz (2014) who stated that in KSA males receive more encouragement towards computer use from parents than females. However, female students in this study have a similar attitude toward computers as males.

Parents' education and their use of computers have a strong relationship with their children's attitudes to computers. Children whose parents use computers report stronger computer liking, less anxiety, more confidence and higher perceived usefulness. Parents with a higher education level, who deem the use of computers important, encourage

their children to learn more about the technology by using it (Shashani & Khalili, 2000). In Arabic culture, children are subject to the directions and opinions of their parents, and the satisfaction of their parents with them is very important.

4.4.3 Differences between Cities

Significant differences in students' attitudes to computers arise in the findings, based on the location of their universities. Students from the capital city have a more positive attitude toward computers than students in the more rural locations. Moreover, students in the capital city have longer experience and use computer for a longer time than students from small cities. When comparing the students in the capital city and the students in the small cities, 7% of students from small cities were found not to use email, and 13% don't use Word. In contrast only 1% of students in the capital city don't use email, and 6% don't use Word. The study by Menachemi et al (2007) support the finding in this study that most people who live in rural areas have poorer attitudes toward using technology in general, with many of them are not even using any for communication, such as sending emails. This is related to the fact that the largest Saudi Arabian cities have a multicultural population with varied backgrounds. This differs from the typical population of smaller cities, towns and villages which contain many Bedouin families who have special practices and different customs (Al-Silami, 2010; Menachemi et al, 2007). In addition, living in a rural area often means having fewer opportunities to access technology and other resources than people who live in large cities, which are associated with successful use of information technology and greater availability of resources (Al-Silami, 2010; Menachemi et al, 2007). Al-Silami (2010) reports that in Saudi Arabia urban schools have more resources than rural schools, and their teachers are more experienced (Al-Silami, 2010). This study as well as the qualitative study (chapter 5) provides another reason for the difference in attitude toward computers and computer experience between large cities and small cities: parents of urban students tend to be better-educated, and they have positive attitudes to computers. This may make them more likely to encourage their children to use computers and get more skills than rural parents, who have less experience with education and computers. This finding supports that of Al-Silami (2010).

4.4.4 Computer Experience

Computer experience is another factor that can influence computer attitude (Eyadat, 2006; Popovich et al, 2008; Korobili et al, 2010; Kutlucai & Baskan, 2013). Students who have used computers from an earlier age and for many years, spending longer time with them, have more positive attitudes. This finding is supported by the teachers' focus group study (chapter 6): if students use computers from an early age they can do better and be more creative with them. According to Hashim and Mustapha (2004) and Teo (2008) students who have more experience with computers possess more computer skills and less anxiety, and like computers more (Beckers and Schmid, 2003). The more students use computers, the better their development of a range of techniques and skills that result in an overall improved computer knowledge. Oshan & Khudair (2008) suggest that people with greater experience with computers feel more positively towards computers, less anxious, more confident using them, and happier working independently to solve problems.

The significant differences between males and females in computer experience was found only in that females use computers earlier, for social networking, database and computer-assisted learning, while males significantly spend a longer time using them to play games. It seems that females are more conscientious than men about studying using computers. Confirming this finding, CITC (2008) suggests that even though males use the computer more than females, searching for information is more common amongst female users. In addition, Al-Kahtani et al (2006) suggest that females are more likely to see the internet as an important resource to develop their skills. Colley & Maltby (2008) found the internet can have a greater impact for women than men.

The study finds that women believe men and women to be equal in their computer use, whereas most of the men believe that computer technology is more suitable for males than females. Shashani and Khalili (2001) likewise find males in their study believe that the computer is a masculine subject.

4.4.5 Using Computers in the University

Although all students have a positive attitude toward computers, a large percentage of them don't use them at university. The qualitative study in chapter 5 confirms this finding. Some students don't know if there is a computer lab for students and some

universities don't allow access to the computer labs for all students. Also, females in some universities in KSA are not allowed to use or bring their own devices to the university. As Alturise & Alojaiman (2013) suggest, the reason is that the cultural norms and community attitudes in Saudi Arabia play a role in preventing technology use in Saudi universities. According to Al-Kahtani et al (2006) the more conservative elements of society fear that it is dangerous, and that its dangers outweigh its benefits. Moreover, the study indicates that male undergraduate students in Saudi Arabian universities spend more time using computers than females at university, while they are similar in accessing computer from home. This finding is consistent with Mahmood (2009) in Pakistan and Li & Kirkup (2007) with a UK sample. This is a result of females in some universities being prevented from bringing or using their own devices. However, for females who utilise university computers less even when they are permitted full access, Mahmood (2009) believes that there are cultural explanations. In Pakistani Muslim society, which is the same as KSA, female students spend less time at university. They mostly just attend classes and do not access the ICT facilities of the university before going home.

4.4.6 Purpose of Computer Use

Most of the Saudi students in this study use computers at home. Also home is the place that gives students the opportunity to use them for the first time. Sait et al (2007) and CITC (2008) confirm the finding that in KSA the home is the first point of access to the internet, and the one most frequently reported by participants. Sait et al (2007) suggest that some KSA regular Internet users and most irregular users do not like to access it from public places such as cafes or the library, preferring home access.

A small percentage of students don't use the Internet. This reflects the increase in internet usage in Saudi Arabia, as previous studies report (Simsim, 2011; Internet World State, 2014). However 10% of females and 7% of males don't use email. Email addresses are important to use many applications or to share information in some websites.

In terms of computer use, the majority of students use computers but they are diverse in their approach and purposes. Most Saudi students use computers for social networking, as found by Al-Saggaf (2011). Also they receive encouragement from the community around them. This could be related to Saudi culture, which Hofstede (2010) described as

126

a collective culture where group dynamics are considered to be vital. People look after each other, communication is indirect and group solidarity is essential. Miliany (2014) suggests that the internet is considered a vital communication tool by young Saudi people, due to the opportunities it offers to expand social circles by providing opportunities to meet new people online and keep people connected at all times, regardless of time or location. The second purpose of using a computer is for entertainment. This finding is consistent with Al-Saggaf (2011) and CITC (2009), that entertainment-related activities have been the main reason prompting the younger generation to use the internet. Many students report that they use computers for education as a third purpose. According to CITC (2009) 4% of participants use the internet for education purposes and 42% use computers to prepare work related to education. Most Saudis are aware of online learning but a small percentage uses a computer to learn (CITC, 2008).

4.4.7 Computer Access

Students' attitudes toward computers have a positive relation to access to computers from home and time spent using them, so the availability of a computer at home allows students to gain the benefits it offers. Previous studies confirm this (Teo, 2008; Pamuk & Perker, 2009; Alaba et al, 2012; Eyadat, 2006; and Kutlucai & Baskan, 2013). Availability and accessing computers positively enhances such attitudes as computer confidence, their perceived usefulness, liking, self-efficacy and lower levels of computer anxiety. Distinct differences therefore exist relating to the amount of access students have to computers and the components of their attitude. Students who report negative attitudes to computers did not have regular access to one. In addition, this study supports the finding by Chang et al (2012) that having more computer-related skills increases positive attitudes towards computers, decreases anxiety, and improves confidence in using them. Also, a strong relation is identified in the study between programming skills and confidence: people with more programming skills have a greater degree of confidence.

4.4.8 English

 Since computers and computer software and programming support the English language it could be that non-English speakers find it difficult to use computer tools and manipulate software (Al-Hunaiyyan et al, 2008). This study argues that students who

have lower English proficiency find computers difficult to use, while students who have learned English find computers easier to use and are more comfortable in doing so. According to Korobili et al (2010), the attitudes of people towards computers appear to be influenced by their understanding of English. Many programs can't be used without knowing their interaction language (Al-Hunaiyyan et al, 2008).

There are limited Arabic websites and Arabic online resources, which prompts users to move toward preferring English websites, which have valuable and diverse contents and sources. In relation to the problems facing Arabic Internet users, Arabic websites lack content (Al-Kahtani, 2006). Therefore, knowledge of the English language is an important component determining successful and regular Internet use. A wider range of developed Arabic websites would increase Internet usage to correspond with growing accessibility across Saudi Arabia.

4.5   Conclusions

Results show that students have strong positive attitudes toward computers. This attitude is stronger with students in the capital city than in other smaller cities. There is no significant difference between males and females in the capital city, whereas gender differences exist within the small cities sample, whose females have stronger positive attitudes toward computers than males. There are strong relationships between the attitudes of anxiety, confidence, liking, and usefulness. In addition, English language skills, computer experience, and parents have a strong positive relationship to undergraduate students' attitudes towards computers.

CHAPTER 5. UNDERGRADUATE SAUDI STUDENTS' ATTITUDES TOWARDS COMPUTERS

In the previous quantitative study, students were found to have positive attitudes towards computers and no overall gender differences were observed, although there were differences in attitudes by gender and location. In addition, the quantitative study concluded that parental attitudes toward computers, computer experience and English language skills have positive strong effects on students' attitudes towards computers. Moreover, capital city students have more positive attitudes than students in a smaller town. After collecting the statistical data about Saudis' computer attitudes, it is important to examine qualitative data that describes the causes and reasons behind computer use, affection for it, experience and confidence. Therefore a focus group was carried out to find explanations using group discussion regarding undergraduate students' attitudes to computers, and their use and experience of computers in learning and in general life tasks. This qualitative study was conducted among Saudi undergraduate students from different subject areas and genders.

5.1 Methodology

5.1.1 Participant

This study was carried out to find qualitative data about undergraduate students' attitudes towards computers. Six focus groups (three male and three female) were conducted with six undergraduate students in each group. One female group and one male group were collected from a relatively small city (Hail); the students were studying different subjects. Further groups were from the capital: one male group and one female group were drawn from different subjects, and one male and one female group were from the School of Computer Science. Table 1 shows the coding for each group. This variation in groups was to help make comparisons between rural and urban students, between male and female students, and to compare Computer Science students with other subject students.

5.1.2 Study Procedure

After getting formal agreement from each university to conduct the study, participants were asked to sign forms of informed consent before starting the discussion.

A semi structured interview was carried out to control the discussion. As reported in table 5-2 the interview started with demographic questions about age and study subject. Subsequent questions were about computer use at home and university, computer experience, computer skills, and encouragement to use computers.

In order to make the discussion easier and more effective focus groups were carried out in Arabic, as the interviewees were native Arabic speakers. The interviews were translated into English by the author then evaluated by a professional translator, for data analysis and discussion. The NVivo (Qualitative data analysis software) programme was used to analyse this qualitative data using thematic analysis (see appendix 9). Transcripts of two of the groups were second-coded by another researcher to validate the analyses. The interrater reliability for the raters was found to be Kappa = 0.86.

Table 5-1) Classifications of Undergraduate Students Focus Groups

Groups	Gender	Symbol
1	Male students, Computer Science subject (urban)	MCU
2	Male students, non-Computer Science subject (urban)	MSU
3	Male students, non-Computer Science subject (rural)	MSR
4	Female students, Computer Science subject (urban)	FCU
5	Female students, non-Computer Science subject (urban)	FSU
6	Female students, non-Computer Science subject (rural)	FSR

Table 5-2) Questions have been asked to undergraduate students

No	Focus Group Question
1	How old are you?
2	What is your subject?

3	When did you use a computer for the first time?
2	How did you feel when you used a computer for the first time?
3	Where did you use a computer for the first time?
4	What purposes did you use the computer for, the first time?
5	Did you use the computer at school? At which level?
6	Who or what encouraged you to use the computer?
7	Did you have your own computer?
8	Who bought the computer for you?
9	Do your parents use a computer?
10	Do you think that parents' knowledge and regular use of computers could influence children, and that children would copy their parents?
11	Did your parents encourage you to use a computer, or not?
12	Are there any differences between girls and boys in parental encouragement to use computers?
13	Is there any restriction in using computers for girls?
14	Do boys do better than girls in using computers, or not?
15	In my previous study I found that girls spent more time with computers than boys. What do you think the reason behind this is?
16	If you have good English language skills does that affect you when you use the computer?
17	What do you use the computer for most often?
18	How many hours do you spend using computers or tablets (per day)?
19	Are you happy when your teacher asks you to do projects using a computer?
20	Do you use a computer at university?
21	Are there computer labs available for students at any time in the university?
22	What computer skills do you have?
23	Would you like to have some workshops to learn computer skills?
24	Why did you chose to study Computer Science - what encouraged you?
25	In my previous study I found that Saudi students use computers for social networking and entertainment as their primary purpose rather than for education. What do you think the reason for this is?
26	Do you use a smartphone or a tablet?
27	Which applications do you use?

5.2   Analysis of the Results

5.2.1   Encouragement

Sources of encouragement to use a computer for the first time were varied. Males students from the capital city were encouraged by family, friends or were interested for themselves to explore something new: "*My brothers and friends*"; "*My father*"; "*My family*"; "*My curiosity*"; "*My cousin*"; and one male student got encouragement from "*My teacher when I was in school. He taught us some skills and gave us some homework to do by computer*" (MSU). Female students had most encouragement from family, friends or from themselves: "*By myself I wanted to explore something new*" (FCU); "*My family*", "*My neighbours: I was going to them every day and they shared their computer with me then my father bought one*" (FSU); "*My sister had one; she gave it to me sometime to play games or surf the internet*" (FSU); and "*My father: he thinks computers are important*" (FCU). Students from the small city had encouragement from: "*My family and friends*" (MSR, FSR); "*The need for learning*" (MSR); "*Myself: I have not had any encouragement and my parents don't use it*" (FSR); and few of the students bought a computer for themselves.

However, five students from the small city reported that their encouragement was from school and that it was the first place they got to use a computer: "*My teacher in High School made me like computers*" (FSR); "*In school we learnt some skills*" (MSR); "*The computer teacher at school*" (MSR); "*I liked it at High School and started using it*" (FSR) - this was as a result of parents' lack of familiarity and experience with computers.

Most of the students from urban and rural areas reported encouragement coming from parents and family rather than schools. Because their learning of computers from school was in the higher education stages - High School and Intermediate School - they do not have enough computer experience and skills in early school. Hence, they acquired these themselves or from their families.

In this study, most of the students have their own computer. Some acquired it earlier and some later, when they were in Primary, Intermediate or High School; and some had their own when they started studying at university. However, there are five students

who still do not have their own computer yet, or who had acquired it recently: "*I use my brother's computer when needed*" (MSU); "*No, I didn't have one until recently*" (FSR). One of the female students from the capital city mentioned that she uses her smartphone and tablet, and this discouraged her from owning a PC or laptop: "*I have a smartphone and tablet; if I need to do something by laptop I borrow my sister's or brother's*" (FSU). Another male student from the small city area agreed that smartphones and tablets reduce the use of computers: "*Using smartphones and tablets limits using computers*" (MSR).

Students' answers in regards to who bought a computer for them were varied. Most of them were given a computer by their parents, especially their father, and four students had computers as a gift from a relative: "*My older brother*"; "*My husband*"; "*My brother gave it [a laptop] to me as a gift*"; "*First computer was from my aunt*". Those relatives are males apart from one female. However, four students mentioned that they bought computers for themselves. Five students out of thirty-six do not own a computer yet: "*I have a smartphone and tablet; if I need to do something by laptop I borrow my sister's or brother's*"; "*I don't have one; I use my brother's computer when needed*" (MSU).

Most parents encouraged their children to use computers: "*They encouraged me to use it in learning, not just for other purposes*" (MCU); "*Yes, because we need it at this time*" (MCU); "*They think it is good because most of the jobs require computer skills*" (MCU); "*Yes, they encouraged me, because computers have become important nowadays for life and work*" (MSU); "*Yes, because it's a key requirement for my generation*" (MSR); "*Yes, to be distinguished in my study and work*" (MSR); "*They encouraged me they see that a computer is important*" (FSU); "*Sometimes they encourage me to have some workshops*" (FSU); "*Yes, they encouraged me as it is civilizational tool*" (FSR); and "*They encouraged me because computers are becoming an important tool in society*" (FSR).

However, eight students reported that they still don't have encouragement from their parents to use computers: "*No, they think it is just wasting time*" (MCU); "*No. They don't know what it is and how to use it*" (MSU); "*No, because they don't know about the benefits of computers or how they work*" (MSR); "*No. My parents' view of computers is they are something that does not benefit anything unless in university*"

(MSR); and *"They say that computers are not good; they waste time and harm the eyes"* (FSR).

In the discussion about whether parents encourage their children to have a good attitude towards using or studying computers, fourteen participants believe that parents can have an effect: *"Yes, if they have knowledge about computers they will encourage their children"* (MCU); *"Yes, it's a technology era"* (MCU); *"I think a big effect"* (MSU); *"Children usually copy their parents"* (MSR); *"I don't like computers but my parents encouraged me"* (FCU); *"Yes. I think when parents have experience then their children learn and copy them"* (FCU); *"Yes, sure, they teach us how to use computers"* (FCU); *"It is possible my father taught me how to use it"* (FSU); and *"I think if the parents bring a computer to the home and use it in different ways they will influence their children"* (FSR). Other students think there was no effect from parents as their parents didn't have any computer knowledge, and they used computers before their parents ever encouraged them: *"Maybe sometimes it depends on the child and his hobbies"* (MSU); *"No I don't think so"* (MSR); *"I don't think so: some parents use it and like it but their children don't like it and don't use it"* (FCU); *"No, not really. My parents have only used computers for one year and I've used them before them"* (FSU); and, *"No they don't affect me"* (FSR).

One of the female students mentioned that she in fact teaches her parents how to use computers: *"I don't think that, because I use it whereas my father doesn't. I taught my father and give him information about it"* (FSU).

In regards to the differences between males and females in getting encouragement from parents to use computers, nine students' view is that there are no differences in parental encouragement for either males or females: *"Girls are like boys in getting encouragement"* (MCU); and *"No differences"* (MSU). On the other hand, fourteen students agreed that there was a difference in encouragement to use computers between males and females. They reported that males get more encouragement and they usually had a computer first: *"Boys have encouragement more than girls"* (MSU); *"Boys have more chance and more encouragement"* (FCU); *"It's boys who usually have a computer first, they buy it and bring it home"* (FSU); *"Boys have more encouragement I think"* (MSR).

They suggested many reasons for boys getting better encouragement than girls, such as job opportunity for males, or that study and work are more important for males than females: "*Boys need computers for work, but girls have little computer usage for work*" (MSU); "*Because the disciplines are available for men more*" (MSU); "*Girls are busy with house work*" (MCU); "*They [parents] are careful about boys' studies*" (FSR). Female students reported that boys usually have a computer first because they go outside home and meet people then get knowledge: "*Because they [boys] go out of the home and meet people; learn more out of the home*" (FSU). Another female argued that boys do not always have a computer before girls because she herself got a computer first: "*I got my own laptop before my older brother*" (FCU).

However, four students were neutral in deciding whether boys and girls differ or not. They attributed differences between boys and girls to parental levels of encouragement to use computers: "*It depends on the parents*" (FSR); "*and on their opinions*" (MSR); "*They encourage those interested in computers whether girl or boy*" (FCU). A male student from the small city suggested there are no differences between girls and boys as it is important for both: "*Because it's important for university study*" (MSR).

In addition, this difference between males and females in encouragement from parents may have been caused by restrictions on females using computers. These restrictions come from Saudi culture and religion: "*It's religious faith and morality*" (MSU); "*Girls should know their limit and what is true and wrong*" (MCU). Some students mentioned restrictions on girls such as chatting with foreign men: "*Can't chat with men*" (MCU); "*Our culture forbids chatting with strangers*" (MSU); "*Maybe in some homes they don't allow the girls to use smartphones or internet*" (FSU). Social networking connecting people with different genders is forbidden in some families: "*They don't use Twitter and Facebook*" (MCU); "A*nything related to dating strangers is not good for girls*" (MSR); "*Now there is still a problem with chatting with men or adding them in Facebook*" (FSU). Other restrictions on girls include not putting her photo online, not using the camera, and not using the computer for long periods: "*They don't post their photos*" (MCU); "*No camera in the device*" (MSU); "*I have to use it in the living room not in my own room*" (FCU); "*I don't use it for a long time, or in the middle of the night*" (FCU); "*Don't put her photo on*" (MCU). However, girls' restrictions are becoming rarer: "*Maybe in the past, but now no restrictions are imposed*" (MSR); "*In the beginning*

they are scared of the internet, but now it's my study no-one asks me" (FCU); and
"*there were [restrictions] in the past, but now no*" (FSU).

5.2.2 Gender Differences and Computer Abilities

This study has investigated student opinion on whether there are differences between males and females in computer ability. Most male Computer Science students held the opinion that there was no gender difference in ability: "*Boys and girls have the same ability*" (MCU); "*I don't think it depends [on gender]*" (MCU). However, one student argued that males are more able than females in computer use: "*Yes [there is a difference], men invented computers not women*" (MCU). One male said that females are better than males: "*Sometimes girls do better than us*" (MCU). Similarly, female Computer Science students demonstrated a difference of opinion. One thought: "*there are no differences; it depends on the person and his effort*" (MCU). Two females suggested that males are better than them: "*Boys are better in Computer Science programmes; they have a big brain*" (MCU); "*Most of the experts are men, when I browse the internet or search something*" (MCU). However, two females reported that females are better than males: "*I see girls are better than boys; not just me, university educators say that we are better than boys in our study*" (MCU); "*I think girls are better than boys because they make more effort and they are cleverer*" (MCU). Because males and females have separate campuses in Saudi Arabia, students of the opposite gender don't see each other's effort and work.

Male and female undergraduate students studying subjects which are not Computer Science were divided. The first view agreed that males are better than females in computer technology*: "Boys are better and most of the works are given for boys to work on or to study, because boys work hard and are more tolerant" (MSU); "Boys are better than girls often*" (MSU); "*Yes, boys are better, it's related to natural ability*" (MSR); "*Boys are more creative than girls; when I browse the internet I see boys are more productive and more participative, and helpful if someone faces problems*" (FSU); "*Yes, because we use it every day, not like girls*" (MSR); "*Sure. Boys have established themselves better in technology*" (FSR). The second view understands that there are no such differences, and both can do well if they learn and try: "*Whoever wants to get better, they have to learn, whether boy or girl*" (MSR); "*I think there are no differences. Girls could be better sometimes*" (MSU); "*No differences between girls and boys*"

136

(MSR); "*It could be a girl is better and could be a boy is better; depends on the person, whatever, boy or girl*" (FSU); "*I don't know who's better: sometimes boys are better and sometimes girls are better*" (FSR). One male from the small city group found distinguishing between males and females difficult: "*I don't know; the comparison is difficult*" (MSR). Only one opinion from the non-computer students agreed that females are better than boys: "*No, girls use computers better than boys; girls have more experience*" (FSR). One female from the capital city who is a non-computer student suggested that each gender has different abilities so that males can be creative in some tasks, and females can be creative in different tasks which males can't be creative in: "*I see boys do better in programming, repairing computers, but girls are better in designing, painting, Photoshop*" (FSU).

In the quantitative study (chapter 4) male and female student were equal in the time they spent using computers, but females from the capital city had more experience in social networking and emails, and spent more time using them than males. However, the study in chapter 3 found that Saudi female students spent more time with computers than male students. Therefore, this study asked participants to speculate on the reasons behind this phenomenon. Three participants stated their agreement that females spend a long time using computers: "*It's true they* [Women] *spend a long time with a computer without benefit*" (MSR); and nine students, both male and female, agreed the reason was because in Saudi culture females often stay at home so they spend their time chatting with their friends and browsing the Internet or playing games: "*Girls stay at home while boys spend their time outside the home*" (MCU); "*Because girls don't go outside like boys*" (MSR). Female students shared this opinion: "*Because boys spend their time outside the home and meet their friends*" (FCU); and females spend their time on the Internet to keep in touch with their friends as they can't go outside their home to meet them any time: "*We spend most of our time at home, and the Internet is the only means of entertainment*" (FSU); "*We use the internet to keep in touch with our friends*" (FSU); "*Boys can do different activities outside the home, but girls stay at home and spend their time surfing the Internet and chatting to their friends*" (FCU); "*Boys are usually busy and they can meet their friends any time outside the home*" (FSU). While this quote mentions that boys are busy, in contrast three statements agreed that girls have longer leisure time than boys: "*They have longer leisure time and they can't go outside any time*" (MCU); "*Girls have long leisure time*" (MSU); "*We have free time then spend*

it chatting to friends that we can't go outside and meet at any time" (FSR). Most girls stay at home, as one student suggested, because: "*In our culture there is not a lot of work opportunity for girls*" (MSU). Furthermore, students suggested other reasons: "*Maybe because girls like reading more*" (MCU); "*Girls have more curiosity*" (MCU); "*Because we spend time looking for fashion*" (FSR).

5.2.3 Computer Skills and Experience

With regards to computer confidence and experience, the study showed that lower confidence in computer use made students unhappy to do homework or projects when their teachers asked them to: "*No, because I don't have experience in computer use*" (MSU); "*I don't have many computer skills so it makes me nervous*" (FSR). Lower computer skills made them take a long time doing their homework and they felt doing work with a computer was difficult and complicated: "*I don't like doing work with a computer because searching and writing take a long time*" (MSR); "*I don't like that; it takes a long time to do it*" (FSU); "*Sometimes I don't know how to do it*" (FSU); "*I need help; so difficult, very complicated*" (FSU); and "*No. It takes a long time to do, then hurts my eyes*" (FSR). Computer students also didn't like to do homework using computers and they felt doing it without computers was easier: "*No, but I have to work with a computer*" (MCU); "*Without a computer it would be easier*" (MCU); "*If I can do it by hand it would be easier*" (FCU). Although fourteen students stated that they are happy to do homework using computers, in contrast thirteen students don't like to do so. The former suggested it is easier to do by computer than by hand: "*It's better by computer: more tidy and easier than writing by hand*" (MSR); "*In my opinion using a computer is easier and faster than searching in books*" (MSR); "*It is more enjoyable*" (FSR). Computers allow them to send their homework to their teacher: "*To send homework in an easy way*" (MSU); and they reported that it is more convenient for university students to do homework by computer: "*Doing homework by computer is better as we are university students*" (FCU); "*I like that, it's good for university students, it is better than doing it by hand*" (FSU). One female students from the small city mentioned that their teachers don't ask them to do homework using a computer: "*Educators don't ask us to do homework with computers*" (FSR).

Most students use computers later at a higher education level, in Intermediate and High School, so they will not have had good experience and therefore will be less confident

to use computers. In addition, most of the non-Computer Science students don't use computers in university. Females in one university in the capital city (Imam University) and females from the small city are not allowed to bring and use their laptops or tablets in class, and in the small city, as well as laptops and tablets, they are prevented from bringing smartphones onto the campus: "*No. The university don't allow us to bring laptops, tablets or smartphones*" (FSR); "*Though it is not allowed to bring or use computers or tablets in the university, we have to get permission if we need to use them for presentations*" (FSU). Moreover, some capital city students reported that there are computer labs in their university, whereas some others did not know whether there was a computer lab at university or not. Students who reported that there were computer labs said these were not available to all students or not available at all times: "*But the labs are not open all the time; labs are for Computer Science students only*" (MCU); "*Not available sometimes*" (FCU). Whereas, male students from the small city said that there are computer labs available but without Internet access; while female small city students said that no computer labs were available for all students: "*No computer labs for students, but maybe there are for Computer Science students. I hope there are computer labs for students.*"

In addition, this study considered if undergraduate Saudi students were interested in having workshops on computers to increase their skills. All Computer Science students were interested in increasing their computer skills because that would increase their job opportunities: "*It's important for jobs where we need certificates*" (MCU); "*Good for finding a job*" (FCU). Or, it would help them in their study: "*It will be very useful for my study*" (MCU); "*Help me in my study*" (FCU). Also, it increases their skills and knowledge: "*It is good for computer programming*" (MCU); "*To have more experience*" (FCU). Only one male Computer Science student did not want to have computer workshops: "*No, my study is enough*" (MCU).

Moreover, male and female students of non-Computer Science subjects were interested in having computer workshops for similar reasons, thinking that it would lead to job opportunities, especially male students: "*I want them because computers help in lots of careers*" (MSU); "*Because it is important these days*" (MSU); "*To have more skills in computer use" (MSU); "Most of the computer skills are ones I need to learn and I will need them in my future job*" (MSR); "*More workshops in computers are important for opportunities to get jobs*" (FSU). Other students wanted to have opportunities in

computer workshops to increase their skills and knowledge as they think computers are important in their life: "*To make everything easy*" (MSU); "*Computers are now used for all fields*" (MSR); "*I would like to have more skills*" (FSU); "*To improve my skills*" (MSR); "*To learn something I don't understand*" (FSR); "*Computers have become important in our life so I would learn more skills to increase my knowledge*" (FSR). Refusing the idea of getting workshops in computer skills was voiced by five females from both cities, because they have a negative attitude towards computers: "*No I don't like working with computers unless needed*" (FSU); "*No, I don't like computers*" (FSR); "*No, I will not need to use computers for more than surfing the internet*" (FSR).

Most students felt it was stimulating to have a workshop in computers but they were not happy to study computers in the university as a subject since they did not like it: "*It's not one of my hopes*" (MSU); "*I don't like computers*" (MSU, MSR); "*No. Absolutely didn't think to study it; don't like programming*" (FSU). Some of them felt learning how to use computers was difficult: "*Computer work is too tiring*" (FSU); "*I don't like working with computers*" (FSU); "*Not my ambition*" (FSR). One male had a conflicting opinion: that there are not a lot of job opportunities for Computer Science graduates: "*No. I'm thinking about jobs and there is no future work for Computer Science students*" (MSR). On the other hand, there were students who liked studying Computer Science but did not have a chance to get onto the course: "*I wanted to study computers but there was no opportunity*" (MSU); "*It is important and enjoyable but there was no opportunity*" (MSU); "*But not enough places to study*" (MSR); "*I like Computer Science, it's an interesting and enjoyable subject*" (MSR); "*It is a good subject, but unfortunately no places were available*" (FSR); "*Yes, but we have to get good grades to get acceptance*" (FSR).

Also, some Computer Science students from both genders thought about future jobs so they choose studying Computer Science not because they like the subject, but instead to have better job opportunities: "*Future careers depend on computers*" (MCU); especially females who have limited employment opportunity: "*I don't like computers but I study them for more job opportunities; we don't have lots of subjects to choose, especially girls, few subject are available to study and Medicine and Computer Science are the most needed jobs*" (FCU). Four participants had good attitudes towards computers, and they chose to study Computer Science because they liked and enjoyed working with computers: "*I like programming and coding from High School on*" (MCU); "*I love to*

140

learn programming languages" (MCU); "*I like it from school and I am now very happy to study Computer Science*" (FCU). A male student had both ambitions, as he liked computers and wanted to study them but also for job opportunities: "*For career opportunities, and because I liked computers from childhood*" (MCU). Two students reported they had encouragement to study Computer Science from their family: "*My father encouraged me to study Computer Science*" (MCU); and "*My sister is studying Computer Science so she encouraged me to study it; I was not convinced about studying Computer Science*" (FCU).

5.2.4 Purposes of Computer Use

Saudi students used computers for simple activities and limited purposes in the past such as games, chatting, browsing websites and watching videos. After studying at university, students tended to use computers for studying whilst they still using them for entertainment such as games, and chatting.

Small city students, male and female, rarely use computers in general, using them only for studying, though some use them only for entertainment. They replied to the questions about using computers for studying as follows: "*No, only for entertainment*" (MSR); "*I just use it for studying*" (MSR); "*No I don't need it*" (MSR); "*I use it for studying but a little when I want to do research or a project to find information or pictures*" (MSR); "*Yes, sometimes*" (FSR); "*Yes, but not as the main purpose*" (FSR); "*A little*" (FSR); and "*No, it wastes my time*" (FSR).

On the other hand, most participants from the capital city, studying different subjects, use computers for studying more than the small city students, as found in their answers to the questions about whether they used computers for studying. Computer Science students were not asked these questions as computer use is their study subject.

Participants were asked about the reasons behind their computer use being more for entertainment than for learning. This situation could be related to the limits of their knowledge and skills with computers and not knowing how to benefit from the internet, as discovered from students replies: "*Maybe they are not aware about how to use it for learning or to use it for something useful*" (FCU); and "*Our knowledge of computers is maybe limited: we just use it for social connections*" (FSR); "*Because they are unaccustomed to using them in learning*" (MSR).

Male computer students explained that the possible reason why Saudi students tend to use computers for entertainment more than learning is as a result of the education system in schools and universities in Saudi Arabia: "*There is no learning from childhood about how to benefit from computers*" (MCU); and "*They don't need to use it unless for entertainment*" (MCU). Similarly, other male and female students from different subjects offered the same reason, mentioning there was no need to use computers or the internet in their study: "*In our education and study there is no need to use computers, or we don't have to use computers*" (MSU); "*Most of the curriculum doesn't need use of the internet*" (MSR); "*Because we don't depend on computers to produce homework or projects*" (FSU); "*Our knowledge of computers is maybe limited: we just use it for social connections*" (FSR); and "*Because our education doesn't keep up with developments people use it for entertainment*" (FSR). A female student from the small city explained not using computers for learning thus: "*The main reason is that in our education system we learned about computers in few classes in High School and then no more in other classes or even in the university*" (FSR). Then she suggested that improving the education system will result in a good chance to use computers in learning: "*If the education system is strong we will use computers for studying, learning and increasing knowledge*" (FSR). Moreover, male students from the small city and female Computer Science students from the capital city added another reason. They felt it was due to the availability of material or sources on the Internet: "*Because there is not a lot of material on the Internet*" (MSR); and: "*There are not enough education sources*" (FCU). Additionally, male students from the small city suggested a different reason for using computers for entertainment: "*Because we don't have places for entertainment so we use the Internet for leisure and to make friends*" (MSR). Female non-Computer Science students suggested the same reason: "*Maybe because we stay at home and don't go outside, so we use it for chatting with friends and relatives*" (FSU).

Small city male students suggested that the next generation will have more experience in using computers for learning: "*But I think the future generation will use computers more for learning and useful things*" (MSR).

5.2.5 English Language

Knowing the English language has been reported to be an important element in learning and using computers by both genders and by students from the capital city and the small

city. Both male and female Computer Science students reported that English is important to learn Computer Science or to use computers and programs: "*When we try to find information in our study of Computer Science we find rich and useful information in English and don't find it in Arabic*" (FCU); "*I find lots of information in English and it's more specific*" (MCU); "*English language is important to deal with the devices and programs*" (MCU); "*Most programs are developed in English*" (FCU); and that because "*New programs were created in English, then sometimes an Arabic version is made*" (FCU). Also they agreed that the better your English language knowledge is, the better one would be as a programmer: "*A person who has good English language skills is the best user of computers*" (MCU); and "*To be a good programmer you should learn English*" (FCU). Similarly, students from other subjects reported that: "*Most programs and websites are in English*" (MSR); "*Computer language is almost all in English*" (MSU). Moreover, female students from the small city reported that good English language skills will produce better work, and not having English skills makes using computers more difficult: "*My English language is not good and I find I have difficulties*" (FSR); "*I think good computer experience and good English language will result in more efficient work*" (FSR). However, male students said that using computers helps them learn English: "*Of course learning with a computer forces you to learn English*" (MSU); "*A computer is a tool to learn English as well*" (MSU). Likewise, female students from the capital city confirmed that as computers are developed in English then English skills are important: "*English websites are the most rich in information and programs*" (FSU); "*Sometimes I see icons and windows in English, so English is very important*" (FSU).

5.2.6 Smartphones

All students in this study have smartphones, except one female student from the small city who uses a feature phone instead. No gender differences or differences between students in the capital city and small city were found with regards to smartphone ownership. All students, male and female, use smartphones for chatting, social networking applications, news applications, Instagram, notes, dictionary, games, to send broadcasts and for learning English applications.

5.3   Discussion

5.3.1 Gender Differences

Regarding gender differences in computer skills amongst the Saudi students participating in this study, Computer Science students reported no gender differences as girls can perform just like boys in using computers. In addition, girls studying Computer Science have been reported by their lecturers as being better and getting higher marks than boys. So students who studied or graduated from Computer Science as a subject have a lot of knowledge and experience in computers, and therefore know that a person can be creative whether they are a girl or a boy. However, the finding from this study and the quantitative study suggest that there are still some students, especially males, who think that males do better in programming and that a lot of computer experts are males. This came from the stereotype that computers are a male subject as reported in the literature (Moghaddam, 2010; Oshan & Khudair, 2008; Appianing & Van Eck, 2015). Students of non-Computer Science subjects held opinions similar to Computer Science students: some felt that boys are better, some felt that girls are better and some saw no differences, as all can do well if they decide to. There was an opinion expressed that girls are more creative in designing while boys were seen as more creative in programing. However, counter to what students believe about differences of gender ability, the quantitative study (chapter 4) shows females are the same as males in the strength of their attitudes toward computers.

In this study participants agreed that girls spent longer using computers than boys - whether PC, laptop or tablets - as in the previous qualitative study (chapter 3). They suggested the main reason for this is that in Saudi culture, women spend more time at home and so had the time, opportunity and interest to use computers for browsing the internet, playing games, or chatting with their friends. Moreover, other reasons given in this study include that girls like reading and looking for fashion inspiration, and girls have more curiosity and so they spend time online looking for information and news. Finally, there aren't a lot of jobs available for women (AlMunajjed, 2009; Alhudhaif & Nalband, 2012) and so when they stay at home all day, they use the computer as an entertainment tool in the home.

5.3.2 Smart Phones

The study showed that all students use computers and most of them own their own computer and smartphone as well. Saudi students appeared to use smartphones for the purposes of social networking such as Twitter, Facebook, and Instagram, as well as to use notes, the dictionary and chatting applications. This finding supports those made by Google (2012) and McIlhone (2014), that a large percentage of Saudi students use their smartphones to access the internet and for social networking applications. The study's results also highlighted the fact that using smartphones and tablets reduced the use of PCs and laptops. This is compatible with Nassuora (2012) who argues that smartphones are mobile devices which provide access to the Internet on-the-move and boast a great degree of functionality, unlike desktop computers. However, some students mentioned using smartphones for learning too, though limited to English language applications. This was the result of the low availability of Arabic language applications, or perhaps because they were of low quality, whereas students found English applications helpful to learn the English language. The study by Al-Kahtani et al (2006) supports the finding that there are limited Arabic websites and Arabic online resources, prompting users to prefer English websites, which have valuable and diverse content and sources.

5.3.3 Purpose of using Computers

Furthermore, Saudi student participants used computers in the beginning for entertainment purposes but after starting at university most of them began using computers for studying. However, as the quantitative results in chapter 4 show, a large percentage of students still use computers for entertainment as a main purpose. This could be because they have low confidence, experience and skills in using computers, even if most of them have computer classes in Secondary schools. Many reasons can lead students to be less informed in computer skills, and to lack the required level of experience. Amoudi & Sulaymani (2014) suggest that one reason could be because computer labs in KSA were initially built in schools to enable students to learn how to use computers, and they were not linked to general learning, which leads to their ineffective use. In addition, Gay et al (2006) confirm that the amount of computer and Internet use by students correlates directly with the degree to which they feel it is useful for communication and access to information for their work. The study also shows that limited availability of the suitable materials and sources on the internet is another factor

for students' proficiency and confidence. The more Arabic-language programs or education resources are available to students, the more they will access them and gain interest in benefiting from computers.

5.3.4 Computer Experience and Skills

In addition, students having low computer skills and experience could be related to the fact that in some subjects, educators (at school and university) do not ask students to provide homework or projects using computers, and in some cases they do not allow students to use computers for class. The students therefore don't practise computer skills or realise that a computer is an important learning tool for all subjects. On the other hand, some students themselves did not like doing homework using computers. This was due to their limited experience and lower confidence in using computers. They found it difficult to spend a long time to prepare their homework on the computer. This finding supports those of Eyadat (2006), Korobili et al (2010), and Kutlucai & Baskan (2013), that computer experience has a strong relation to students' attitude toward computers; that possessing more computer skills leads to less anxiety (Hashim and Mustapha, 2004; Teo, 2008) and to liking computers more (Beckers and Schmid, 2003). Additionally, Alfahad, (2012) and Alturise & Alojaiman (2013) suggested that the lack of facilities in the education sector forms a major barrier preventing students from learning to use and benefit from computers. Most students get computer skills at High School level and then it could be too late to learn such an important technology tool for different fields.

According to Alturise & Alojaiman (2013) cultural norms and community attitudes also play a role in preventing technology use at Saudi universities. This study shows that students in Saudi Arabian universities cannot access computers easily, especially girls, whether in the capital city or a smaller city because universities do not allow students to bring their laptops or tablets, or use computers inside the university. Some girls from small city, who reported less computer experience and use than other groups in the quantitative study, are not allowed to use smartphones either. Hence, according to the qualitative study, females are less likely to access computers at university than male students. This meant they did not have a chance to gain experience or knowledge when working together with friends. So this issue is a major barrier to improving computer skills and experience as there are no opportunities for students to access computers

inside the university, especially those who can't use computers at home or outside the home, or who do not have Internet access at home. So even students who have a positive attitude towards computers cannot benefit from their use.

As with the quantitative study (chapter 4) this study indicates that most students were interested in gaining opportunities to have computer workshops and this preference came from wanting to have certificates to improve their job competitiveness, which does not necessarily mean they like using computers.

In contrast, some females in this study didn't want to have computer workshops as they didn't like using computers, and some thought they didn't need computers beyond surfing the internet. This gender difference in negative attitudes toward computers was found in previous studies (e.g. Chua et al, 1999; Schumacher & Martin, 2001; Lee, 2003; Othman & Latih, 2006; Eyadat, 2006; Bebetsos & Antoniou, 2009; Kannan et al, 2012). However, in the quantitative study (chapter 4) there are no gender differences in preference for studying Computer Science or to have computer workshops. From the quantitative study, about 50% of students preferred to study Computer Science, and about 70% wanted computer workshops. However, this positive attitude is also not necessarily due to liking computers; it could be the same as for Computer Science students who pointed out that they study computing as a subject without enjoying or finding it interesting. They could simply study computers to have better job opportunities as the Computer Science department is very immature in Saudi Arabia and lots of jobs are growing for computer experts.

5.3.5 English Language

The study found that there was a positive relationship between English language acquisition and higher levels of confidence in using computers and being more creative using computers. This result supports that of Korobili et al (2010); Alturise & Alojaiman, (2013); AL-Hunaiyyan et al, (2008) that students who had knowledge of English reported more positive computer attitudes. Consequently, most computer programs were developed in English, and so that impacts negatively on a student who does not understand English well, as they would have difficulties in using computers and programs in English. This finding is also compatible with the earlier qualitative and quantitative studies in this thesis (chapters 3 and 4).

5.3.6 Differences within Cities

Moreover, this study found that students from the small city had lower awareness in computer usefulness and importance than the capital city students. Perhaps they had missed opportunities to be directed in how to use computers in learning, especially since some small city students felt that computers wasted time, which led to them having poorer computer skills and knowledge. Students from the capital city are a little more aware about using computers for educational purposes. This result was found in the statistical study (chapter 4): students in the capital city have a stronger positive attitude to computers and more experience than students from small cities. Also, it was found that students from the small city reported less computer usage for database, spreadsheets and learning than students in the capital city.

This weakness in computer usage by students in the small city may relate to the fact that, in general, parents of students in the small city are less educated compared to the parents of students from the capital city. Alsakran et al (2009) confirm that families from the capital city tend to be more educated and have better knowledge about computer technology than families from the small city. Therefore, parents in the capital city encourage their children to use computers, while most parents of the small city students do not. Another suggestion by Al-Silami (2010) which can considered a factor that differentiates students in the capital city from their small city counterparts is that most large Saudi Arabian cities have a multicultural population with varied backgrounds while small cities, towns and villages comprise many Bedouin families who have special practices and different mores.

5.3.7 Parents

The study supports Shashani & Khalili (2000) which found that parents have a strong effect in encouraging their children towards computer use. In addition, the research suggests that some students believe that parents had an effect on their children regarding computer use, when they used computers in front of their children and shared information or caused their children to imitate them and to explore this technology more. Liu (2009) concludes that home computer access in conjunction with parental support helps students build their computer knowledge. On the other hand, there were some students who did not believe parents had an effect on their children towards

computer use, since some children used computers while their parents did not use them or know how they worked.

Furthermore, most students who participated in this study used a computer for the first time at a later age (15 years and above), resulting from a lack of access at school and lack of encouragement from their families, as some parents did not use a computer and didn't know anything about them. Their children were the ones who showed them how computers worked and how they were used. This supports the finding by Sait et al (2007) who argue that by the year 2007 most Saudi internet users were new to it.

The research proposed that there were some gender differences in regards to encouragement to use computers. Most of the undergraduate Saudi students who participated in this study reported that boys were encouraged more than girls and they usually got to use a computer first. Those parents tended to give greater importance to males' educational needs above those of females, since in Saudi culture men bear the responsibility to care financially for their families, whereas females usually do not work and instead rear their children at home. In Saudi Arabian culture, as is the case in many countries worldwide, the main role a woman assumes traditionally is that of wife and mother (Alhudhaif & Nalband, 2012). Therefore, some parents thought education for women was not as important as education for men.

Another reason given for why girls receive less encouragement to use computers was that girls were restricted because of parental worries about their children using them to do something forbidden, such as getting to know strangers, chatting with them or sharing their photos online. This supports Sait et al (2007) who reported that restrictions imposed by the family limited youngsters from having Internet access. According to Al-Kahtani et al (2006), 41% of female undergraduate students in his study did not use the Internet because more conservative elements of society fear that it is dangerous, and that its dangers outweigh its benefits. However, these restrictions on girls have become less restrictive over time with some families, so parents have changed their opinions and most of them now believe in the importance of computers for girls and boys. Therefore, families have become more aware of using computers for different purposes and that they can get a lot of benefits from them.

5.4   Conclusion

This study was conducted among Saudi undergraduate students to investigate their attitudes to and utilisation of computer technology. The study found that Saudi students were encouraged to use computers by their families and by schools and teachers. Most of them had their own computers at home, bought by their parents. This indicated that schools and parents play a major role in influencing students to use computers. Saudi students have limited confidence and experience in using computers and most use computers for entertainment purposes as opposed to learning because they learn to use computers at later stages of study, and so are not aware of the benefits possible from using computers.

This study suggests the importance of adopting computers at the earlier levels of school study and also of providing university students with workshops in computer literacy to improve their computer skills and knowledge. Also, there needs to be more reliable online Arabic learning resources available for students at different ages. Furthermore, the study reported how Saudi culture causes more restrictions on computer use by Saudi girls, both from universities and parents. Also, finally, that Saudi boys have more encouragement to use computers and own computers before girls, giving them an advantage over Saudi girls.

CHAPTER 6.   ATTITUDES OF HIGH SCHOOL TEACHERS IN SAUDI ARABIA TOWARDS COMPUTERS

Teachers play a major role in building and shaping students' skills and knowledge. Teachers can therefore encourage students to benefit from the use of technology. The attitudes of teachers towards information technology is a key issue for the successful use of computers in education (Yushau, 2006; Abedalaziz B. et al, 2013): an individual teacher's attitude toward computers and their use of computers in the classroom can give their students positive attitudes to the use of computers. Saudi students in the earlier quantitative and qualitative studies (chapter 3, 4 and 5) reported a lack of education systems in Saudi schools regarding computer use, and the majority of them didn't get encouragement from their school to use computers. In these cases, teachers' attitudes to computer use inside or outside the classroom should be examined to identify any contributory weakness in the education system or in teachers' training.

Hence, this qualitative study has been conducted to examine teachers' attitudes to computers and their use of computers in the classroom. Focus groups were used to gather more information and descriptive data about how teachers use computer in general and in the classroom, their computer skills and experience. This data allows us to answer the research question about teachers' attitude toward computers.

6.1   Methodology

6.1.1   Participant

A focus group has been used in this study to establish qualitative data about High School teachers' attitudes toward computers, and also to collect information on computer availability in schools and how teachers use them in their classrooms in Saudi Arabia. Before starting the focus groups, agreement from the Ministry of Education was secured; also, each participant read and signed a form to confirm their informed consent. As schools in Saudi Arabia separate pupils by gender, female teachers teach in girls-only schools, and male teachers teach in boys-only ones. Therefore, three female teachers' focus groups and three male teachers' focus groups were conducted. All teachers were chosen from the capital city of Saudi Arabia. In table 1 each group is

given a symbol for easy reference to the quotes in the analyses. Each group contained six teachers who were chosen to be of different ages, subjects and teaching experience (see Appendix). This variety in age and subject was to ensure attitudes would be examined in terms that could identify causes of difference. Interviews started with demographic questions about age, teaching experience and subject (see appendix). The next questions were about computer use at home and in school, computer experience, and computer skills (see table 2). In order to make the discussion easier and more effective interviews were carried out in Arabic, as the interviewees were native Arabic speakers. Each interview was then professionally translated into English for data analysis and discussion. The NVivo programme (Qualitative data analysis software) was used to analyse this qualitative data using thematic analysis such as: computer experience, computer importance, purpose of using computers. Then, to validate the analyses, another researcher recoded the data. The interrater reliability for the raters was found to be Kappa = 0.70.

Table 6-1) Classification of High School Teachers' Focus Group

Groups	Gender	Symbol
1	Male Teachers, all classes equipped with Computer, Projector & Smart Boards. (6 teachers)	M1
2	Male Teachers, no Computer, Projector or Smart Board in classes. (6 teachers)	M2
3	Male Teachers, no Computer, Projector or Smart Board in classes. (6 teachers)	M3
4	Female Teachers, all classes equipped with Computer, Projector & Smart Board. (6 teachers)	F1
5	Female Teachers, some classes equipped with Computer, Projector & Smart Board. (6 teachers)	F2
6	Female Teachers, no Computer, Projector or Smart Board in classes. (6 teachers)	F3

Table 6-2) questions asked of teachers in each focus group

No	The Topic of the Question
1	How old are you?
2	What are your subjects?
3	How much experience have you got in teaching?
4	For how long have you been using a computer?
5	Do you use a computer at home?
6	How often do you use it?
7	What do you mostly use computers for?
8	Do you use a computer to learn or to prepare lessons?
9	How do you feel when you use a computer?
10	What computer skills do you have?
11	Did you get any training courses on computer use?
12	Did you get a training course on how to use computers in teaching?
13	If the school provided a training course on computers, would you attend it?
14	Do you use smartphones?
15	How long have you been using them?
16	What programs or applications do you use often on your smart phone?
17	What are the advantages of computers?
18	Are there any benefits from using computers in teaching?
19	What are the disadvantages of computers in your opinion?
20	Do you use computers at school? Or in the classroom?
21	How often do you use a computer in the classroom?
22	Are there any rules which you follow when you prepare lessons by using a presentation made by the headmistress or the ministry, such as using two colours only or one picture in every slide?
23	Do you ask your students to do their homework using a computer? (Writing, presentations, doing projects, information)
24	How do you ask them? And how often?
25	Do you connect with your students online through websites or by email?
26	Do you find any difficulty when you use computers in the classroom?
27	How many computers are available in the computer lab?
28	Do you share with other teachers of the same subject files or materials online?
29	Could you describe how you use the computer in your class?

30	Does your headteacher or supervisor ask you to use technology in the classroom, or share some tools with other teachers, or conduct discussions online?	
31	If you lived without the computer, how would you feel?	
32	Do you expect it will affect your work or your students' effort or performance?	
33	Do students use computers at school?	
34	Do students use computers at home?	
35	Do you think that parents encourage their children to use computers?	

6.2 Analysis of the Results

The following sections include analyses of the teachers' focus group.

6.2.1 Teachers' Attitudes toward Computers

Most of the teachers, male and female, have positive attitudes toward computers, and they use them at home or in school. In addition, they believe that computers are important in their life as they said this when they were asked about their feelings when they use computers. Female teachers feel that computers give them enjoyment and help them to communicate with the world: "*Amused, I'm in a different world*" (F3); "*Touring the world*" (F1); "*Very happy, self-confident*" (F2). When males use a computer they feel "*Comfortable, dazzled*" (M1); "*Happy, interesting, enjoy*" (M2); "*It is a natural part of life; confidence and enjoyment; I feel happy and enjoy it; achievement*" (M3). In addition, teachers' feelings about what life would become without computers are strong evidence of computers' importance and of their positive attitudes to them. The females said: "*Disconnection with the world, isolated* " (F1); "*Very hard, it's like life without electricity; we will return to books; it will be very tiring, my works will not be saved; we will return to the panels and traditional methods which are destroyed fast; we will return to write the exam questions by hand*" (F2); while males' replies showed a range of attitudes, such as "*Frustration, retarded; as if I was absent from the world; life will stop (M1)*"; "*l will feel resentful, bored; I will feel emptiness (M3)*"; and a sense that live would be difficult: "*Life would be more difficult, monotonous and slow*" (M2); "*Life will be complex; difficult to do tasks*" (M1); "*The work will be hard (M1)*".

6.2.2 Smartphones

All teachers in these focus groups use smartphones except one male teacher. They have been using them for seven years or less. There are no differences between males and females in how long they have used them.

Males and female teachers were found to use smartphones for different purposes. Females reported several applications on their phones, such as: Google; social networking; games for their children; calendar; WhatsApp; email; YouTube; camera; calculator; and news. However, there are two females who use smartphones for calling and texting only and who do not use other applications: "*I'm ignorant; I know just calling and texting*" (F1); "*Nothing*" (F2)*.* Moreover, males use smartphones for similar applications as females, but they use them more widely for different purposes: "*Bank application, notes, government applications, dictionary*" (M1); "*Weather applications*" (M2); "*Currency change*" (M3). One male mentions that he uses only one application in his phone - WhatsApp - for "chatting" (M3), so he doesn't use it widely.

On the other hand, one of the female teachers was not happy with smartphones as she expressed the following opinion: "*Smartphone has lots of disadvantages, such as wasting time, harming the fingers, watching videos and chatting, wasting time and making it easy to access the forbidden*" (F1).

6.2.3 Computer Advantages

All teachers believe that computers are important in life and report lots of advantages of computer technology. Female and male teachers have mentioned similar computer advantages, such as "*Saves time and effort*" (F1, F3, M2, M1, M3); "*Fast searching and finding the information*" *(F1, M2, F3)*; "*Easy to find the information*" (F2); "*Everything between your hands, everything available on the internet, many sources in websites, preparing lessons, solving problems, doing projects, clarifying lessons in YouTube*" (F3); "*Lots of benefits, abbreviation of effort*" (F1); "*I can find news with updating*" (F1); "*Communication between us and other worlds*" (F2); "*Fast spread of news and information*" (F2); "*Completing the work very fast*" (M1); "*The advantages of the computer are various: it is easy to use, they provide ease, speed and subject enrichment in getting to the knowledge, or what you search about*" (M1); "*Easy to find the information and view what's new*" (M1); "*Saving information in full satisfaction and*

perfect organization, then easy to access to what has been saved" (M2); *"Fast performance and giving information in a fast way"* (M2); *"Lots of useful websites for teaching"* (M3).

However, males seems to differ from females: they focus on the quality of the work and in self-learning and development: *"Accuracy in some usage like drawing, and organisation and good performance"* (M2); *"Easy to record and analyse data"* (M2)"; *"People can learn at home by using electronic learning"* (M2); *"Organisation"* (M3); *"Using emails to deliver documents"* (M3); *"Accuracy, achievement and perfections, keep up with developments"* (M3); *"They provide ease, speed, accuracy and enrichment to the subject"* (M1); *"Tidy content"* (M2); *"Saving information in full satisfaction and perfect organization, then easy to access to what has been saved"* (M2).

Females think differently in some ways, as they focus on teaching and their students: *"Computer is a grace, it has us moving from old methods that I used: going to the library to find the information and register in the library and pay money"* (F3); *"Everything between your hands; attract students, who see it is not like listening"* (F3); *"We don't need panels or traditional painting"* (F2); *"Pictures are better than speaking"* (F2); *"Makes teaching easier"* (F2); *"Video clips are useful and make it easy for students to understand"* (F2).

6.2.4 Computer Disadvantages

Teachers reported advantages of computer technology, but they also reported disadvantages that make them scared of or annoyed by computers. Female and male teachers agree that computer disadvantages include people spending a long time with computers for entertainment, filling their time without feeling, leading them to health problems or isolation: *"Wasting time in entertainment, chatting"* (F3); *"Students spend their time in entertainment then they don't study"* (F3); *"The computer takes all my time; it takes me from my children"* (F2); *"A disadvantage is that a person could spend many hours with computers without feeling"* (M1); *"They lead to social isolation"* (M1); *"Addiction using the internet; wasting time in chatting; games affect the brain"* (M3); *"Computers affect human health, especially eyes"* (M2); *"Health problems which are caused by computers"* (F2).

Moreover, they mentioned that unreliable sources from the Internet make them annoyed: "*There are many texts of wrong information and unreliable sources*" (F3); "*Most of the information available on the internet is not true and not reliable*" (F1); "*Inaccurate information and doubt about resources*" (M2); "*Computers are not enough knowledge for students*" (M1). In addition, teachers reported that using computers affects reading and writing skills negatively: "*We don't use the pen and paper like before, it causes bad hand writing*" (F1); "*lacking in reading books*" (F1)*;* because: "*Students don't have books they get all information online*" (F3).

Furthermore, Saudi teachers, both male and female, appear to be worried about their children, and they want to maintain their moral standards: "*Controlling children is the most difficult problem as the internet is open to the world*" (M2); "*Bad usage, like watching pornographic clips*" (F3); "*Bad and porn websites*" (M3).

Other disadvantages were in computer malfunction and internet quality in Saudi Arabia: "*The damages which break devices and programmes*" (M1); "*Hackers and viruses*" (F2); "*Computer breakdown*" (F1); "*The Internet quality is bad, slow and disconnected*" (F2). Males have reported additional negative points about computers: "*The difficulties of some programs because of lack of program quality*" (M1); "*Lack and rarity in potential and lack of support*" (M2). Finally, one male says: "*But in general the advantages of computers surpass the disadvantages*" (M2); so they believe in the importance, the huge benefits and the usefulness of computers.

6.2.5 Feelings when Using Computers

Teachers' feelings when they use computers were found to be influenced by the advantages. These make their feelings positive, whereas their feelings become negative when faced with the disadvantages or when they suffer any problems with computers. Females have good feelings when they use computers: "*Enjoyable*" (F2); "*Amused. I'm in a different world*" (F3); "*Touring the world*" (F1); "*Very happy*" (F2); "*Enjoyable, self-confident*" (F2). But they have negative feelings sometimes when they don't get the benefits, face problems or spend a long time working on a computer. They reported: "*It's interesting when I find what I'm looking for and feel comfortable, but I become nervous, tired and stressed if I don't find anything or if the internet is slow*" (F3); "*What bothers me on the internet is that some information is not correct or I find different information from different websites, or when the work is not completed*" (F3); "*Happy*

but if I stay for a long time, I become nervous" (F3); "*I become nervous when I don't find what I want, or I feel nervous and I feel I have a headache when I don't understand the programme*" (F3); "*It was enjoyable before, but not now, because I'm busy now. I don't have time. I have lots of work that is more important than using the computer*" (F2). Also, females' feelings are dependent on the purpose they are using computers for: "*I feel nervous when I do something related to my work, but enjoy it when I use it for entertainment, watching videos or social networking media" (F1)*; "*I get nervous when I use mathematics problems*" (F3). Similarly, male teachers reported positive feelings when using computers as they get advantages from them: "*Comfortable*" (M1); "*Ease and accuracy and speed*" (M1); "*Happy, interesting, enjoyed*" (M2); "*It is a natural part of life*" (M3); "*Confidence and enjoyment; I feel happy and enjoy it; achievement, comfortable*" (M3). However, males' negative comments happened less often and they did not mention nervousness or stress like females; only one male reported being tired when he spent a long time working with a computer: "*Amused, but if I stay for long time, tired*" (M1).

6.2.6 Computer Skills and Experience

Male and female teachers reported having limited skills in using computers and they suggested the reasons for this were a lack of experience and that they didn't use or learn computers when young: "*I don't know anything. When I need something I ask the students to do it for the class, because I didn't learn computer at an earlier age. If I had learned during childhood I would be very confident, but now I don't understand I'm grouchy*" (F3); "*yes, it is true computer is not of our generation, it's the students' generation; they are better than us at using computers*" (F3); "*I don't have any skills; my daughter writes for me, she enrolled me on Twitter and Instagram*" (F1). In addition, the age of teachers also affects their computer confidence. Older teachers, both male and female, have fewer computer skills and less confidence in using computers than younger teachers. In fact, older teachers don't seem to use computers much at all. One female and one male don't use computers at home or in school, while one female uses it only in the classroom to give PowerPoint presentations to the students.

6.2.7 Gender Differences

Male teachers have more skills and confidence than female teachers. Female teachers have reported the following skills: *Word*; *PowerPoint*; *downloading programmes*;

Excel; *interactive white board*; *Photoshop*; *email*; *YouTube*; *downloading videos*. Some female teachers don't have any skills: "*I don't have any skills*" (F1); "*Nothing*" (F3); "*I don't know anything*" (F3). On the other hand, males reported a wide range of skills: these included those mentioned previously, plus: Excel; English dictionary programme; text processing; and Visual Basic; Microsoft Office programs; and designing photos.

Male teachers have longer experience of computer use than female teachers: most of the males have used computers for 10 years and over while most of the females have used computers for 6 years or less. The average computer experience for males was 15 years, while the average for female computer experience was 7 years.

Male teachers usually use computers daily at home for hours more than female teachers, as the males reported in the interview. The least computer use by a male is 1 hour per day. They usually spend between 2 and 5 hours. One male reported that he uses computers 10 hours per day, while one male uses computer for only 15 minutes per day. On the other hand, females seem to use their computers less than males, often using them for between 1 and 4 hours per week.

Only one female from the first group and four females from the second group uses the computer for longer: about 2 to 3 hours daily.

Some of the female teachers don't use computers currently, or use them only a little for teaching: "*In the past I used a computer for a long time to prepare presentations for the class, but now I have everything I don't need to use the computer*" (F2); "*Just 1 or 2 hours per week to prepare lessons only*" (F1); "*Little, just to find what I need then I close it immediately*" (F3); "*I just use it to write the exam questions then close it*" (F3); "*We just use it when we need it for teaching*" (F3); "*We don't have time to use it for a long time*" (F3).

Male teachers use computers for different purposes in teaching and other personal use: "*Browsing, reading; for teaching and self-development; reading and watching news, general education*" (M1); "*Studying, academic searching; typing with Word; translation; for searching; typing student data; writing exams and other usage; for entertainment, communication; saving information then finding it easy to return to*" (M2); "*News; banking and communication. The most important things are browsing*

and writing, teaching purposes and browsing the internet, and typing exams using Word" (M3).

In contrast, most of the female teachers use computers for limited purposes. They use them for teaching (preparing lessons) as their main or only purpose, and for few other purposes: "*Just surfing the internet; typing using Word; searching for pictures or presentations to use them in the class; PowerPoint and Word*" (F3); "*Writing exam questions; preparing lessons; collecting data for the class; and preparing PowerPoint for my files only. Also searching for information*" (F1). Only the second female group - who mentioned previously that they spend more time using their computers than other female groups - have a wider reason to use computer. These include "*Browsing websites; preparing lessons; news, email; shopping; Twitter*" (F2).

Fewer female teachers were keen to undertake additional computer training than the male teachers. Seven female teachers out of eighteen replied negatively to the question "*If the school provided training courses on computers, would you be happy to attend them?*", while only two males don't want to take part in computer workshops. Replies included: "*No, I don't have time now*" (F2); "*No, I know what I need*" (F3); "*No, I don't want*" (F3); "*I don't need them and would get no benefit from them*" (F3); "*No, I don't want to get any workshops: humans teach themselves*" (F1). However, there are teachers who do want to have computer workshops: "*Yes, I want to learn and know more skills in computer use*" (F3); "*I hope so*" (F1); "*I want them, but at an appropriate time*" (F1); "*We have basic knowledge but we need to learn more deeply about computers*" (F2); "*I want to learn about Word more*" (F2).

Female teachers want to have workshops to keep up with their children and control them, and one wanted to have workshops that are useful for her work: "*I like to learn more about computers, at least to understand what my children do on them*" (F3); "*Specific courses are useful for my work*" (F2); "*I like to have anything new related to teaching*" (F1). In contrast, most of the male teachers would like to have computer workshops to increase their knowledge and keep up with technology improvements: "*Yes, to learn more skills*" (M1); "*Yes, because computer science and programs are developing and are renewed super-fast*" (M1); "*To improve ourselves and learn new skills that we probably don't know*" (M1); "*To increase my experience and skills in computers*" (M2); "*I'm interested in having a workshop on databases, Excel and*

Access" (M2); "*Yes, to improve myself*" (M2); "*To know all computer skills; the computer has become a necessity of civilization*" (M2); "*More benefits*" (M3); "*For self-improving*" (M3). However, two male teachers would not like to have computer workshops, since they reported: "*No, because my subject doesn't need computers*" (M3); "*We don't need it*" (M3). Furthermore, most of the male teachers arrange to attend computer workshops themselves: "*I have the International Computer Driving License*" (M1); "*I attended a number of workshops on Microsoft office, Word and Photoshop*" (M1); "*I had a course on computer usage*" (M2); "*On Word and PowerPoint*" (M2, M3), "*Visual Basic*" (M3). Females who reported that they had had a computer workshop, got them in their schools: "*In school they did a workshop for all school teachers*" (F3); "*The school offered a training course on how to use an interactive white board*" (F1); "*In school we had a workshop on how to use interactive white boards, on Word, and on how to edit photos*" (F2); "*In school they provided a workshop for all school teachers*" (F3). One teacher paid for a computer workshop herself: "*I paid to have a workshop*" (F1).

Most of the male teachers are happy with the Internet and their life is linked to computers so they reported the following feelings about living without computers: "*Frustration, retarded*" (M1); "*As if absent from the world*" (M1); "*Life will stop*" (M1); "*l would feel resentful*" (M3); "*I would feel emptiness*" (M3); "*Bored; we would return to using limited technologies*" (M3). They think the work will be difficult without computers: "*Life will be complex, it will be difficult to do tasks*" (M1); "*Doing bank and government transactions will be difficult*" (M1); "*The work will be hard*" (M1); "*Life would be more difficult, monotonous and slow*" (M2); "*Life and work will be hard in some points because we wouldn't be able to save information and send it easily*" (M2). However, two male teachers have different feelings: they don't have problems with living without computers: "*No problem, maybe, we will lose fast performance and lose communication, but it is not important*" (M2); "*I don't care, it's not important*" (M3).

On the other hand, females are more likely to not care about living without computers: "*Don't care*" (F3); "*No problem I hope*" (F2); "*I don't worry*" (F3); "*No problem*" (F3). They are happy to use the traditional methods that they studied before, when they lived without computers: "*We would return to the traditional old materials*" (F3); "*We studied before without computers*" (F3); "*We lived and studied without computers*"

(F1); "*We will return to use the traditional methods only, it's basic*" (F2); "*We lived and studied without computers*" (F1); "*Computers make people busy and separate them from their society*" (F3). Female teachers reported that giving classes without computers is better: "*It would be much better, presentations waste the importance of the lessons, thus, the students don't understand*" (F2); "*No problems, safe health and having a good brain; computers destroy students' thinking*" (F1). Nevertheless, there are seven females who have negative feelings about life without computers: "*Very hard, it's like life without electricity*" (F2); "*We will return to books*" (F2); "*It will be very tiring*" (F2); "*My works will not be saved, we will return to the panels and traditional methods, which are destroyed fast*" (F2); "*We will return to writing the exam questions by hand*" (F2); "*Disconnection with the world*" (F1); "*Depressed, rigid life, isolation*" (F1). Furthermore, while they mention that the absence of computers is not a problem for them, it will be for students: "*The computer is a part of their life [students], while it's 20% or 30% of our life*" (F3); "*We can use books and other sources, but the students don't have books, they get all their information from the internet*" (F3).

6.2.8   Using Computers in Schools

Male and female teachers reported advantages from using computers in learning and teaching. Female and male teachers agreed that using computers in the classroom is beneficial and necessary. It allows the use of new techniques that provide efficient learning: students understand faster when they use computers, which provide a fast way to find information and to provide self-learning. They reported "*Shifting from traditional educational methods*" (F1); "*Students can replay what they didn't understand more than once*" (M1); "*A source for finding information*" (M3); "*Ability to benefit from information and data, fast implementation of tasks, and using the computer anywhere*" (M3). In addition, participants stated that using computers to give the class videos and pictures assists students to learn ideas faster and with less effort: "*Some students understand more and better when I use PowerPoint presentations; they shorten the amount I need to explain and they see how to carry out the steps in a project*" (F3); "*Connecting the information with pictures or videos is very important as it becomes easy to understand*" (F3); "*Visual is better than audio*" (F1); "*Students understand more from the computer; traditional tools are not useful for them*" (F2); "*Sometimes they can't understand without pictures and videos. Using pictures in a lesson about plants brings the information closer to the students; it makes the lesson easy for students to*

understand and more enjoyable" (F3); "*Easy explanation and delivery of information to the students in an interesting way*" (M3); "*Information from computers becomes clear because it's linked with all the senses*" (M1)".

Moreover, male teachers add that computers help students to concentrate and enjoy their classes: "*Preventing dispersal*" (M1); "*Increasing the students' attention*" (M3); "*Providing information in an interesting way*" (M1); "*Ability to introduce the lesson in an awesome way with high quality and accuracy*" (M2); "*It saves time, provides easy access to references, and fast and easy communication and training*" (M2).

The teachers also indicated that computers motivate students to learn: "*Breaks the routine, and makes the students look forward to the class*" (F1); "*The students interact with what they learn and they are absorbed immediately*" (M1); "*Make the lesson exciting*" (M1); "*Interesting to students*" (M2). Moreover, teachers suggested that computers make teaching easier: "*In the past we made more effort but now everything is ready and available in the presentation and we don't talk a lot like before*" (F2); "*Saving time and effort for both the teacher and the student*" (M3). In addition, they reported that electronic books and notes are an added advantage of computers in teaching: "*If they used electronic books rather than bringing the books every day to school this would be better for them*" (F2); "*Electronic books and electronic notes make it easy to carry them everywhere*" (M1). Males saw an additional benefit of computers in teaching: "*Organising students' grades and easy access to them*" (M2).

Teachers also reported disadvantages of computers to students. Male and female teachers reported that students need to be controlled when they use computers, and that they lose their academic searching skills as they get the information from unreliable sources: "*Controlling children is the most difficult problem as the internet is open to the world*" (M2); "*Computers remove students' academic research skills and social communication skills*" (M2); "*The students depend on the internet and find the wrong information; not everything on the internet is true*" (F2). Also, female and male teachers agreed that students use computers for entertainment and have no time for learning: "*The students spend their time on entertainment, then they don't study*" (F3); "*There is not enough knowledge among students about computers; I mean they don't know how to use a computer effectively. They spend their time on something not useful, on chatting or games, watching video clips*" (M1). One male teacher thinks the reason for not using

computers in the correct way is "*because they lack direction about how they can use computers to learn or to be creative*" (M1).

Female teachers reported that there are disadvantages in using computers in the classroom, but that these are not from computers; rather, they are from teachers who use computers in the wrong way: "*Some teachers depend on the presentations then don't make an effort in the class. She just presents the PowerPoint*" (F3); "*Some teachers ask their students to prepare the presentation and that's wrong, as the teacher should make it by herself*" (F3); "*Also some teachers take presentations already available on the internet or buy them then use them in the class*" (F3); "*Some teachers depend on the presentation and don't use the board or do activities*" (F1). Teachers reported that students prefer to use traditional methods and remember the lessons more with them: "*When we ask the students which teaching method they prefer, they like using the traditional method, only the marker and board, and they don't like presentations; they say we understand more with the traditional method and memorise the information, while presentations make us feel bored and we don't understand* (F2)". These problems arise probably because they didn't get any training on how to use computers in teaching or in the classroom, or on how to design a presentation for classroom lessons (as the teachers reported in the interview).

Some teachers believe that using computers is important for all subjects: "*It's important for all subjects. Computers absorb all sciences, and provide programs that support all subjects*" (M1); but some male teachers reported that computers are not important for all subjects: "*Important, especially for scientific subjects and English*" (M3); "*Not for maths and physics, but it is important for other subjects like religion and Arabic*" (M3); "*I see for scientific subjects it is very important*" (M3); "*I think it is very important for scientific subjects*" (M3); "*A little. Because of the lack of benefits of the computer, maths should be easier and clearer by board and marker*" (M2). Some females stated that computers are not important for all subjects, as did many males: "*It depends on the subject. I teach Arabic. I don't need to use it in class, I just use it for searching for information*" (F1); "*It depends on the lessons and the subject*" (F3); "*Depends on the subject; mathematics doesn't need a computer for presentations, I only use it in difficult lessons*" (F2); and they think using a computer is needed for some but not all lessons: "*In my opinion some of the lessons need to use computers to present*

pictures or video or to find information, while there are lessons it is not important to use a computer for” (F1).

Teachers use computers at school depending on their availability, so in schools that are equipped with a computer, smart board and projector in every classroom teachers use them many times per week, whereas in schools that are not equipped with technology the teachers don't use computers in the classroom. These teachers explained: “*There are no facilities in the class, no computers or projectors. I have to bring my computer and connect it and that takes time from the class*” (M3); “*There is a resources room which has a computer, an interactive white board and a projector, for all teachers and students. This room should be reserved first, maybe for a month or more in advance to give a class in it*” (M3); “*There is one that has a computer, a projector and an interactive white board. Only one is not enough as we fight to book this room*” (F3); “*The lessons by presentations take longer time than lessons without them and I have to finish in 45 minutes so the time is not enough*” (F3). Moreover, they find difficulties in delivering lessons through computer: “*Sometimes the presentations don't open and get hung then half an hour is wasted in solving the problem*” (F2).

6.2.9 Students and Computers

The teachers reported that most of their students use computers at home and such students have good skills and more confidence than the teachers. Females reported of students: “*They are creative in designing presentations*” (F3); “*Sometimes they lead us when we face a problem with the computer in the class*” (F3); “*They are better than us*” (F1, F3); “*Yes, they know how to work with programs*” (F2); “*They are better than us; sometimes I ask them*” (F2). Males too reported: “*Their achievements appear in their files which they have to complete*” (M1); “*Also it appears through their work with computers in the class*” (M1); “*Sometimes we ask them to prepare a presentation for the lesson and they show very distinctive abilities*” (M1); “*Especially electronic games, and they have abilities in computer usage*” (M2); “*They have good abilities, it is a necessity at this age*” (M3); “*Some students have better skills than teachers*” (M3). Another opinion expressed by female teachers is that students use computers for entertainment most of the time: “*They use it, but just for entertainment*” (F1); “*They use it for chatting and browsing, watching films, for secondary purposes*” (F1). On the other hand teachers reported that there are some students who don't use computers and don't have any

knowledge or skills: "*I expect that not all students use computers; it depends on their families, maybe; some of them can't use the computer or, maybe, they don't have it [computer] at home*" (M3); "*There are students who are excellent in computers and there are students who don't know anything about computers*" (F2). Therefore students can't use computers at school unless in computer classes, as there is only one computer lab for every High School and the labs contain a smart board, projector and 30 or fewer computers. Also, neither female nor male students can bring their own computers to school.

Teachers were asked what they think about how parents encourage their children to use computers. Most of them think that parents encourage their children to use them and that this increases their ability and confidence: "*They bought computers for them*" (F3, M1); "*Yes, they provide it for their children*" (F1); "*I see parents encourage their children and they share opinions in school Twitter accounts*" (F1); "*I think every student has three devices not one: a laptop, a tablet and a smart phone*" (F1); "*Yes, now life works with computers*" (F2); "*Yes, they encourage them to use it and let them get courses in computers*" (M1); "*Yes, each home has internet and computers*" (M3); "*Some parents share with their children, and keep pace with scientific progress*" (M3).

On the other hand, there are a number of students, especially females, who don't use computers at home and who don't have any skills. Female teachers said: "*There are about 10% of students who don't have a computer, don't use it at home, and who don't know anything about it*" (F3); "*There are students who have neither computers nor any technology experience*" (F1). The reasons for not using computers could be related to the economic situation or to parental strictness: "*Some of them are poor and can't provide it, and some of them have a high life standard, but their parents are maybe strict*" (F3); "*I think parents are not happy with computers; they don't recommend them for their children. But it's necessary these days*" (F3); "*Worrying about using it for bad things leads to the computer being forbidden*" (F3). Moreover, two males have different opinions, that parents are not happy with computers, but that their children force them to buy them: "*I think they don't encourage them, but the children themselves want computers and ask their parents to buy them*" (M2); "*They see their friends and relatives have ipads or laptops, so they want to have them*" (M2). Male teachers suggested that "*Direction is important as the internet has websites that are destructive of morality and ideology*" (M1). Male teachers also went on to suggest that parents

should encourage their children, and that parental encouragement leads to computer creativity: "*Encouragement from parents increases their creativity*" (M1); "*They should encourage them to learn and use a computer, because it has become essential in work and for communication*" (M1).

Most teachers do give students homework that involves using a computer but this is limited to once in a semester and not for the daily or weekly homework: "*Once a semester, divide them into groups and every group prepares a PowerPoint*" (F3); "*Once a year, a group of ten do one project together*" (F2); "*To prepare PowerPoint or flash, but with a group of students once per semester*" (F1); "*Doesn't always depend on what they need*" (F2); "*Designing lessons from the curriculum related to lessons about nutrition*" (M1); "*Doing a presentation by PowerPoint*" (M3). However, male teachers are more likely to use computers in different ways and more frequently for homework: they use emails to send homework and webpages for electronic learning: "*Doing homework then sending it by email*" (M2); "*We made an English website for communication to train students in English writing skills and to learn more vocabulary, as much as possible*" (M2); "*Sending homework by email and doing charts on the computer*" (M2); "*Doing a short research*" (M3). The teachers reported that students like working with computers at home and do some projects without being asked, and then bring it to school in a flash memory stick: "*Some students do that for themselves. They like working with computers and designing flash and PowerPoint presentations*" (F3); "*Normally I don't ask them but some students show their interest in doing presentations in the class*" (F1).

Most teachers give their students homework in a group to do it with a computer. One of the male teachers observed that because some students can't access a computer at home it will be difficult to do it, "*Because not all students have a computer at home, so we do group projects and students can share in preparing and presenting them*" (M1). One male teachers' group reported a negative impression from students: "*I ask them to do PowerPoint presentations, but they respond negatively as they don't want to do them*" (M3); "*Students enjoy being with a computer, but some students hate computers and don't wish to learn or to use a computer*" (M2).

Additionally, some female teachers reported that they get benefits from students in the class as they help them when they lack technical knowledge: "*I benefited from students*

as they have good experience in computers, because the young use them at an early age" (F1); "*The students help me when my presentation crashes*" (F1); "*Some of the students are creative; they do better things than their teachers in presentations*" (F2).

Female teachers reported that students have good computer skills because they have computer experience from an early age and they talk about computers with friends: "*They didn't attend any workshops because they have good skills; they talk a lot about computers and they have had them from 7 years old. They learned how to use computers from experience, not by studying*" (F2).

Also, one female teacher suggested that computers encourage children to learn reading and writing: "*Computers encourage them to learn writing and reading to do searching and to surf the internet. For example my son, who is 5 years old, told me he wanted to learn how to write [games] or a song's name*" (F2).

With regards to students' performance when teachers use computers in the class, most teachers described good interactions. Female teachers said: "*They are enjoying the class, they remember the lessons better when I use a computer*" (F3); "*They see the information in a real way, and presented with the idea, they are very happy*" (F3). Males also reported a high degree of performance when they use a computer in the classroom to deliver lessons: "*Excellent*" (M1); "*Very high*" (M1); "*Wonderful; probably they learn very fast*" (M1); "*Huge interaction and raises their motivation to learn*" (M2); "*Not so bad*" (M2); "*Strong interaction with me when I use the computer*" (M3); "*They pay attention to lessons*" (M3); and one male teacher has an additional benefit and interaction that can give students more understanding: *If the student didn't understand he can download the scientific subject and replay it at home*" (M1). In contrast, six statements from male and female teachers reported no difference in students' interactions when they use computers in the classroom: "*No differences in the students' performance: it is the same whether using a computer or the traditional method*" (M3); "*Normal with no changes. Students' interactions depend on the lesson itself*" (F1).

But some students dislike it when a computer is used to present the lesson: "*It depends on the class and the teacher who presents the lessons. For example, my class students don't like lessons with PowerPoint because I use it in every lesson. Then, they feel bored. When I moved to teach a new class, the students were very happy to have the*

lessons using a computer because they had never had it with their previous teacher” (F3); “*My students tell me they feel sleepy when I use a projector because I turn off the lights, and they prefer writing on the board*” (F3).

One female teacher argued that using a computer in the class has a negative effect on students' performance: “*The lessons that have presentations are chaos for the students: they pay attention to the pictures and colours and they do not understand the lessons. They feel they are a kind of entertainment and they don't know about the basic objectives. So when I review the lessons with the students they remember the lessons in which I used traditional methods - marker and board - more than those in which I used the computer*” (F2). This situation, in which students don't like the computer in the class and perform less well, could be because the teachers didn't themselves were not educated in computer use for teaching and presenting in class, as they reported: “*There are not any rules or any learning about how to make an effective presentation*” (F2); “*also the presentation with PowerPoint is supposed to be used a little when needed, not in all lessons. There are grades on the number of times teachers use computers and presentations. They ask us, but they don't ask how we use them or when, and that makes students feel bored from using computers during class*” (F2).

6.3   Discussion

The study's results have shown that most teachers have a positive attitude towards computers and use them at home and at work. They believe in the importance of computers in general life and for work purposes. According to Yushau (2006) positive attitudes toward computers and using them for academic purposes suggest a high degree of computer acceptance as well as willingness to adopt computers as important tools in learning and teaching. However, the study featured a lot of sceptical comments about students not learning as much from PowerPoint, because some teachers have unsophisticated views of how technology can facilitate teaching and learning.

6.3.1 Gender Differences

Six gender differences were found with regards to computers. These differences were not found in the qualitative and quantitative studies in earlier chapters. However, gender differences were found in many previous studies (Lee, 2003; Othman & Latih, 2006;

Eyadat, 2006; Bebetsos & Antoniou, 2009; Kannan et al, 2012; Hales & Fura, 2013; Maxwell & Maxwell, 2014; Appianing & Van Eck, 2015).

Male teachers have more computer skills, and more computer experience than females, and use computers for a longer time. The results tell us that male teachers have used computers for more years while most female teachers have only used computers more recently, commencing 6 years ago at the earliest, meaning that female teachers began to use computers later in life than their male counterparts. A study by Mahmood (2009) confirms that males have more computer access in or out of the home, and use computers for longer than females.

Another difference is that male teachers use computers for several purposes, such as self-development, government, e-bank, etc. Females tend to use computers for teaching as the main purpose and some used computers only to prepare lessons. Moreover, male teachers had more workshops in computer literacy than their female counterparts. Also, males wanted to have additional computer workshops to improve their skills and increase their knowledge, whereas female teachers wanted to have computer workshops to keep up with their students, to control them, and for teaching.

An additional difference is that most male teachers felt negatively if they couldn't use a computer anymore, and felt their work would be more difficult without computer access. In contrast, most female teachers did not worry about losing access to computers and some expressed happiness if they had to stop using them and return to traditional methods.

There were more negative attitudes to computers among females than males. This could be related to Saudi culture in which it is more entrenched that women should stay at home and rear children and focus on housework as their main responsibility (Alhudhaif & Nalband, 2012). It could be considered that females would not have as much spare time to use computers as much as males since their responsibilities as mothers and housekeepers would limit the time they would have to leave their homes to attend computer workshops. Therefore, workshops in school would be more suitable and accessible for females to learn how to use computers while they are already in their work environment. Also, according to Amoudi & Sulaymani (2014) there are few public places for females in Saudi Arabia to access computers and the internet, whereas for males there are many. Moreover, males in Saudi Arabia are mainly responsible for the

management of their family's financial expenses and decisions. They are therefore more likely to improve their computer skills in order to seek better employment and job opportunities. Also they would be more familiar with using e-banks and e-government websites to manage their family affairs more easily from home.

6.3.2 Smartphones

Most teachers, both male and female, use smartphones. These help them have a positive attitude towards new technology and computers since smartphones allow easy access to the internet and other applications similar to computers. Support to this finding is that 79% of Saudis used a smart phone by 2013 (Mcilhone, 2014), and this figure increases each year (Emarketer, 2014). In addition, some teachers, especially older ones, don't have enough skills to use them and so only use them for calling and texting, whilst others use them for chatting and social networking. Thus, even though a teacher may have a smart phone, it doesn't mean they have positive attitude towards it. They may have bought it to keep up with the latest trends and to avoid using old mobile devices, or they may like the newer techniques. Consequently, some have reported disadvantages from using smartphones, such as harm to health, wasting time doing something that is not useful, and easy access to forbidden things.

6.3.3 Computer Skills and Experience

This study suggested limited computer experience led to a lack of computer skills and confidence. Further to that, not using computers at an early age and less computer use caused a lack in computer skills. Teachers who have used computers for a long time and who have a lot of computer experience have more computer skills and are more confident than teachers who use computers later in life. Knezek and Christensen (2002) suggest that teachers who have risen to higher stages of computer use have made technology an integral part of their classroom and use it to develop pupils' higher cognition, and that this has been accompanied by a predictable change in their attitudes and requirements. Some teachers of both genders don't have enough computer skills and find using computers or learning to use them very difficult, which in turn causes negative attitudes towards computers. Ermer (2009) says that teachers need skills in using such technology for successful learning to be transferred to students via computers.

Additionally, the study reported that lower computer confidence and experience and lack of skills tended to cause negative attitudes towards computers in teaching. Teachers reported disadvantages from computer use, since a lack of program quality and lack of support resulted in inferior computer skills and confidence among Saudi teachers, leaving them unaccustomed to using varied programs. Additionally, many programs do not support Arabic language, so they found it difficult to use computers or programs as they were unfamiliar with the English language. This finding arose in the earlier chapters too: people with good English language skills have a more positive attitude toward computers than people with limited English.

In reality, some teachers, especially females, know how important computer technology is nowadays and the improvements and changes technology has brought to life, but are less interested in using computers in the classroom or attending workshops to learn more computer skills. As Ermer (2009) suggested, combining computer skills with a belief in the importance of computers will allow the technology's full potential to be reached for teachers as well as students.

Teachers avoid using programs or use them with negative feelings because they are not skilled enough to use them well. Hardy (1998) and Agbatogun (2010) suggest a positive relationship between teachers' attitudes toward computers and their use of them in the classroom, and their computer experience and knowledge. Having more skills in computing and a high level of experience tends to result in less computer anxiety and more favourable computer attitudes. Computer anxiety is the main factor affecting the attitudes of educators towards ICT. Because technology is a comparatively new learning tool in educational settings in Saudi Arabia, a number of teachers become nervous and confused while working with computers, and do not achieve compatibility between information technology and their teaching performance. This finding is supported by Albirini (2006) who confirms that most educators were unsure the place computers have with their curricular goals.

6.3.4 Computer Advantages and Disadvantages

Teachers reported many advantages to using computers. Among these were: saving time and effort; ease of information discovery from different sources; and the rapid spread of news, etc. Moreover, teachers in this study reported the advantage of using computers depended on their interest and importance to them. Oyaid (2009) and Knezek &

Christensen (2002) confirm that the needs teachers believe they have depend heavily on how accessible ICT resources are and the extent to which the technology has been adopted for education. Therefore, male teachers focused on quality, accuracy and achievement of work, and were interested in electronic learning. However, female teachers in this study were more interested in their teaching job and students' learning.

The advantages of computer use in making their work easier and motivating students to learn were positively expressed by teachers. On the other hand, they also reported some disadvantages of using computers in learning, such as: access to unreliable sources; getting wrong information; and wasting time for something not useful. Furthermore, they reported that computers led students to lack writing and reading skills because they had become accustomed to getting information from the internet and from unreliable sources. This supports the finding by CITC (2014) and Miliany (2014) that the largest group of users, within the age range 15 to 25, used the Internet for chatting, browsing and for email. The majority of Internet users in Saudi Arabia also use social networking sites like Twitter and Facebook, among other purposes (Al-Saggaf, 2011) and surfing the Internet and communications have been the main reasons prompting the younger generation to use the Internet (CITC, 2014).

These situations could be caused by lower computer skills and knowledge among students and a lack of academic and learning sources in Arabic, including electronic sources, as mentioned in previous qualitative studies (chapters 3 and 5). Students therefore don't have reliable references and lack academic and search skills. They therefore use computers for entertainment purposes rather than learning, to watch films, use social media and to chat and play games, as mentioned in the previous study (chapter 4).

Moreover, teachers claimed that computers caused a reduction in reading books and searching for information from reliable sources. Also, when students completed all their tasks by computer they would not have many opportunities to develop writing and drawing skills using pen and paper. However, this view came from those with less knowledge of computer benefits and of the programs and facilities computers can provide for learning. There are lots of programs and websites supporting writing and many smartphones and tablets that provide e-books and electronic applications.

This study suggested that feelings when using computers have a strong relationship with the advantages and disadvantages teachers derived from using computers. They had higher benefits when they felt happy, comfortable, successful and enjoyed working with computers. When they had negative feelings, on the other hand, such as being stuck, spending too much time without finding what they needed, using a difficult program or having bad Internet quality, they felt nervous, had headaches and felt stress, making the disadvantages more prominent.

6.3.5 Using Computers in the Classroom

The importance of computers in teaching and learning was proposed by all teachers in this study. Moreover, they reported that using computers in the classroom to clarify ideas to their students helped them understand the work better and retain information in their memory. Computers were especially viewed as a useful tool which can change the face of learning (Wong et al, 2012). Furthermore, teachers suggested that computers made students learn individually through electronic lessons. This supports Alturise & Alojaiman (2013) who affirm that IT has made distance learning possible and that it makes all types of information readily available to anyone with access to a computer.

However, even though teachers hold positive attitudes towards computers this does not necessary mean they use them successfully in class. According to Sabzian & Gilakjani (2013), despite the general availability of technology in schools, teachers will not be able to interact with it successfully unless they have a positive attitude towards it and sufficient skills to use it. Most educators were unsure the place computers have regarding their curricular goals (Albirini, 2006).

Teachers using computers in the classroom were affected by computer availability in their school. This finding confirms studies by Alharbi (2013), Oyaid (2009) and Sabzian & Gilakjani (2013), which suggested that the availability of technology in the school is an important factor to encourage teachers to use them as part of their teaching approach. Schools that were provided with enough computers and interactive white boards had teachers who used these to present lessons more often than schools with limited availability. In schools that had only one room equipped with computers, projector and interactive white board, teachers did not use computers often. They found it difficult to bring their own devices and to take the time to connect these into the classroom to deliver the information.

Even when computers are more available in classrooms, some teachers still fail to use them effectively in their curriculum. This finding supports previous studies by Rosen & Weil (1995), Ermer (2009) and Albirini (2006). However, Ermer (2009), Sabzian & Gilakjani (2013) suggested that the availability of technology alone is not enough to confer its benefits on students. Ermer (2009) added that, for educational quality to be attained, teachers should have a positive attitude towards computers, plenty of skills to use them, and fully endorse the use of ICT as part of the teaching environment. Teachers suggested some disadvantages of using computers in the classroom to present their lessons, such as students feeling bored, muddled, or struggling to understand. But it is possible that this was caused by inappropriate methods of technology use in the classroom by unskilled teachers who did not know how and when to use their computers effectively. Previous studies (Sabzian & Gilakjani, 2013; Ermer, 2009) confirm that the effective use and integration of technology in teaching requires teacher training in computer use, and decisions about how and when computers will be used during the teaching process. Unsuccessful use of technology by teachers in the classroom negatively affects students' learning, makes students feel bored, and likely to develop a negative attitude towards computers themselves. However, the study by Baylor & Ritchie (2002) suggests that to effectively widen the range of educational opportunities that can be offered to students, teachers should maintain a certain level of technological ability. This will allow teachers to be more effective in their work, and help them to prepare efficient research and presentations.

Teachers reported that students' performance was better when they used computers to deliver their lessons, and they did better in exams. Some teachers reported that students' performance whether using computers or not was similar, but some reported better results with traditional methods using pen and board. In fact, Alturise & Alojaiman (2013) and Wong et al (2012) reported that using a computer in class motivated the students to learn, and gave them information in an interesting way. But students' performance depended on how effectively teachers used computers to design and deliver lessons: Hardy (1998) and Yushau (2006) stated that intensive use of computers and positive attitudes did not guarantee that educators adopted computers successfully as tools of learning and teaching in the classroom. Therefore, as Ermer & Leftwich (2009) state, teachers must have in-depth knowledge of how to use technology to teach parts of the curriculum in order to enhance student learning, such as in student-centred

instruction. To effectively widen the range of educational opportunities that can be offered to students, teachers must therefore maintain a certain level of technological ability. This will allow teachers to be more effective in their work, helping them to communicate easily with students' parents, to maintain records, and to prepare efficient research and presentations (Baylor & Ritchie, 2002). Will et al (2005) emphasised the importance of training teachers effectively as this provides more experience and competency with computers, which can, in turn, enhance their ability to use them. Teachers will need high levels of computer skills, knowledge, competency, and attitudes in order to use technology creatively for learning.

6.3.6 Students and Computers

This study showed that all teachers believe most students have their own computers and can access them from home. They also believe students have more computer confidence than the teachers themselves as they started using computer from an earlier age, so computer experience increased their confidence and skills. These finding are consistent with the earlier studies in chapters 4 and 5, where students displayed strong positive attitudes towards computers, and most of them had access to a computer at home. Furthermore, teachers reported that male and female students were found to be very creative in using computers and to have good skills, as seen when they submit homework or projects which were done using computers.

On the other hand, some teachers argued that there is a small percentage of students who can't access computers from home and so have very little computer skill and experience. There are three probable reasons for students not having access at home. Firstly, the parents' financial situations may be too poor for them to pay for their children to have their own devices or access to the Internet. Secondly, their parents could be strict and want to prevent their children's access to the Internet. As Miliany (2014) suggested, young people's use of the Internet and watching TV is often controlled by their parents, who may grant permission to use them for only limited periods, something which may vary based on culture. As evidence, Saudi teachers were unhappy with the Internet because it contains pornographic websites or clips, tempting students to learn bad things. Therefore, some parents prevented their children from using the Internet. Thirdly, the students themselves do not always have positive attitudes

towards computers: they may have access to devices and the Internet but prefer not to use them.

Regarding parents, teachers suggested that students who have parental encouragement tended to have their own computer or tablet, probably paid for by the parents. Some parents in fact connect with their children by social networking. Also, teachers in this study suggested that students whose parents did encourage them to use computers were more creative. This was indicated in the previous quantitative study (chapter 4): there is a statistical relationship between parents' encouragement of computer use and their children's attitudes to it. Moreover, the teachers suggested that it was not necessary that a student who owned their own computer had parents encouraging them. It could have been that students had argued with their parents to get a computer for them, even against parental wishes.

The study indicated that both male and female students in High School have computer classes but get access to computer labs for their computer class time only; and that they can't get access to the lab or to their own laptop or mobiles in schools at other times as it is not allowed. The qualitative and quantitative studies showed that most students don't access computers in university, especially females who are prevented from using them (chapters 4 and 5). Therefore, students lacking access to computers in school don't get to share their activities or work with their friends and teachers, and can't work together with them. When students do use computers in school they learn from each other and can motivate each other. In addition, if only computer science teachers use the lab other subject teachers can't get access to it either. While they can use computers in the classrooms if they are available or book the resource room to give lessons using computers, they nonetheless need access to the lab in some lessons to do exercises with computers, such as creating charts, drawing or searching and learning individually, and to lead students in how to use computer to learn. Therefore, teachers with limited access in school are not able to direct and teach their students in how to use computers to learn, or direct them to good electronic sources.

6.3.7 Conclusion

To summarise, most Saudi High School teachers in this study have positive attitudes towards computers. Some teachers who have lower computer skills and computer experience had more negative attitudes towards computers. Gender differences were

detected in this study in regards to computer experience, skill, usage and in attitudes towards computers in general. Those female teachers who had lower computer confidence and experience than males did not like having computer workshops. Moreover, some female teachers did not mind living without computers. This study found some factors that affected teachers' attitudes towards computers. These factors were having computer experience and confidence as much as skills, and included the role and importance of computers in their life and in their teaching.

CHAPTER 7.   DISCUSSION AND CONCLUSION

The earlier chapters include collective studies examining the attitudes of students and teachers toward computers. These studies differed in their sample and approach to collecting and analysing data.

This chapter provides a brief discussion on the findings of these previous studies, which also occurred in the previous chapters. The earlier studies, which were carried out in order to identify the attitudes of students and teachers towards computers, concluded with findings that should contribute to the improvement of the use of computers among teachers and students, and to solving difficulties which prevent students and teachers from using computers. This discussion focuses on the major findings of this research and on the ways in which the results relate to the literature.

This chapter also includes a summary of the findings, lists the contributions this study makes to ongoing research, as well as recommendations that can be drawn from the results.

7.1   Discussion

7.1.1   Attitude toward Computers

Saudi university students have a positive attitude toward computers. This study, like most studies, found that students hold a positive attitude toward computers (Stephens & Creaser, 2002; Eyadat, 2006; Teo, 2008; Pamuk & Perker, 2009; Korobili, et al, 2010; Yusuf & Balogun, 2011; Sabti & Chaichan, 2014). Popovich, et al. (2008) suggest that over the past 20 years, daily use of and reliance on computers in relation to various aspects of life has risen. Potentially, this accounts for the shift in attitudes towards computers that has occurred. However, even when people have a positive attitude, it does not necessarily mean that they use it as a learning tool. Saudi students mainly use computers as a form of entertainment and as a tool for communication through chatting and social networking. This finding supports the work of Gsma & Ntt Docomo (2013), who argue that many Saudis access the Internet mostly from their mobile devices mainly for communication and entertainment purposes. According to the CITC (2008)

study, 48% of Saudis were aware of the existence of electronic learning, but only 4% actually used it, while 79% of Saudis had not used the Internet for online shopping.

This suggests that positive attitudes toward computers do not necessary mean that students use it to enhance their learning. Relatively low usage computers for learning can be down to a number of reasons, which are reported by students and teachers in the research. One of the reasons is that lack of access to computers at schools and universities is an issue. Students are not normally able to interact with each other while they learn, and are therefore unable to exchange their IT knowledge and work together as a group. Alharbi (2013) and Oyaid (2009) suggested that the availability of technology in educational institutions is an important factor encouraging both students and educators to use them during their studying approach. In addition, Saudi students lack skills in relation to computer use. Even if some have computer classes at school they actually learn computer literacy rather than using the technology as a part of gaining knowledge and increasing their education. There are important differences in the sorts of teaching approaches which can be used when only the teacher uses the computer, or when the children can use it individually or in groups. If there is not enough equipment for students to use it for very long, they will not benefit. Arabic resources are scarce, and some topics are available on websites which are not certified. So students learn incorrect information and that makes them distrust the Internet and become uninterested in using computers to further their knowledge and research. These barriers confirm the findings by Sabti & Chaichan (2014), who conclude that three barriers exist which affect school students' attitudes, and these are: lack of motivation; lack of skills; and lack of equipment. Some educators don't ask the students to complete homework using computers or a specific programme. They don't ask students because they know that not all students have the ability to do it because some do not have devices at home. So, in this case, the schools should provide the opportunity to students to do so at school in computer labs or provide them with devices to use at home. Another reason is that many educators use computers during class, but they use it in unengaging ways, such as presenting materials and articles using PowerPoint slides. This can make educators reduce their efforts, forcing students to follow the slides rather than interacting with the educator. This finding is consistent with MENA (2013), which reported that students in Saudi Arabia have lower levels of knowledge and skills as the result of the lack of skilled teachers; after all an education system is only as good as its

teachers. Another negative impression of educators is that some believe that using computers in classrooms is not important for all subjects. So, all these can lead to a negative attitude towards computers in general and specifically for learning purposes.

Another finding is that students' attitudes toward computers differs based on their field of study. This is the result of the fact that in some subjects students do not use computers to learn or to complete tasks, which means that they do not have good experience and skills. Their attitude to computers is poor because they feel that computers are unnecessary in their field of study. However, other students who have to use computers frequently as a part of their study, have more positive attitudes towards computers.

Furthermore, people in KSA are not accustomed to using computers in their general life, such as for shopping, finding locations, booking and applying for things. This situation changes when people relocate to developed countries, where they use the Internet for online shopping, booking things, and finding information online. They become more aware of the importance of computers and their benefits, and then computers become part of their life to the point where they are unable to live without them. In developed countries, people can access computers at schools, universities, and libraries, and they use them as a primary tool or learning or for general life.

The home was the first point of access to computers reported by participants, and this was also found in previous studies (Sait et al., 2007 & CITC, 2008).

Smart phones seem to have taken over from computers because people use them to access the Internet and to communicate with each other. A third of children use their smart phones to access the internet (Gsma & Ntt Docomo, 2013). However, Nassuora (2012) found that 82.5% of participants reported that they do not use mobiles for learning. This is a negative finding in that students are using smartphones more frequently and more than computers, but not to enhance their learning.

From the quantitative study, it seems that a large percentage did not want to study Computer Science as a subject. Moreover, some students in the qualitative study believed that no jobs would be available for Computer Science students. Similarly, Liu (2009) argued that the negative attitude towards leaning Computer Science may relate to the concern by students that their body of knowledge following the course will not be

sufficient to equip them for the workplace. On the other hand, some students in the focus group realised that they study Computer Science not because they like it but only for better job opportunities. So, not all students have the knowledge of computer education for job purposes. Some students wanted to choose Computer Science as a subject, but there was no opportunity for them to do so.

To improve attitudes toward using technology in learning, Prokop (2008) suggests that schools use ICT for activities, which can result in better ICT compensation for extra-curricular activities or poorer ICT skills. Also, Liu, (2009) argues that good ICT learning is not just shaped by the provision of computers, but also by the provision of attention and support to students, which can increase confidence using computers. So, undertaking activities at school with computers allows students to learn and interact with technology and this, in turn, allows them to develop lots of ways to use technology and increase their importance to every individual. This finding is in accordance with those of Ermer (2009), who suggests that combining computer skills with a belief in the importance of computers allows the technology's full potential to be reached for teachers as well as students.

On the other hand, students who hold negative attitudes or inferior computer skills cannot achieve success in their work, and may not be considered as desirable for employment since working with technology in an important part of work these days. According to Curley (2013), over a third of respondents reported that English would further their employability, while a third believed that it was computer skills that would do so primarily.

 Increasing the rate of Saudi citizen in high-skilled sectors is still problematic (Gerbich, 2015). The higher growth of Saudi employment in such sectors is partially down to the non-existence of skill-matching the needs of these sectors and educational achievements (Gerbich, 2015). Therefore, the Saudi labour market relies heavily on foreign labour, particularly in the private sector (Alhamad, 2014).

Moreover, teachers need skills in relation to using such technology in order for successful learning to be transferred to students via computers. However, to effectively widen the range of educational opportunities which can be offered to students, teachers should maintain a certain level of technological ability (Baylor & Ritchie, 2002). This will allow teachers to be more effective in their work, helping them to communicate

easily with students and parents, maintain records, and prepare efficient research and presentations.

7.1.2 Computer Experience and Skills

This research suggested that those who grew up with computers from childhood have stronger positive attitudes towards computers and gain skills as their knowledge increases year by year. On the other hand, people who have no idea about computers from their early years usually have more negative attitudes towards computers and are less interested in using them than people accustomed to computers from an early age.

In general, Saudi students have poor computer experience, because many have only been using computers for a few of years. This is caused by the education system, which used to introduce computer education in the curriculum at high school level (age 16 and over) only. Some students did not use computers at school, but started using them at university level. Also, according to the qualitative study there are no facilities to give students a chance to use computers with their teachers during class time, as the computer lab is restricted to basic lessons on how to use computers and not how they can be used for other learning. This is due to the lack of availability of computer labs in schools, with computer literacy being learned from books instead of practical experience. Of course, students can practise what they learn at home with their own computers, but some may not have access to a computer at home. The students are familiar with limited programs, and do not widely use a variety of programs. Therefore, students tend to use computers for entertainment purposes rather than for more useful pursuits.

In addition, according to the qualitative teacher study (chapter 6) and Aldail (2003) teachers are not trained enough to be able to interact with technology, students and curriculum. Also, most of the education institutions in Saudi Arabia don't have access to the Internet (CITC, 2009). However, Almulhim (2014) suggests that a school's inability to offer access, effective training, or technical support, along with the high cost of hardware and software also presents potential barriers to technology use in schools. As Alfahad (2012) and the teachers' focus group study suggest, lack of availability of technology and support and insufficient time to acquire technical skills are considered barriers preventing the use of technology in schools. Teachers have poor computer experience and limited skills, and as such are unable to influence their students. Since

they have a limited use of programmes to perform in the class, they spend a long time opening material. Teachers do not have access to computer labs at school in which to give classes or in which to prepare for their lessons, meaning that students are unable to obtain skills and experience from their teachers while they use computers during class or in a computer lab because it is not an option. This finding supports the research of Alyami (2014), who states that in Saudi Arabia many educators have no experience with computers because of their generation or because they simply do not care to.

This study recommends policies to improve the computer skills of KSA educators and therefore further technology integration in the classroom. This can be done by: (1) making use of computer laptops where educators can prepare class and course content easily, (2) teaching educators how to integrate technology into learning, by applying a teaching framework such as Technological Pedagogical Content Knowledge (TPACK), (3) ensuring that technology integration supports the intended outcomes of the curriculum, and (4) ensuring that only the best quality technological resources are selected.

This study also evidences that some teachers, especially female teachers, do not want to attend computer workshops. On the other hand, the majority of students have positive desires to increase their computer skills, but unfortunately there are no opportunities to do so. This can be provided by schools and universities. A variety of workshops could increase students' abilities with regards to computers and programmes. In addition, teachers should be aware of the importance of technology and the importance of increasing their knowledge of the variety of new programs and methods available to improve the quality of learning. Ertmer & Leftwich (2009) recommend that: educators should be aware of the best technology to match with the desired outcomes of the curriculum and the ways in which it can be used to improve learning to reach these outcomes. This will ensure that students are using the most effective forms of technology to enhance every stage of their learning and that teachers are using the most appropriate technology to increase their abilities as educators. Moreover, it is suggested that greater encouragement should be offered by universities to students in relation to increasing their computer skills. Motivation can be provided during workshops for students and educators, encouraging access to computers, the internet and online resources.

7.1.3 Gender Differences

The most interesting finding is that there are no gender differences in attitudes towards computers either in relation to postgraduate or undergraduate students. This finding is similar to those of a number of studies reporting no gender differences in computer attitudes (e.g. Wong & Hanafi, 2007; Sam, et al., 2005; Tekinarslan, 2008; Alaba et al, 2012; Kar et al, 2014; Agut et al, 2014; Suri & Sharma, 2014 and Rhema & Miliszewska, 2014).

With regards to postgraduate students, females spend a longer time using computers and female undergraduate students seem to use social networking, database and computer assisted learning earlier than males do. This was also found in the study by Gsma & Ntt Docomo (2013), with females in Saudi Arabia being reported to be more likely to use mobile phones for social networking and microblogging than males. This can be explained by the fact that Saudi females spend their leisure time at home, because in Saudi culture females are not allowed to go outside alone at any time. Therefore, they spend time with their devices as a form of entertainment as well as a way to communicate with their friends. This allows females to spend a longer time using social networking earlier than males as they require them more than males. In addition, males argue that females have more leisure time than males and that they spend more time looking for fashion, therefore they spend a longer time using computers. This finding is similar to that of Colley & Maltby (2008), who suggest that women use the Internet more than men, and that they differ in relation to their purpose of use. Females in small cities and rural areas are more confident, less anxious and have more positive attitudes towards computers than males. However, they are less likely to use computers in general, and many do not use social networking and email. This could possibly be explained by the fact that they do not have access to computers at home and university, as most reported that universities do not allow the use of computers inside the campus.

However, even though there are no gender differences between students in the capital city of Saudi Arabia, a belief still exists that computers relate to males, as does programming, while designing relates to females.

Saudi students have a lack access to computers at university level, caused by universities failing to provide computer labs for students or to provide labs even without Internet access. Males are more likely to use computers at university than females,

185

which is explained by the restrictions imposed for girls within universities. This finding supports those of Mahmood (2009) and Li & Kirkup (2007), whose research reported that males have better access to computers at university.

However, a sample of teachers highlights gender differences, with males having more positive attitudes, more experience and better skills with regards to computer use than female teachers. This finding is consistent with that of the study by Powel, (2013) who reported no gender differences with regards to computer anxiety in students at college level, while he did report gender differences between younger and older individuals, with females having higher computer anxiety than males. He also suggested that females at college could have been more goal-orientated or could have been offered better opportunities to use computers than other women.

In addition, male teachers have used computers for a variety of purposes, while female teachers seem to use them primarily for the teaching process. Also, males are more aware of the importance of technology and are more likely to attend computer workshops than females. Other studies support this finding, such as that by Sainz (2014), which reported that both men and women use computers, but their approach differs massively, with men seemingly more aware of the global impact of technology.

7.1.4 English Language

Attitudes towards computers have a strong correlation with English language skills. This statistical finding has been confirmed by the qualitative data. Saudi postgraduate students develop more positive attitudes when they move to the UK for study purposes. As well as postgraduate students, undergraduate students in KSA suggest that computer confidence is synonymous with good English language skills seeing as computers and programmes developed in English, and programming language is English. Moreover, students can benefit from English language websites, which are rich with information. AL-Hunaiyyan et al (2008), Korobili, et al. (2010) and Antonio & Tuffley (2014) suggest that students with knowledge of English reported more positive computer attitudes.

7.1.5 Parents

There is a significant statistical relationship between both the use of computers and the education level of parents and the attitudes of their children towards computers.

Moreover, parents are the second main source of encouragement to use computers. This finding is consistent with those of other studies, such as those by Shashani and Khalili (2001), Avraham (2005), Liu (2009), and Ozyurek et al. (2015), which reported that home computer access in conjunction with parental support helps students build their computer knowledge.

However, students in the focus group were divided when it came to a certain issue. Some argued that their parents are a vital factor because children usually copy their parents and try to do as their parents do. Moreover, they believe that when parents allow access to computers at home this will give them the chance to explore them and gain both experience and skills in using them. On the other hand, others believed that their parents were irrelevant in this respect because they actually used computers before their parents ever did, and sometimes they are the ones who encourage their parents to use computers or smartphones. This could be true when compared with the statistical study, which found that community encouragement is greater than parental encouragement to use computers. Hofested (2010) suggests that Saudi Arabia is collective in nature, characterised by a group mentality, a paramount part of which is loyalty. Thus, community influence is vital, and it is the community which encourages students to use technology as opposed to schools.

As teachers suggested, some parents do encourage their children and bought devices for them to access the Internet. However, they also suggested that some parents were forced by their children to buy such devices for them, like smart phones and tablets, in order to keep up with other children in their society. This is inconsistent with the statistical study, as the community, as discussed above, is the first source of encouragement over parental encouragement. Therefore, this indicates that parents did not necessarily purchase computers to encourage their children, but did so because their children encouraged them to buy them. Teachers also suggested that some students do not have access to computers at home because they come from low income families unable to provide devices or Internet access. However, some parents are strict and do not allow their children, and especially females, to access computers. This can be explained by the culture in Saudi Arabia, part of which is finding it difficult to accept new ideas, instead opting to follow tradition and convention. Therefore, innovation is considered inferior to tradition.

Saudi Arabia is an Islamic country, which forbids relations between females and stranger males. This makes parents very strict with their children in relation to using computers and the Internet, which is especially true for females. This is consistent with the findings of the study by Miliany (2014), which found that parents are worried about their children as teachers have suggested that the Internet opens up the world, and that it can be lead children to dangers. Gsma & Ntt Docomo (2013) confirm this, arguing that more than half of the respondent parents were worried about the smartphone use of their children, and that almost all parents were concerned that their children would use them to view inappropriate content.

Students reported that there are still restrictions for girls in relation to using computers, in that many parents do not allow their daughters to post photographs online, chat or make friends with male strangers. Further to this, some do not allow the use of social networking sites, like Facebook and Twitter. However, some families do not allow their children, and especially girls, to use computers and the internet at all. For this reason, Docomo (2013) found that females were more than males likely private profiles on such networking sites. Leading on from this, many parents are just as worried about the use of privacy settings on such sites.

However, these restrictions are not limited to the family and home environment, but are also present within institutions banning females from bringing and using their computers or tablets. Moreover, females students in small cities are prohibited from using smart phones inside universities. Although there are more restrictions for females than males, the statistical result reported no gender differences in students' attitudes toward computers.

Some students argue that parents do not necessary influence their children because they started to use computers before their parents and actually taught them how to use computers. The study by Gsma & Ntt Docomo (2013), which was conducted among Saudis, agrees that children use the Internet and social networking more than their parents.

The quantitative study shows that fathers are more educated and use computers more than mothers, which is why most children in the study by Almogbel et al. (2015) went to their fathers for information rather than their mothers. This suggests that parents, and especially mothers, should be educated more in computer use.

Parents with computer knowledge and skills are more comfortable with their children using the internet if they are well-versed in the workings of the Internet and security settings.

7.1.6 Different Between Students Based on Cities

The quantitative study shows that evidence exists that students in the capital city have more positive attitudes towards computers, and have more experience than students from small cities. Small city students have less computer skills and fewer awareness in the importance and usefulness of computers than students from the capital city. The findings from Menachemi et al. (2007) matched this, and arguing that the size of the city and population are the main causes of the differences between urban and rural areas, and that most people who live in rural areas have poorer attitudes towards using technology in general, with many of them not even using technology for communication, such as sending emails.

In both studies, quantitative and qualitative, the parents of capital city students are less educated than the parents of students from smaller cities. This results in poorer attitudes towards computers for small city students as there is no encouragement from their parents to use computers. Family income can reflect the availability of technology at home. According to Almogbel, et al. (2015), Riyadh is where the wealth in Saudi Arabia is concentrated. So, more educated parents in the capital have better knowledge of technology and higher incomes, leading to better opportunities for both parents and students to use technology.

In addition, according to Al-Silami (2010) and Menachemi, et al. (2007), most large Saudi Arabian cities have a multicultural population with varied backgrounds. This differs from the typical population of smaller cities, towns, and villages, which contain many Bedouin families who have special practices and different morals. Therefore, as Saudi students have more encouragement from communities, this suggests that the community in the capital city, which is a mixed culture and more open to new technology, is a more modern society which influences its members, while in smaller cities people are less educated, do not mix with other cultures, and find it hard to accept new technology.

Poorer computer attitudes in small city students could relate to the availability of technology at schools and universities. According to Saqlain (2013), who conducted a study in Sabt Al-Alaia, a small city located in the south of the country, local schools do not have the same technology as schools in bigger cities, and both better technology and greater funding is required in such schools in this area and other similar areas. Moreover, the research found that educators in these schools showed a willingness to integrate technology into education, but did not have the chance to do so. Also, possibly there is no access to technology at home or in public. As reported by CITC (2009), the majority of Internet users in Saudi Arabia were located in the major large cities, and in some areas increases are not reflected. In large cities, access to the Internet is greater; it is higher quality and this positively impacts on the levels of education in these cities, which is generally higher (Sait et al., 2007; Al-Silami, 2010), while in rural areas, often there are fewer opportunities to access technology and other resources (Menachemi et al., 2007).

7.2 Contributions

1. This is the first major study of KSA university students' attitudes toward computers. There have been many previous studies conducted around the world but, as discussed in the literature, different cultures produce different results. This study observes male and female Saudi undergraduate students with a sample of 1,073, from different fields of study and from different universities.

   There are two comparable studies which were conducted among Saudi students. One study by Oshan and Khudair, (2008), was restricted to undergraduate students at one university (King Saud University in Riyadh) and from the Science and Humanities College, considered measuring their attitude toward the Internet. This study adapted the Internet Attitude Scale (Tsai et al., 2001), which covers four subscales: perceived usefulness, affection, perceived control and behaviour, and each subscale included 5 statements. The other study was by Alharbi, (2010) which was conducted to measure attitudes of students at King Abdulaziz university (in Jeddah) toward E-learning, using the Perceptions and Attitude Toward E-learning scale (Ajzen, 1985, Davis, 1989, Moore and Benbasat, 1991 and Stoehl and Lee, 2003), which covered five subscale: perceived ease of use, perceived usefulness, perceived flexibility, perceived interactivity and perceived accessibility.

2. This is the first study within KSA to examine the relation between the attitudes of students and their parents to computers, and the impact of parental encouragement.

3. This study is the first study whose sample includes university students from the capital city of Saudi Arabia (Riyadh) and from other small and ono major cities (Majmaah, Kharj and Hail), to allow comparison between the two groups regarding attitudes toward computers.

4. This study is the first which includes qualitative and quantitative studies conducted among university students to find description and details of their attitudes to computers, computer use, experience, and their skills. This gives us a chance to compare the findings from both types of study and to find reasons and explanations behind the numbers.

5. This research in computer attitudes is a first collective study among university students and school teachers in KSA.

6. This study is the first to find that parents in KSA culture have a strong role in their children's use of and positive attitude to computers.

7. The study found differences between students from the capital city and students from other non-major cities in KSA in attitudes toward computers. The study suggests that these differences result from differences between parents' education and use of computer in the different kinds of city.

8. The finding of this study contribute to improving the education system in KSA and to increase the quality of learning that students can have using new technologies.

7.3   Research Questions

The following questions have been answer by the result of this research:

1. **What are Saudi undergraduate students' attitudes towards computers? (Chapters 4 and 5)**

   The study reports that Saudi undergraduate students have positive attitudes toward computers. Also, the study shows there is a strong positive relationship between English language skills, field of study, and attitudes to computers.

   The study also confirms that Saudi undergraduate students use computers for communication by chat programs, email or social networking, and they use computers for entertainment mainly rather than for education. Therefore, they have a high experience level in each of email, Internet, Word and social networking. In

addition, Saudi students have less experience in some computer tasks which are important such as: database, spreadsheets, computer assisted learning and programming.

2. **Are there any differences based on gender in Saudi undergraduate students' attitudes towards computers? (Chapters 4 and 5)**

There are no gender differences among Saudi undergraduate students. Both genders have similar attitudes to computers, computer anxiety, skills and confidence. Females in the small cities have more positive attitudes toward computer but this finding is not significant.

However, females have rated themselves as having higher level of experience than males in some computer tasks such as email, internet, Word, database, spreadsheets and computer assisted learning.

3. **Are there any relationships between attitudes toward computers and computer experience? (Chapters 3, 4 and 5)**

The study suggests strong relationships between computer experience and attitudes toward computers. More computer experience results in stronger positive attitudes towards computers.

4. **How does parental education level, school of study and English language knowledge affect Saudi students' attitudes to computers? (Chapters 3, 4 and 5)**

The study reports that in Saudi Arabia parents' education level and their attitude to and use of computers all have a strong effect on their children's attitudes toward computers. Parents who have a high education level and positive attitude toward computers pass a more positive attitude toward computers on to their children than parents who are uneducated or hold negative attitudes toward computers. In addition, English language knowledge is related strongly to attitudes toward computers. More English knowledge results in more positive attitudes towards computers.

5. **Are there any differences between students in different geographic areas in their attitudes towards computers, encouragement to use computers, computer skills and computer experience? (Chapters 4 and 5)**

The study suggests differences between university students based on the kind of city they live in. Students in the capital city have a stronger positive attitude toward computers than students in the small cities. This result could be caused by the parents, as from the study parents have strong effects on their children's computer attitudes. The parents of students from small cities seem to be less educated, a high percentage of them don't use computers, and they offer less encouragement to their children to use computers.

6. **What are Saudi teachers' attitudes towards computers? (Chapter 6)**

Teachers have strong positive attitudes toward computers, and most use them in their teaching process. However, teachers suffer from the lack of availability of technologies and the lack of training to use these technologies in the teaching process. These weaknesses in the education system result in limited use of computers among teachers, and prevent teachers and students from interacting with computers during classes. This can then impact on students' attitudes to computers, leaving them preferring to use computers for entertainment rather than learning, as they are not aware enough about using a computer as a tool of learning.

7. **Are there any gender differences among Saudi teachers' attitudes towards computers? (Chapter 6)**

The study confirmed that there is a gender difference in attitude toward computers among Saudi High school teachers, with male teachers having more positive attitudes toward computers, more experience and more confidence in computer usage.

7.4 Research Hypothesis

*1.	Saudi undergraduate students have positive attitudes towards computers, but male students have stronger attitudes than female, males are more confident and less anxious than females.(Related to research question 1,2 and 3)*

This hypothesis have been rejected by this study as male and female have similar attitudes toward computer. Both women and men show the same level of computer anxiety, confidence, liking and usefulness. They have low computer anxiety, and a high level of computer confidence, liking and perception of usefulness.

*2.	The children of parents who have use computers and seem to have a positive attitude toward computers, or have high education levels, have stronger positive attitudes to computers, than children of parents who don't use computer. (Related to research question 4)*

This hypothesis has been accepted as the result suggested there is a relationship between parents' computer use and their children's attitudes toward computers. Students who reported that their parents use a computer have a higher computer attitude score than those who reported that their parents don't use computers.

*3.	Students from the capital city have more positive attitude toward computers than students from other cities which are smaller and whose students who come from villages. (Related to research question 5)*

This hypothesis has been accepted as the result shows that students from the capital city have a more positive attitude toward computers than students from small cities. Students in the capital city use computers much earlier and for longer than students in the other cities. In addition, the cross tab test shows significant differences between students in the capital city and students in the small cities in terms of parents' education level. Parents of students in the capital city seem to be more educated than those from the small cities.

7.5   Recommendations

The findings of this study lead to recommendations to improve the education system in Saudi Arabia, to increase the awareness of the importance of computers in learning and teaching, and to increase the educational use of computers by Saudi students located in any area of the country. These recommendations are listed below.

1.	The availability of computers in schools and universities should increase. This is to give all students access to computers and the Internet for learning purposes from their institutions. It would allow them to use computers in their free time, as well as make them interact with their teachers or with other students.

2.	More computer courses should be given to students to enhance their knowledge of computers and how to use them from an early age of study. Saudi students start leaning computer literacy at High School: this is too late for such an important

source and tool of learning; starting earlier also helps to instil positive attitudes about computers as well. Students should start using and learning about computers from an earlier age, in schools, as a part of the education curriculum.

3. Because English language is an important factor in shaping students' attitudes toward computers, computer education should help students understand familiar English words in computing. This will make them more confident and less anxious when they use computers.

4. The education system should ensure that every teacher has enough skills and knowledge of their technology to enhance their students' learning. Teachers should be able to use computers in different and varied ways in order to make the technology useful and enjoyable for students, and understand how to use technology to support learning. This method also will make the students aware about using computers in education and learning and will encourage them to explore more ideas in self-learning.

5. Parents should be made more aware of the potential benefits and importance of computers in everyday life. If they are better informed about potential risks of internet usage and skilled in online safety, they will be better able to guide their children to positive computer experiences. This responsibility can be given to schools as they need to make every students use computers and encourage parents to help. So schools should provide workshops or meetings to give parents ideas about how to make their children safe when they use the internet - for example by installing programs to ensure their children will not access forbidden websites.

6. The Saudi government and companies should support online services and Arabic learning sources for both adults and children. The more such sources are available, the more students will be encouraged to use computers, and they will be likelier to use them for learning.

7. The government of KSA should increase career opportunities, services, development and facilities in every city and town. This can address the poverty and increase the knowledge of people inside small cities and rural. The Ministry of Education should make intensive efforts to improve learning strategies in all cities. This can be through improved technology infrastructure and teacher training in all areas.

7.6 Limitations and Further Work

1. There is a lack of availability of references about Saudi Arabia. There is little up to date information about technology use in Saudi Arabia, Internet use, use of computers among Saudis or among institutions, or people's incomes by cities and rural and urban areas.

2. This research includes samples from the capital city and from three small cities, so it doesn't cover many cities in KSA. Further research should take samples from other cities in a different regional area, as KSA is a huge country and its regions and cities have widely varying levels of development, and different availability of services and facilities provided by government or industries.

3. Further research should be conduct to measure the attitudes of people who live in the rural areas around KSA toward technology including young people who don't attend university.

4. The research was conducted among university students; a further study should examine school students of different ages, within qualitative and quantitative methods.

5. This research conducted qualitative studies among teachers. Another quantitative study should be conducted for more statistical evidence about teachers' attitudes toward computers, and to compare their attitudes with students attitudes. Also, the study should include teachers from primary, intermediate and secondary schools.

6. This study was conducted within the Saudi context. Comparison between Saudi culture and other cultures should be considered to gain more evidence about students' attitudes toward computers and the factors that can affect them. So the same instrument used in this research should be applied to measure student attitudes in another country to ensure comparisons are not affected by different methodology.

7. A comparison between Saudi Arabia with other developing countries which have different economies and culture should be conducted to find out whether these countries are similar or differ in terms in using technology.

8. A link of qualitative and quantitative studies should be designed to explore children's experience, confidence, skills and attitudes to computers and compare their attitudes with their parents' and teachers' to find out critical factors and effects.

9. In this study, students self-rated their level of experience. Another practical observational experiment should measure students' ability to perform a range of tasks.

7.7 Conclusion

The main contribution of this study is in investigating the attitudes of both teachers and students within the Saudi context. It has combined the mixed methods of large quantitative data and a number of qualitative studies. Also, the study compared students in different cities in KSA regarding their attitudes to computers, computer experience and use.

The main finding of this research is that Saudi undergraduate students have a positive attitude towards computers. Parents' education and attitudes towards computers, English language, and computer experience all have significant effects on students' attitudes towards computers. Students would benefit from additional computer skills and experience. This situation is even more critical with students in smaller cities. These findings have led to recommendations for some improvements in education polices for students and teachers, which will serve to increase the successful integration of technology in education establishments and to increase the use of computers.

The educational use of computing in KSA requires increased availability of computers; provision of computer workshops for students and educators starting from early education levels and extending to the higher education; and encouragement and training of students to use computers in learning methods in order to be successful.

APPENDIX 1

Sample Informed Consent form for Participants to be Interviewed as Part of the

Pilot Study

'UK/Saudi Postgraduate Students' Attitudes to Computer'

As a research student at Heriot-Watt University, you have been invited to take part in a research study which investigates UK/Saudi students' attitudes toward computers and their experiences of using computers in education. This involves an interview of approximately 35 minutes. The interview will be anonymised and will not be shared with any other party.

If you agree to take part, please sign below.

_____

Signature

Many thanks for your time.

Manal Alothman

PhD student

Computer science

Heriot Watt University

APPENDIX 2

Codes and Definitions: Postgraduate Student Interviews

Free Nodes

Time spent with computer: how long the student spends using a computer.

Subject: subject of study.

Smart phones: whether or not the student owns a smartphone and if so what applications they utilise.

Own computer: whether or not the student owns a personal computer.

English language knowledge: the student's opinion of the importance of English language for using computers.

Age:

Tree Nodes

Using Computers in Education Sectors

Using computers for study or learning: whether or not the student uses computers for learning.

Using computers at school: whether or not the student had access to computers at school.

Using computers in university: whether or not the student has access to computers at university.

Using computers for homework: whether or not the student likes doing homework using a computer.

Availability of computer labs in university: whether or not there are computer labs in the student's university.

Sex differences

Reasons girls spend more time with computers: why girls spend more time using computers than boys.

Restrictions on girls' use of computers: whether or not there are restrictions on girls' computer use and what they are.

Differences in encouragement offered to girls and boys: whether or not there are gender differences in the encouragement parents offer their children.

Boys do better than girls: whether or not boys have better computer skills than girls.

Purposes

Reasons computers are used for entertainment: whether or not the student uses computers for entertainment more than for learning.

Purposes of computer use: the student's most common computer uses.

Purposes of computer use in the past: the purpose of the student's first computer use.

Opportunities to study computers

Preference to study computer science: why the student chose to study computers or not.

Having more computer skills: whether or not the student would like to have more computer skills.

Experience

Where the student used a computer for the first time.

When the student used a computer for the first time.

What the student felt when using a computer for the first time.

Encouragement

Why you chose to study computers: (for computer science students) what encouraged the student to study computer science.

Parents

Who bought computer for you: how students get their own computer.

Parents use computer: if their parents use computer or not

Parents affect their children: their opinion on parents have an effect on their children to use computer

Do parents encourage: if their parents encourage them to use computer or not.

Confidence

Computer skills: the practical computer skills the student possesses.

APPENDIX 3

Questionnaires to Measure Saudi Undergraduate Students' Attitudes to Computers

Part 1: Demographic Questions

Age: Gender:

Field of study: Year of study:

_____

1.   What is Your English Language level?

excellent very good   good   limited   no knowledge

2.   What is your parents' education level?

uneducated   primary school   intermediate school   high school   university

3.   Do your parents use computers?

yes   no

4.   Do your parents encourage you to use computers?

yes   no

5.   What other factors encourage you to use computers?

school   parents   friends   community   other

6.   Where do you use a computer?

home   university   internet café   library   other

7.   Where did you first use a computer?

home   school   university   internet café   library   other

8.   Please number these computer applications by how often you use them. (1=most, 4=least)

social networking   education   entertainment   shopping

9. Would you undertake further study of computer science if you had the opportunity?

yes   no

10. Would you like to take a computer literacy course?

yes   no

Part 2: Gender Beliefs (5 Likert Scale)

1. It's hard to believe that women or girls could be computer geniuses.

2. Girls who enjoy using computers are a little weird.

3. Women certainly are logical enough to use computers.

4. I would trust a woman just as much as a man to figure out how to operate a computer.

5. In general, boys are better than girls at using computers.

6. Girls can do just as well as boys at using computers.

Part 3: Computer Attitude Scale (CAS) (5 Likert Scale)

Computer Anxiety:
 1. Computers do not scare me at all. (reversed)
 2. Working with a computer would make me very nervous.
 3. I do not feel threatened when others talk about computers. (reversed)
 4. I feel aggressive and hostile toward computers.
 5. It wouldn't bother me at all to take computer courses. (reversed)
 6. Computers make me feel uncomfortable.
 7. I would feel at ease in a computer class. (reversed)
 8. I get a sinking feeling when I think of trying to use a computer.
 9. I would feel comfortable working with a computer. (reversed)
 10. Computers make me feel uneasy and confused.

Computer Confidence:
 1. I am no good with computers. (reversed)

2. Generally I would feel OK about trying to solve a new problem on the computer.

3. I don't think I would do advanced computer work. (reversed)

4. I am sure I could do work with computers.

5. I am not the type to do well with computers. (reversed)

6. I am sure I could learn a computer language.

7. I think using a computer would be very hard for me. (reversed)

8. I could get good grades in computer courses.

9. I think I do not think I could handle a computer course. (reversed)

10. I have a lot of self-confidence when it comes to working with computers.

Computer Liking:

1. I would like to work with computers.

2. The challenge of solving problems with computers does not appeal to me. (reversed)

3. I think working with computers would be enjoyable and stimulating.

4. Figuring out computer problems does not appeal to me. (reversed)

5. When there is a problem with a computer run that I can't immediately solve, I would stick with it until I have the answer.

6. I don't understand how some people can stand so much time working with computers and seem to enjoy it. (reversed)

7. Once I start to work with the computer, I would find it hard to stop.

8. I will do as little work with computers as possible. (reversed)

9. If a problem is left unresolved in a computer class, I would continue to think about it afterward.

10. I do not enjoy talking with others about computers. (reversed)

Computer Usefulness:

1. I will use computers in many ways in my life.

2. Learning about computers is a waste of time. (reversed)

3. Learning about computers is worthwhile.

4. I'll need a firm mastery of computers for my future work.

5. I expect to have little use for computers in my daily life. (reversed)

6. I can't think of any way in which I will use computers in my career. (reversed)

7. Knowing how to work with computers will increase my job possibilities.

8. Anything that a computer can be used for, I can do just as well some other way. (reversed)

9. It is important to me to do well in computer classes.

10. Working with computers will not be important to me in my life's work. (reversed)

Part 4: Experience

1. For how many years have you used a computer?

2. For how many hours in a week do you use a computer at home?

3. For how many hours in a week do you use a computer at university?

4. Please complete the following:

	How many hours per week do you spend on each of these?	For how many years have you used each of these?	Please rate your level of experience? 0=none, 1=novice, 2=good, 3=expert
E-mail			
Internet			
Computer games			
Word processing			
Databases			
Spreadsheets			
Computer-assisted learning			
Programming			
Social networking			
Other software			

APPENDIX 4

Questionnaires for the quantitative study - Arabic version

طلب تعبئة استبانة

عنوان البحث: "اتجاهات طلبة البكالوريوس نحو الكمبيوتر والعوامل المؤثرة في ذلك"

اخي الطالب/ الطالبة:

يهدف هذا الاستبيان الى التعرف على اتجاهات طلاب المرحلة الجامعية نحو استخدام الكمبيوتر. لذا

امل التكرم بالاجابة على الاسئلة بكل دقة و صراحة.اذا لم يكن لديك رغبة في الاجابة عن سؤال معين

لاي ظرف يمكنك تركه فارغا ثم الانتقال الى السؤال الذي يليه

ستعامل البيانات و الاجابات بكل سرية، ولن تستخدم لغير غرض البحث.

اشكر لكم تعاونكم''

منال العثمان

لاستفساراتكم

hotma@1alothman_lm.com

206

اجب عن الاسئلة الاتية بوضوح ودقة مع الحرص على عدم ترك السؤال بدون اجابة

الجزء الاول/اسئلة عامة:

- العمر:
- الجنس:
- السنة الدراسية(المستوى):
- التخصص:

_____

- ما هو مستواك في اللغة الانجليزية

☐ممتاز.   ☐جيد جداً.   ☐جيد.   ☐محدود.   ☐لا اجيد الانجليزية

- مستوى التعليمي لابويك:

الام:

☐أميّ   ☐ابتدائي.   ☐متوسط.   ☐ثانوي.   ☐جامعي

الاب:

☐أميّ   ☐ابتدائي.   ☐ متوسط.   ☐ ثانوي.   ☐ جامعي

- هل يستخدم ابويك الكمبيوتر

الام: ☐نعم.   ☐لا

الاب:☐نعم.   ☐لا

- هل شجعك/يشجعك ابويك على استخدام الكمبيوتر

☐نعم   ☐لا

- من شجعك على استخدام الكمبيوتر(اختر <u>اجابة واحده</u> فقط)

☐المدرسة   ☐ العائلة   ☐ الأصدقاء.   ☐ المجتمع☐   غير هذه الخيارات

- اين تستخدم الكمبيوتر (اختر <u>اجابة واحده</u> فقط)

☐في البيت   ☐المدرسة   ☐في الجامعة.   ☐مقهى انترنت.   ☐ المكتبة اخرى

- اين كان استخدامك الاول للكمبيوتر(اختر <u>اجابة واحده</u> فقط)

☐في البيت.   ☐في الجامعة.   ☐ مقهى انترنت.   ☐المكتبة   ☐اخرى

- <u>رتب اغراض</u> استخدامك للكمبيوتر حسب الاكثر غرض تستخدم الكمبيوتر لاجله (1 لاكثر غرض تستخدم الكمبيوتر لاجله، 4 لاقل غرض تستخدم الكمبيوتر لاجله)

☐مواقع الشبكات الاجتماعية.   ☐التعلم.   ☐التسلية.   ☐ التسوق

- هل تود الدراسة في تخصص الحاسب الآلي اذا توفرت لك

☐ نعم   ☐ لا

- هل تحب ان تتعلم بعض مهارات الكمبيوتر عن طريق الدورات

☐ نعم   ☐ لا

_____

الجزء الثاني: اختر اجابة واحده من احد الاختيارات الخمسة حسب موافقتك للعبارة

1. من الصعب تصديق ان المرأة او الفتاة قد تكون عبقرية في الكمبيوتر

☐اوافق بشدة   ☐اوافق   ☐محايد   ☐لا اوافق   ☐لا اوافق بشدة

2. الفتاة التي تستمتع باستخدام الكمبيوتر غريبة قليلاً

☐اوافق بشدة   ☐اوافق   ☐محايد   ☐لا اوافق   ☐لا اوافق بشدة

3. المرأة بالتأكيد منطقية كفاية حتى تستخدم الكمبيوتر

☐اوافق بشدة   ☐اوافق   ☐محايد   ☐لا اوافق   ☐لا اوافق بشدة

4. انا اثق بان المرأة كالرجل في معرفة كيفية تشغيل الكمبيوتر

☐اوافق بشدة   ☐اوافق   ☐حايد   ☐لا اوافق   ☐لا اوافق بشدة

5. عموما، الأولاد افضل من البنات في استخدام الكمبيوتر

☐اوافق بشدة   ☐اوافق   ☐محايد   ☐لا اوافق   ☐لا اوافق بشدة

6. البنات يستطعن استخدام الكمبيوتر كما يستخدمه الأولاد تماماً

☐اوافق بشدة   ☐اوافق   ☐محايد   ☐لا اوافق   ☐لا اوافق بشدة

الجزء الثالث: اختر اجابة واحده من احد الاختيارات الخمسة حسب موافقتك للعبارة

1. الحاسب الآلي لا يخيفني

☐اوافق بشدة   ☐اوافق   ☐محايد   ☐لا اوافق   ☐لا اوافق بشدة

2. لا احسن استخدام الحاسب الآلي

☐اوافق بشدة   ☐اوافق   ☐محايد   ☐لا اوافق   ☐لا اوافق بشدة

3. ارغب استخدام الحاسب الآلي

☐اوافق بشدة   ☐اوافق   ☐محايد   ☐لا اوافق   ☐لا اوافق بشدة

4. سوف استخدم الحاسب الآلي بأساليب متعددة في حياتي العملية

☐اوافق بشدة   ☐اوافق   ☐محايد   ☐لا اوافق   ☐لا اوافق بشدة

5. العمل على الحاسب الآلي يجعلني عصبيا جداً

☐اوافق بشدة   ☐اوافق   ☐محايد   ☐لا اوافق   ☐لا اوافق بشدة

6. بشكل عام ارتاح لمحاولة حل مشاكل جديدة باستخدام الحاسب الآلي

☐اوافق بشدة   ☐اوافق   ☐محايد   ☐لا اوافق   ☐لا اوافق بشدة

7. التحدي لحل بعض المسائل بالحاسب الآلي لا يناسبني

☐اوافق بشدة   ☐اوافق   ☐محايد   ☐لا اوافق   ☐لا اوافق بشدة

8. تعلم الحاسب الآلي مضيعة للوقت

☐اوافق بشدة   ☐اوافق   ☐محايد   ☐لا اوافق   ☐لا اوافق بشدة

9. لا انزعج عندما يتحدث الآخرون عن الحاسب الآلي

☐اوافق بشدة   ☐اوافق   ☐محايد   ☐لا اوافق   ☐لا اوافق بشدة

10. لا اعتقد اني ارغب في استخدام مهارات الحاسب الآلي المتقدمة

☐اوافق بشدة   ☐اوافق   ☐محايد   ☐لا اوافق   ☐لا اوافق بشدة

11. اعتقد ان العمل مع الكمبيوتر ممتع و مشجع

☐اوافق بشدة   ☐اوافق   ☐محايد   ☐لا اوافق   ☐لا اوافق بشدة

12. تعلم الحاسب الآلي جدير للاهتمام

☐اوافق بشدة   ☐اوافق   ☐محايد   ☐لا اوافق   ☐لا اوافق بشدة

13. اشعر بعدوانية اتجاه الحاسب الآلي

☐اوافق بشدة ☐اوافق ☐محايد ☐لا اوافق ☐لا اوافق بشدة

14. بكل تأكيد استطيع ان اقوم بعملي باستخدام الحاسب الآلي

☐اوافق بشدة ☐اوافق ☐محايد ☐لا اوافق ☐لا اوافق بشدة

15. حل مشاكل الحاسب الآلي لا يروق لي

☐اوافق بشدة ☐اوافق ☐محايد ☐لا اوافق ☐لا اوافق بشدة

16. سوف احتاج لبراعة في الحاسب الآلي لعملي في المستقبل

☐اوافق بشدة ☐اوافق ☐محايد ☐لا اوافق ☐لا اوافق بشدة

17. لا يزعجني ان ادرس مواد الحاسب الآلي

☐اوافق بشدة ☐اوافق ☐محايد ☐لا اوافق ☐لا اوافق بشدة

18. لست من النوع الذي يحسن استخدام الحاسب الآلي

☐اوافق بشدة ☐اوافق ☐محايد ☐لا اوافق ☐لا اوافق بشدة

19. عند حدوث خلل او مشكلة في الحاسب الآلي ولا استطيع حله في الحال، فاني أحاول المواصلة حتى اجد حل

☐اوافق بشدة ☐اوافق ☐محايد ☐لا اوافق ☐لا اوافق بشدة

20. اتوقع ان يكون استخدامي للحاسب الآلي قليل في حياتي اليومية

☐اوافق بشدة ☐اوافق ☐محايد ☐لا اوافق ☐لا اوافق بشدة

21. الحاسب الآلي يشعرني بعدم الارتياح

☐اوافق بشدة ☐اوافق ☐محايد ☐لا اوافق ☐لا اوافق بشدة

22. بكل تأكيد أسطيع تعلم لغة البرمجة

☐اوافق بشدة ☐اوافق ☐محايد ☐لا اوافق ☐لا اوافق بشدة

23. استغرب ان يقضي البعض وقتا طويلا بالعمل على الحاسب الآلي ويبدو انهم يستمتعون بذلك

☐اوافق بشدة ☐اوافق ☐محايد ☐لا اوافق ☐لا اوافق بشدة

24. لا استطيع ان افكر بأي طريقة لاستخدام الحاسب في مهنتي

☐اوافق بشدة ☐اوافق ☐محايد ☐لا اوافق ☐لا اوافق بشدة

25. اشعر بالراحة في مادة الحاسب الآلي

☐اوافق بشدة ☐اوافق ☐محايد ☐لا اوافق ☐لا اوافق بشدة

26. اعتقد ان استخدام الحاسب الآلي صعب جداً بالنسبة لي

☐اوافق بشدة ☐اوافق ☐محايد ☐لا اوافق ☐لا اوافق بشدة

27. عندما أبدا بالعمل على الحاسب الآلي يصعب علي التوقف

☐اوافق بشدة ☐اوافق ☐محايد ☐لا اوافق ☐لا اوافق بشدة

28. معرفة العمل بالحاسب يزيد من احتمالات حصولي على العمل

☐اوافق بشدة ☐اوافق ☐محايد ☐لا اوافق ☐لا اوافق بشدة

29. اشعر بالإحباط او عدم الطمأنينة عندما افكر في محاولة استخدام الحاسب الآلي

☐اوافق بشدة ☐اوافق ☐محايد ☐لا اوافق ☐لا اوافق بشدة

30. استطيع الحصول على درجات مرتفعة في مواد الحاسب الآلي

☐اوافق بشدة ☐اوافق ☐محايد ☐لا اوافق ☐لا اوافق بشدة

31. سوف اقوم بالحد الأدنى لاستخدام الحاسب الآلي

☐اوافق بشدة   ☐اوافق   ☐محايد   ☐لا اوافق   ☐لا اوافق بشدة

32. اي شئ يمكن ان يستخدم به الحاسب الآلي استطيع ان اقوم به باي طريقة اخرى

☐اوافق بشدة   ☐اوافق   ☐محايد   ☐لا اوافق   ☐لا اوافق بشدة

33. اشعر بالارتياح عند العمل بالحاسب الآلي

☐اوافق بشدة   ☐اوافق   ☐محايد   ☐لا اوافق   ☐لا اوافق بشدة

34. لا اعتقد اني استطيع دراسة الحاسب الالي

☐اوافق بشدة   ☐اوافق   ☐محايد   ☐لا اوافق   ☐لا اوافق بشدة

35. اذا لم تحل مشكلة في مادة الحاسب الآلي، فاني استمر في التفكير فيها

☐اوافق بشدة   ☐اوافق   ☐محايد   ☐لا اوافق   ☐لا اوافق بشدة

36. مهم بالنسبة لي ان أحقق مستوى جيدا في مادة الحاسب الآلي

☐اوافق بشدة   ☐اوافق   ☐محايد   ☐لا اوافق   ☐لا اوافق بشدة

37. الحاسبات الآلية تجعلني اشعر بالقلق وبتشويش الذهن

☐اوافق بشدة   ☐اوافق   ☐محايد   ☐لا اوافق   ☐لا اوافق بشدة

38. اشعر بكثير من الثقة بالنفس عند التعامل مع الحاسب الآلي

☐اوافق بشدة   ☐اوافق   ☐محايد   ☐لا اوافق   ☐لا اوافق بشدة

39. لا استمتع بالحديث مع الاخرين حول الحاسب الآلي

☐اوافق بشدة   ☐اوافق   ☐محايد   ☐لا اوافق   ☐لا اوافق بشدة

40. العمل باستخدام الحاسب لن يكون مهما لي في حياتي العملي

☐اوافق بشدة   ☐اوافق   ☐محايد   ☐لا اوافق   ☐لا اوافق بشدة

_____

الجزء الرابع:

▪ منذ كم سنة وانت تستخدم الكمبيوتر

▪

▪ كم ساعة في الاسبوع تستخدم الكمبيوتر في البيت

▪

▪ كم ساعة في الاسبوع تستخدم الكمبيوتر في الجامعة

▪

▪ الرجاء اكمال الجدول التالي

كيف تقيم مستوى خبرتك من 0= لايوجد،1=مبتدئ، 2=جيد،3=خبير؟	كم ساعة في الاسبوع تستغرق في كل من الوارد؟	منذ كم سنة وانت تستخدم كل من الوارد؟	
			ايميل
			انترنت
			العاب الكمبيوتر
			برنامج وورد
			القواعد البيانيةDatabases
			برامج الجداول البيانية مثل اكسل
			التعلم بمساعدة الكمبيوتر
			برمجه
			مواقع التواصل الاجتماعي
			برامج اخرى

APPENDIX 5

Sample of consents obtained from universities to conduct the study in Saudi Arabia

1. Consents from Ministry of Education to conduct the focus group with teachers

2. Consents from Hail University to conduct the study with students

Kingdom of Saudi Arabia
Ministry Of Higher Education
University Of Hail

المملكة العربية السعودية
وزارة التعليم العالي
جامعـــة حائـــل

مكتب وكيل الجامعة

سعادة الملحق الثقافي السعودي بـبريطانيا   سلمه الله

السلام عليكم ورحمة الله وبركاته ... وبعد:

نفيد سعادتكم بأنه لا مانع لدى جامعة حائل من السماح لطالبة الدكتوراه/ منال عثمان العثمان من القيام بدراسة بحثية تتعلق بدراسة توجهات ورغبة طلاب وطالبات البكالوريوس في إستخدام الحاسب الآلي والاستفادة منه في التعليم وخاصةً إستخدام الشبكة المعلوماتية الأنترنت في البحث العلمي على عينة من طلاب وطالبات الجامعة.

ولسعادتكم فائق الاحترام والتقدير .....

وكيل الجامعة المكلف

د. أحمد مهجع الشمري

الرقم: ٢٤/ ٧/ ٩٠٨   التاريخ: ٢٦ /٢/ ٣٣٤١هـ   المرفقات: ــ ـ ـ

213

3. Sample of consents from Imam University to conduct the study with students

<div dir="rtl">

بسم الله الرحمن الرحيم

المملكة العربية السعودية
وزارة التعليم العالي
جامعة الإمام محمد بن سعود الإسلامية
وكيل الجامعة
للدراسات العليا والبحث العلمي

رقم المعاملة: ١٢٠٦٥٠
تاريخها: ١٤٣٤/١٢/١٩
إرسالها: ١٤٣٤/١٢/١٩
المرفقات: استبانة

سعادة عميد كلية علوم الحاسب والمعلومات   حفظه الله

السلام عليكم ورحمة الله وبركاته، أما بعد؛

فنسأل الله لكم التوفيق والسداد ، ونفيدكم أن الطالبة / منال بنت عثمان العثمان -
المبتعثة من قبل وزارة التعليم العالي بجامعة هيريوت وات ببريطانيا - بصدد إعداد دراسة
بعنوان : (اتجاهات طلبة البكالوريوس نحو الكمبيوتر والعوامل المؤثرة في ذلك) وذلك
للحصول على درجة الدكتوراه ،

ونظراً لأن موضوع البحث يتطلب إجراء دراسة ميدانية والحصول على بيانات علمية
نأمل منكم تسهيل مهمة الدارسة لتوزيع الاستبانة.

والله يحفظكم ويرعاكم، وتقبلوا خالص التحية ووافر التقدير.

وكيل الجامعة للدراسات
العليا والبحث العلمي

أ.د. فهد بن عبد العزيز العسكر

العنوان: جامعة الإمام محمد بن سعود الإسلامية، ص. ب: ٥٧٠١، الرياض: ١١٤٣٢، فاكس: ٢٥٩٠٠٠٨، هاتف: ٢٥٨٦٨٨٨

</div>

بسم الله الرحمن الرحيم

المملكة العـربيّة السعوديّة

وزارة التعليم العالي

جامعة الإمام محمد بن سعود الإسلامية

وكيل الجامعة

للدراسات العليا والبحث العلمي

الموضـــوع: ....

سعادة عميد مركز دراسة الطالبات   حفظه الله

السلام عليكم ورحمة الله وبركاته، أما بعد؛

فنسأل الله لكم التوفيق والسداد ، ونفيدكم أن الطالبة / منال بنت عثمان العثمان - المبتعثة من قبل وزارة التعليم العالي بجامعة هيريوت وات ببريطانيا - بصدد إعداد دراسة بعنوان : (اتجاهات طلبة البكالوريوس نحو الكمبيوتر والعوامل المؤثرة في ذلك) وذلك للحصول على درجة الدكتوراه ،

ونظراً لأن موضوع البحث يتطلب إجراء دراسة ميدانية والحصول على بيانات علمية نأمل منكم تسهيل مهمة الدارسة لتوزيع الاستبانة.

والله يحفظكم ويرعاكم، وتقبلوا خالص التحية ووافر التقدير .

وكيل الجامعة للدراسات

العليا والبحث العلمي

أ.د. فهد بن عبد العزيز العسكر

4. Consents from Majmaah University to conduct the study with students

Kingdom of Saudi Arabia
Ministry of Higher Education
Majmaah University
Deanship of Scientific Research

جامعة المجمعة
Majmaah University

المملكة العربية السعودية
وزارة التعليم العالي
جامعة المجمعة
عمادة البحث العلمي

سعادة عميد كلية ادراة الاعمال بالمجمعة   سلمه الله
سعادة عميد كلية الهندسة   سلمه الله
سعادة عميد كلية الطب   سلمه الله
سعادة عميد كلية العلوم الطبية التطبيقية   سلمه الله
سعادة عميد كلية المجتمع   سلمه الله
سعادة عميد كلية التربية بالمجمعة   سلمه الله
سعادة عميد كلية التربية بالزلفي   سلمه الله
سعادة عميد كلية العلوم والدراسات الانسانية بحوطة سدير   سلمه الله
سعادة عميد كلية العلوم والدراسات الانسانية بالغاط   سلمه الله
سعادة عميد كلية العلوم والدراسات الانسانية برماح   سلمه الله
سعادة عميد كلية العلوم بالزلفي   سلمه الله
سعادة عميد كلية طب الاسنان بالزلفي   سلمه الله
سعادة عميد كلية علوم الحاسب والمعلومات   سلمه الله

السلام عليكم ورحمة الله وبركاته . . . وبعد

نأمل من سعادتكم مساعدة الطالبة/ منال العثمان (طالبة دكتوراه في قسم الحساب الآلي- جامعة هيريوت وات في بريطانيا) في استكمال الجزء التطبيقي لرسالة الدكتوراه بشأن "دراسة توجهات ورغبة الطلاب في استخدام الحاسب الآلي والاستفادة منه في التعلم"، وذلك من خلال اتاحة الفرصة لها لتطبيق الاستبانة المرفقة على عينات من طلاب البكالوريوس في كليتكم العامرة.

وتقبلوا خالص تحياتي وتقديري . . .

عميد البحث العلمي

د . محمد بن ناصر السويد

المشفوعات: نموذج الاستبانة   التاريخ: ١١ / ٧ / ١٤٣٤هـ   الرقم: ١٧/٦٠

المملكة العربية السعودية - ص.ب : ٦٦ المجمعة : ١١٩٥٢ هاتف : ٤٣٢١٧١٣ ٦ - فاكس : ٤٣٢٣١٥٦ ٦
Kingdom of Saudi Arabia - P.O. Box 66 Almajmaa : 11952 - Tel: 06 4321713 - Fax : 06 4323156
Email: d.s.a.r@mu.edu.sa   www.mu.edu.sa

5. Consents from King Saud University to conduct the study with students

الى من يهمه الامر / جامعة الملك سعود

السلام عليكم ورحمة الله وبركاته وبعد

افيد سعادتكم اني طالبة في مرحلة الدكتوراة في جامعة هيرت وات بمدينة ادنبرة بيريطانيا وجزء من بحثي الدراسي يتعلق بدراسة توجهات ورغبة الطلاب في استخدام الحاسب الالي و الاستفادة منه في التعلم وخاصة استخدام الشبكة المعلوماتية الانترنت في البحث العلمي .

وحيث ان دراستي سوف تتطلب اخذ عينات من الطلاب في مرحلة البكالوريوس في الجامعات السعودية ولمعرفتي ان جامعة الملك سعود من الجامعات الرائدة في مجال التعليم والبحث بالسعودية فقد تم اختيارة لاجراء هذا البحث .

لذا ارجو التكرم من سعادتكم با لسماح لاجراء بحثي على عينة من طلاب جامعتكم الموقرة

① مرفق عينة من اسئلة الدراسة

وتقبلوا خالص تحياتي وتقديري

اختكم

منال عثمان العثمان

m_alothman1@hotmail.com

٠٠٤٤٧٨٥٤٥٠٦١٣٣

طالبة في مرحلة الدكتوراة بالحاسب الالي

جامعة هيرات وات / ادنبرة بريطانيا

الرياض / عزام العثمان – ٥٠٣٤٩٢٩٣٩

217

APPENDIX 6

Sample of Consents from universities and the Ministry of Education in Saudi

Arabia to conduct the study translated into English

Consents from Ministry of Education to conduct the focus group with teachers:

Kingdom of Saudi Arabia	No : 351018024
Ministry of Education	Date:01-06-1435H
280	02-04-2014G
General Directorate of Education	Enclosures:
in Riyadh Region	
Department of Planning & Development	

Facilitation of Researcher's Mission

Name		Civil Register No.	
Manal Othman AlOthman		1004698682	
Academic Year	Degree	College	University
2013/2014	PhD	Computer	Heriot-Watt

Study title: Attitudes of Male and Female Students and Male and Female Teachers Towards Computers and Factors Affecting Them.
Study Sample: Male and female teachers, male and female students.

Manager of Twenty Fifth Secondary School
Best of greetings.
On the basis of his Excellency the Minister's Circular No. 55/610 dated 17/09/1416H(02/07/1996G) regarding the authorisation of General Directorates of Education to issue letters giving permission to researchers to conduct research and studies, and as the above-mentioned researcher has submitted a request to us asking for permission to conduct her study, and as the required papers are complete, we hope that you facilitate her mission.
Please note that the researcher is fully responsible for the various aspects of the research and that permission by the General Directorate of Education does not mean that it necessarily approves the research problem, the methods or the approaches applied in her study.

Best regards.
Signed

Saud **R**ashid **A**lAbdullatif
Manager, **D**epartment of Planning and **D**evelopment

Copies furnished with greetings to all Offices of Education.

Consents from Hail University to conduct the study with students

Kingdom of Saudi Arabia
Ministry of Higher Education
University of Hail

Office of University Deputy

His Excellency Saudi Cultural Attaché in the UK

Best of greetings.

Please Your Excellency be informed that the University of Hail has no objection to giving PhD student **Manal Othman AlOthman** permission to use a sample of male and female university students to conduct a research study into the attitudes and interests of Bachelor's degree male and female students to using computers and utilising them in learning, especially using the internet in scientific research.

Best regards.

Signed

Dr. Ahmed Mahjaa AlShamari

Acting University Deputy

No.: 34/2/9018

Date: 26/02/1434H

Enclosures: 2

Sample of consents from Imam University to conduct the study with students

Kingdom of Saudi Arabia   No : 351018024
Ministry of Higher Education   Date:19-12-1435H
Al –Imam Muhammad Ibn Saud Islamic
University
University Deputy

Enclosures: Questionnaire For Graduate Studies
and Scientific Research

His Excellency Dean of Female Students' Study Center

Best of greetings.

May Allah grant you everlasting success.

Please be informed that student Manal Othman AlOthman, who has been sent on a scholarship by the Ministry of Higher Education to Heriot-Watt University in the UK, is working on preparing a study with the title 'Attitudes of Bachelor's Degree Students Towards Computers and the Factors Affecting Them' to obtain her PhD degree,

With regard to the fact that the research requires conducting a field study and obtaining scientific data, we hope that you facilitate the researcher's mission for the distribution of the questionnaire.

Best regards.

   Signed

University Deputy for Graduate Studies and Scientific Research

Prof. Dr. Fahd Abdul Aziz AlAskar

Sample of consents from Imam University to conduct the study with students

Kingdom of Saudi Arabia	No : 351018024
Ministry of Higher Education	Date:19-12-1435H
Al –Imam Muhammad Ibn Saud Islamic University	
University Deputy	

Enclosures: Questionnaire For Graduate
Studies and Scientific Research

His Excellency Dean of College of Computer and Information

Best of greetings.

May Allah grant you everlasting success.

Please be informed that student Manal Othman AlOthman, who has been sent on a scholarship by the Ministry of Higher Education to Heriot-Watt University in the UK, is working on preparing a study with the title 'Attitudes of Bachelor's Degree Students Towards Computers and the Factors Affecting Them' to obtain her PhD degree,

With regard to the fact that the research requires conducting a field study and obtaining scientific data, we hope that you facilitate the researcher's mission for the distribution of the questionnaire.

Best regards.

Signed

University Deputy for Graduate Studies and Scientific Research

Prof. Dr. Fahd Abdul Aziz AlAskar

Consents from Majmaah University to conduct the study with students

Kingdom of Saudi Arabia :
Ministry of Higher Education
Majmaah University
Deanship of Scientific Research

His Excellency Dean of the College of Business administration in Majmaah

His Excellency Dean of the College of Engineering

His Excellency Dean of the College of Medicine

His Excellency Dean of the College of Applied Medical Sciences

His Excellency Dean of Community College

His Excellency Dean of the College of Education in Majmaah

His Excellency Dean of the College of Education in AlZulfi

His Excellency Dean of the College of Science and Humanities in Hotat Sudair

His Excellency Dean of the College of Science and Humanities in AlGhatt

His Excellency Dean of the College of Science and Humanities in Rimah

His Excellency Dean of the College of Science in AlZulfi

His Excellency Dean of the College of Dentistry in AlZulfi

His Excellency Dean of the College of Computer and Information

Best of greetings.

We request that you kindly help student Manal Othman AlOthman (PhD student at the Department of Computers, Heriot-Watt University in the UK) to complete the practical part of her PhD thesis (which is a study of students' attitudes towards and interest in using computers and utilising them in learning) by availing her the opportunity to carry out the enclosed questionnaire with Bachelor's degree students in your esteemed college.

Best regards.

Signed

Dean of Scientific research

Dr. Mohammed N. AlSuwayed

Consents from King Saud University to conduct the study with students
King Saud University

Entry No: 4258

Date: 02/02/1434 H

Enclosures:

To Whom it May Concern / King Saud University

Best of greetings.

I inform your Excellency that I am a student in the PhD stage at Heriot-Watt University in Edinburgh, United Kingdom, and that part of my research is related to studying students' attitudes towards and interest in computers and utilising them in learning, especially using the internet for scientific research.

As my study will require using samples of students at the Bachelor's Degree stage in Saudi universities and as I know that King Saud University is one of the leading universities in education and scientific research in Saudi Arabia, it has been chosen it as one location for this research.

So I request Your Excellency to kindly permit me to conduct my research with students of your esteemed university.

Please find enclosed a specimen of study questions.

Best regards.

Your Sister, Manal Othman Al Othmaan

PhD Stage Computer Student

Heriot-Watt University, Edinburgh, UK

Riyadh / Azam AlOthman – 0503492939

1- recommendation

His Excellency Dr. Salih AlRumaih

2- reviewed

Prof. Dr. Salih AlRumaih 18/02/1434H

3- With approval

APPENDIX 7

Statistical Results from Quantitative Study

Table 0-1) Computer Anxiety, Confidence, Liking, and Usefulness Based on their English Language Skills

		Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
Total of computer Anxiety	Excellent	40.0515	6.59130	.66925	38.7231	41.3800
	Very Good	38.3298	6.21136	.36793	37.6056	39.0540
	Good	37.3250	6.06435	.30322	36.7289	37.9211
	Limited	37.1450	6.11892	.43267	36.2918	37.9982
	No English Knowledge	35.5882	6.07018	.84999	33.8810	37.2955
	Total	37.7377	6.23257	.19392	37.3571	38.1182
Total of computer Confidence	Excellent	40.5638	6.78004	.69931	39.1751	41.9525
	Very Good	39.1272	6.03048	.35848	38.4216	39.8328
	Good	37.5111	6.08097	.30217	36.9171	38.1051
	Limited	36.9606	5.91260	.41498	36.1423	37.7788
	No English Knowledge	33.8868	7.30558	1.00350	31.8731	35.9005
	Total	37.9355	6.32552	.19633	37.5502	38.3207
Total of computer Liking	Excellent	38.1579	5.84610	.59980	36.9670	39.3488
	Very Good	35.1399	6.21611	.36757	34.4164	35.8633
	Good	34.4803	5.35213	.26562	33.9581	35.0025
	Limited	34.1642	5.27616	.37215	33.4303	34.8980
	No English Knowledge	32.0755	5.46967	.75132	30.5678	33.5831
	Total	34.8136	5.76543	.17869	34.4630	35.1643
Total of computer Usefulness	Excellent	41.5269	4.91358	.50951	40.5149	42.5388
	Very Good	39.4825	5.18277	.30646	38.8793	40.0857
	Good	38.8418	4.90946	.24797	38.3543	39.3293
	Limited	38.0101	5.32385	.37740	37.2658	38.7543
	No English Knowledge	37.2453	5.32016	.73078	35.7789	38.7117
	Total	39.0205	5.17904	.16192	38.7028	39.3383

Mothers' education * Universities' Location

Crosstab

			Universities' Location		Total
			Capital City	Small Cities	
Mothers' education	Uneducated	Count	90	47	137
		% within Mothers' education	65.7%	34.3%	100.0%
		% within Universities' Location	10.3%	24.6%	12.8%
	Primary school	Count	171	50	221
		% within Mothers' education	77.4%	22.6%	100.0%
		% within Universities' Location	19.5%	26.2%	20.7%
	Intermediate School	Count	136	40	176
		% within Mothers' education	77.3%	22.7%	100.0%
		% within Universities' Location	15.5%	20.9%	16.5%
	High School	Count	222	22	244
		% within Mothers' education	91.0%	9.0%	100.0%
		% within Universities' Location	25.3%	11.5%	22.8%
	University	Count	259	32	291
		% within Mother's education	89.0%	11.0%	100.0%
		% within Universities' Location	29.5%	16.8%	27.2%
Total		Count	878	191	1069
		% within Mothers' education	82.1%	17.9%	100.0%
		% within Universities' Location	100.0%	100.0%	100.0%

Fathers' education * Universities' Location

Crosstab

			Universities' Location		Total
			Capital City	Small Cities	
Fathers' education	Uneducated	Count	39	28	67
		% within Fathers' education	58.2%	41.8%	100.0%
		% within Universities' Location	4.4%	14.7%	6.3%
	Primary school	Count	90	37	127
		% within Fathers' education	70.9%	29.1%	100.0%
		% within Universities' Location	10.3%	19.4%	11.9%
	Intermediate School	Count	93	38	131
		% within Fathers' education	71.0%	29.0%	100.0%
		% within Universities' Location	10.6%	19.9%	12.3%
	High School	Count	237	48	285
		% within Fathers' education	83.2%	16.8%	100.0%
		% within Universities' Location	27.0%	25.1%	26.7%
	University	Count	418	40	458
		% within Fathers' education	91.3%	8.7%	100.0%
		% within Universities' Location	47.7%	20.9%	42.9%
Total		Count	877	191	1068
		% within Fathers' education	82.1%	17.9%	100.0%
		% within Universities' Location	100.0%	100.0%	100.0%

Mothers use computer * Universities' Location

Crosstab

			Universities' Location		Total
			Capital City	Small Cities	
Mothers use computer	Yes	Count	443	56	499
		% within Mothers use computer	88.8%	11.2%	100.0%
		% within Universities' Location	50.6%	29.5%	46.9%
	No	Count	432	134	566
		% within Mothers use computer	76.3%	23.7%	100.0%
		% within Universities' Location	49.4%	70.5%	53.1%
Total		Count	875	190	1065
		% within Mothers use computer	82.2%	17.8%	100.0%
		% within Universities' Location	100.0%	100.0%	100.0%

Fathers use computer * Universities' Location

Crosstab

			Universities' Location		Total
			Capital City	Small Cities	
Fathers use computer	Yes	Count	561	83	644
		% within Fathers use computer	87.1%	12.9%	100.0%
		% within Universities' Location	64.4%	44.4%	60.9%
	No	Count	310	104	414
		% within Fathers use computer	74.9%	25.1%	100.0%
		% within Universities' Location	35.6%	55.6%	39.1%
Total		Count	871	187	1058
		% within Fathers use computer	82.3%	17.7%	100.0%
		% within Universities' Location	100.0%	100.0%	100.0%

Do your parents encourage you? * Universities' Location

Crosstab

			Universities' Location		Total
			Capital City	Small Cities	
Do your parents encourage you?	Yes	Count	715	145	860
		% within Do your parents encourage you?	83.1%	16.9%	100.0%
		% within Universities' Location	81.3%	76.7%	80.5%
	No	Count	164	44	208
		% within Do your parents encourage you?	78.8%	21.2%	100.0%
		% within Universities' Location	18.7%	23.3%	19.5%
Total		Count	879	189	1068
		% within Do your parents encourage you?	82.3%	17.7%	100.0%
		% within Universities' Location	100.0%	100.0%	100.0%

APPENDIX 8

Informed consent for participants in the student focus groups study translated into English

Saudi Undergraduate Students' Attitudes to Computers

As an undergraduate student in Saudi Arabia, you have been invited to take part in a research study which investigates Saudi students' attitudes toward computers and their experiences of using computers. This involves participating in a discussion group of 6 undergraduate students. This discussion will take around 1 hour. The interview will be anonymised, will not be shared with anybody and will not be used unless for this research. You are free to not answer any question you are not happy to answer or to leave the discussion at any time you are not happy to continue.

If you agree to take part, please sign below.

_____

Signature

Many thanks for your time.

Manal Alothman

m_alothman1@hotmail.com

PhD student

APPENDIX 9

Codes and Definitions: Undergraduate Students' Focus Groups

Free Nodes

Time spent with computer: how long the student spends using a computer.

Subject: subject of study.

Smart phones: whether or not the student owns a smartphone and if so what applications they utilise.

Own computer: whether or not the student owns a personal computer.

English language knowledge: the student's opinion of the importance of English language for using computers.

Age:

Tree Nodes

Using Computers in Education Sectors

Using computers for study or learning: whether or not the student uses computers for learning.

Using computers at school: whether or not the student had access to computers at school.

Using computers in university: whether or not the student has access to computers at university.

Using computers for homework: whether or not the student likes doing homework using a computer.

Availability of computer labs in university: whether or not there are computer labs in the student's university.

Sex differences

Reasons girls spend more time with computers: why girls spend more time using computers than boys.

Restrictions on girls' use of computers: whether or not there are restrictions on girls' computer use and what they are.

Differences in encouragement offered to girls and boys: whether or not there are gender differences in the encouragement parents offer their children.

Boys do better than girls: whether or not boys have better computer skills than girls.

Purposes

Reasons computers are used for entertainment: whether or not the student uses computers for entertainment more than for learning.

Purposes of computer use: the student's most common computer uses.

Purposes of computer use in the past: the purpose of the student's first computer use.

Opportunities to study computers

Preference to study computer science: why the student chose to study computers or not.

Having more computer skills: whether or not the student would like to have more computer skills.

Experience

Where the student used a computer for the first time.

When the student used a computer for the first time.

What the student felt when using a computer for the first time.

Encouragement

Why you chose to study computers: (for computer science students) what encouraged the student to study computer science.

Parents

Who bought computer for you: who students get their own computer.

Parents use computer: if their parents use computer or not

Parents affect their children: their opinion on parents have a effect on their children to use computer

Do parents encourage: if their parents encourage them to use computer or not.

Confidence

Computer skills: the practical computer skills the student possesses.

APPENDIX 10

Informed consent for participants in the teachers focus group study translated into English

Saudi teachers' attitudes to computers

As a teacher at High school in Saudi Arabia, you have been invited to take part in a research study which investigates Saudi students' and teachers' attitudes toward computers and their experiences of using computers. This involves participating in a discussion group of 6 teachers. This discussion will take around 1 hour. The interview will be anonymised, will not be shared with anybody and will not be used unless for this research. You are free to not answer any question you are not happy to answer or to leave the discussion at any time you are not happy to continue.

If you agree to take part, please sign below.

_____

Signature

Many thanks for your time.

Manal Alothman

m_alothman1@hotmail.com

PhD student

APPENDIX 11

1. Teachers' Focus Group Codes and Definitions

Free Nodes

Workshops in using computer in teaching: whether or not the teacher has attended workshops about teaching with computers.

Teaching experience: How many years of experience the teacher has.

Subject: Which subject(s) the teacher teaches.

Parents' encouragement: whether or not the teacher believes that the parents of their pupils encourage them to use computers.

Wishing to have workshops: whether or not the teacher would like to attend more training workshops on using computers.

HW with computer: whether or not the teacher asks students to do homework by computer

Gender: male or female.

Feelings about being without a computer: how the teacher would feel if they had to stop using computers.

Feelings when using a computer: how the teacher feels when using a computer.

Difficulties using computers: the difficulties the teacher faced when using a computer in class.

Connecting with students online: whether or not the teacher is connected with students online.

Connecting with teachers online: whether or not the teacher connects with other teachers online.

Computer training: whether or not the teacher had computer training in the past.

Computer skills: what computer skills the teacher possesses.

Computer disadvantages: what the teacher regards as the disadvantages of computer usage in general.

Computer benefits in teaching: what benefits the teacher identifies of using computers in teaching.

Computer availability in school: how many computers are available in the teacher's school.

Computer advantages: what the teacher regards as the advantages of computer usage in general.

Age:

School leaders: whether or not the teacher's school leader asks them to use technology in their classes.

Tree Nodes

Using computers in class

Important for students: the teacher's opinion of the importance for students of using computers in the classroom.

How computers are used in class: how students in the teacher's classes use computers during lessons.

How many times: how often students use computers in the teacher's classes.

Students

Students' use of computer at school: whether or not the student can use computers in school.

Students' use of computer at home: whether or not the student has access to a computer at home.

Students' performance with computer: whether or not the student's performance or interaction changes when teacher use computers in class.

Students' performance if teachers stop using computers in class: whether or not the student's computer use is affected by lack of access in class.

Smartphone

Smartphone use: whether or not the teacher uses a smartphone.

Smartphone length of use: the length of time the teacher has used a smartphone.

Applications in smartphone: what smartphone applications the teacher uses.

Preparing the lessons

Computer use to prepare lessons: whether or not the teacher uses computers to prepare lessons.

Programmes used to prepare lessons: which programs the teacher uses during class or to prepare them.

Computer use

Purposes of use: what the teacher uses computers for.

Number of hours: how long the teacher spends using a computer.

Computer experience: length of time the teacher has used computers.

At school: whether or not the teacher uses computers at school.

At home: whether or not the teacher uses computers at home.

2. Demographic Information for Teachers' Participation in the Focus Group

Table 0-1) Classification of groups, and demographic information of participants in each group

	Age	Subject	Teaching Experience	Computer Experience	Computer Skills
Female 1	30- 52- 34- 40- 31- 38	Social- Arabic- Psychology- English- Religion- Physics	6- 5- 19- 20- 22- 12	9 years- 2 years- 5 years- 4 years- 4 years	Word- PowerPoint- downloading programs- Excel- interactive white board
Female 2	40- 35- 46- 37- 23- 47	English- Biology- Chemistry- Libraries- Maths- Arabic	21- 13- 15- 23- 17- 20	18 years- 4 years- 15 years- 10 years- 20 years ago	Word- PowerPoint- Photoshop- smart board
Female 3	49- 33- 35-29- 52- 38	Social- Religion- Psychology- Maths- Physics- Art	13- 32- 22- 24- 19- 18	5 years- 4 years- 7 years- 6 years- 5 years	Word- PowerPoint- email- YouTube- downloading videos
Male 1	39-40- 42-36- 30-48	English- Arabic- Biology- Library- Physics-Social study	14-18-17- 14-9 years- 8 years	15 years ago- 20 years ago- for 11 years- 13 years- before 13 years- 20 years ago	PowerPoint, Word- designing lessons with PowerPoint- Word, English and Arabic- Microsoft office and Photoshop
Male 2	35- 30- 27- 32- 43- 37	English- Biology- Maths- Physics- Maths	5 years- 8 years- 12 years- 3 years- 18 years- 10 years	10 years ago- 14 years- 20 years- 15 years- 23 years ago	Word- PowerPoint- internet and Excel- printer English dictionary program- Word or text processing- Visual Basic
Male 3	45- 25- 49- 28- 30- 43	Computing- Islamic studies- English- Maths- Social studies-	1- 25- 20- 8- 6- 9	11 years ago- 20 years ago- for 12 years- 20 years- 18 years- 15 years	Word and Excel Microsoft Office programs- Browsing, writing- browsing- designing photos

		Chemistry			
			235		

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