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THE IMPACT OF HOME COMPUTERS ON 12th GRADE STUDENTS' ACHIEVEMENT IN THE COMPUTER SCIENCE CURRICULUM IN RIYADH, SAUDI ARABIA

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by

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CERTIFICATE OF APPROVAL

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This is to certify that the Doctoral Dissertation of

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ABSTRACT

Technology has improved many educational issues. This is a very exciting time for technology and education. The primary purpose of this study was aimed at understanding the impact of home computer use on academic achievement in the computer curriculum of the 12th grade students in Riyadh, Kingdom of Saudi Arabia. In particular, the study attempted to determine if the use of home computers would be an effective manner for increasing students' academic achievement.

The participants of the study were 240 male and female students as a random sample from 12th grade from eight random high schools in Riyadh, Saudi Arabia. An achievement exam and survey were developed by the researcher based on the computer science curriculum topics, the quantitative data was collected in both a single achievement exam and a single survey from a sample of 240 Saudi high school students. Both the survey and an achievement exam were split equally between male and female students. The study sought the answer to 10 questions. Analysis of variance (ANOVA), followed by tests of simple main effects and post hoc comparisons using Scheffé, as well as Pearson Correlation were conducted to answer the research questions.

The study results pointed out that home computers were important to support the students in their academic achievement in the computer science curriculum. Therefore, more attention must be given to the use of home computers for all students. Moreover,

we should attempt to treat the difficulties which students face for getting computers in their homes.

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INTRODUCTION

In the past 50 years we have seen enormous growth in computing capabilities. Computing is everywhere and has impacted nearly everything. In the future, computers are expected to continue to play an important role in continuous development in education. The world has obviously changed by increasing technological change in education.

Computer-based technologies hold great promise both for increasing access to knowledge and as a means of promoting learning. The public imagination has been captured by the capacity of information technologies to centralize and organize large bodies of knowledge; people are excited by the prospect of information networks, such as the Internet which links students around the globe into communities of learners. Also, what has not yet been fully understood is that computer-based technologies can be powerful pedagogical tools, not just rich sources of information but also extensions of human capabilities and contexts for social interactions that support learning. The process of using technology to improve learning is never solely a technical matter, concerning with properties of educational hardware and software.

Many books and articles have been written about the development of educational advancements and computer technology and their affect on students in schools and homes. Also, research has highlighted that home computers should be directly monitored by the parents for emphasizing that students use them in improving their educational achievement. Declan (1999) mentioned that computer access in the home should be considered related to television viewing and should be closely monitored by the parents to promote educational uses. Some studies found that students who have utilized home computers increased their academic achievement. For instance, Hofstetter (1987) conducted a survey of a population of parents who had purchased home computers to see what significance this purchase had on their perceptions of their child's school achievement. The general findings were parental expectations for positive effects of a home computer on school achievement were too high. Also, Attewell and Battle (1999) in their study found that having a home computer is associated with higher test scores in mathematics and reading, even after controlling for family income and for cultural and social capital. In addition, Judge (2005) conducted a study between academic achievement and the use of home computers. This study examined the relationship between academic achievement of young African American children and access to and use of computers in their school and home. The results indicated that use of home computers was positively correlated with academic achievement.

A study by The Madar Center (2002) found that more people are using the Internet in the Arabic Gulf than ever before. In the Gulf Cooperation Council member states, the number of the Internet users increased from 513,000 in June 2003 to 1.8 million for the same period last year. This represents a 250-fold increase in two years.

Attendant to this, Al-Oteawi (2000) found that the Ministry of Education in the Kingdom of Saudi Arabia is interested in the use of technology in schools. Based upon the knowledge they acquire, the Ministry of Education hopes to improve the achievement of students at all levels. They desire to use home computers to enhance the outcomes of the schools so that they can meet the needs of society. Also, in Saudi Arabia, K-12 education needs planning for information technology that includes students' need to develop their knowledge and to acquire information technology skills that enable that development (Al-Oteawi). This will enable teachers to implement information technology in their classrooms in order to enhance teaching and the learning environment as a whole. Teachers who have knowledge of information technology will encourage and persuade their students to use computers effectively to support learning in their home.

Statement of the Problem

Information technology has become essential in our daily life. Also, information technology works as a supplement and a tool for instruction and to support students in the acquisition of information that has a positive effect on their learning activities. Information technology plays a crucial role and is necessary for the students in diverse curricula. Jo (1995) suggests, "The success of school computer education depends on how schools implement computers and how educators view the effectiveness of computers" (p. 3). Many students use home computers as a tool to help perform their home-work. Also, it is used to develop and increase the academic achievement of students (Jo).

These realities underscore the importance of computers and the inclusion of a computer curriculum in the high school in Riyadh. As a curriculum specialist for the

Ministry of Education in Saudi Arabia, the researcher has found that the computer curriculum is based on many basic skills. For instance, problem solving programming by Visual Basic (VB) is one of the most important, if not the most important, of these basic skills in level three of high school in Saudi Arabia. Problem solving usually involves a few steps: analysis of problem elements, algorithm, flowcharts, writing a program by programming language, interpreting the program into assembly language, and testing the program and fixing its errors. These steps require skill enhancement developed in both the school lab and home. Also, the skill of programming will need more practice at home.

Given the importance of use of the computer at home to support development of student knowledge and skills in general, and specifically in the computer curriculum, investigation of aspects of use of the home computer is warranted. As a Saudi supervisor of the computer curriculum, important questions merit investigation. These are:

1. What is the current extent of the students' use of their home computers?
2. What is the extent of the potential benefit of the use of home computers in the computer curriculum?
3. What are the unique barriers encountered by Saudi students in the transition to the use of home computers to facilitate their learning?
4. What student demographics factors and perspectives influence the integration of using home computers by students in computer curriculum, and how do these factors relate to perceived barriers?

The educational system in Saudi Arabia requires planning for use and implementation of information technology in order to employ its features in educational settings. This compelled the researcher to investigate the students' perceptions in the

third level of high school toward utilizing home computers to improve their skills in the computer curriculum. Also, the researcher further sought to determine benefits of using home computers to increase students' academic achievement.

Purpose of the Study

The purpose of the study was to understand the effect of home computer use on students' academic achievement in the computer curriculum of the third year in female and male high schools in Riyadh, Saudi Arabia. In particular, the study attempted to determine if the use of home computers was effective for increasing students' academic achievement. The participants in the study included 240 randomly selected students from school districts in Riyadh, Saudi Arabia.

Significance of the Study

The Ministry of Education in Saudi Arabia seeks to integrate technology into the teaching and learning environment. Technology today changes quickly and, with the ever-increasing body of knowledge and technology to access that knowledge, the pressure to keep up is greater than ever before. By establishing some parameters for understanding the effectiveness of the use of home computers in the computer curriculum, the Ministry as well as interested others may make more informed decisions about how best to integrate technology in the teaching and learning environment in schools and how to plan for strategic use of home computers. Two specific roles of integrated technology informed this study.

First, the role of the computer in the computer curriculum is to improve performance in the application of targeted technology knowledge. Through the Oriented Approach Product, knowledge and skills in programming, computer networking, and

language computer applications among others are addressed. Using home computers in this field makes the teaching process easier, faster and more enjoyable. This study contributes to understanding if home computers also make this learning more effective.

Second, the role of the computer is to improve wide mental and cognitive skills. This means that strong focus is placed on some targeted skills. These include the ability to solve problems, improve thinking skills, and to gather data, analyze it, assemble it and relate it to other data. This study contributes to understanding if home computers support development of these skills.

The results of this study may inform parents' opinion about the effectiveness of home computers in supporting the achievement of their students in the computer curriculum. It may also illuminate the significance of home computer procurement; influencing the chance of parents bringing computers into the home to improve a student's academic achievement over time. Also, the Ministry as well as parents may focus on educational software as they re-evaluate the computer curriculum and integrate new strategies to help students who are using home computers. Finally, there are no such studies done in this field in Saudi Arabia, so this study provided a foundation for future studies.

Research Questions

To achieve its purpose, the study answered the following questions:

1. Is there a statistically significant difference in the mean scores of students' achievement in computer science curriculum between students who use home computers and students who do not use home computers?

2. Is there a statistically significant difference in the mean scores of students' achievement in computer science curriculum between males and females?
3. Is there a statistically significant difference in the mean scores of students' achievement in computer science curriculum among the school districts?
4. Is there a statistically significant interaction between gender and students types (those who use home computers – those who do not use home computers) in the mean scores of students' achievement in computer science curriculum?
5. Is there a statistically significant interaction between school district (North, South, East, and West) and students types (those who use home computers – those who do not use home computers) in the mean scores of students' achievement in computer science curriculum?
6. Is there a statistically significant interaction between school district (North, South, East, and West) and gender in the mean scores of students' achievement in computer science curriculum?
7. Is there a statistically significant interaction among students types (those who use home computers – those who do not use home computers), gender and school district (North, South, East, and West) in the mean scores of students' achievement in computer science curriculum?
8. Is there a statistically significant correlation between the students' achievement in computer science curriculum and the length of the time using a computer at home?
9. Is there a statistically significant correlation between the students' achievement in computer science curriculum and the level of use of a computer at home?

10. Is there a statistically significant correlation between the students' achievement in computer science curriculum and the level of use of a computer outside of home?

Hypotheses

Null Hypotheses

1. There is not a statistically significant difference in the mean scores of students' achievement in computer science curriculum between students who use home computers and students who do not use home computers.
2. There is not a statistically significant difference in the mean scores of students' achievement in computer science curriculum between males and females.
3. There is not a statistically significant difference in the mean scores of students' achievement in computer science curriculum among the school districts.
4. There is not a statistically significant interaction between gender and students types (those who use home computers – those who do not use home computers) in the mean scores of students' achievement in computer science curriculum.
5. There is not a statistically significant interaction between school district (North, South, East, and West) and students types (those who use home computers – those who do not use home computers) in the mean scores of students' achievement in computer science curriculum.
6. There is not a statistically significant interaction between school district (North, South, East, and West) and gender in the mean scores of students' achievement in computer science curriculum.
7. There is not a statistically significant interaction among students types (those who use home computers – those who do not use home computers), gender and school

district (North, South, East, and West) in the mean scores of students' achievement in computer science curriculum.

8. There is not a statistically significant correlation between the students' achievement in computer science curriculum and the length of the time using a computer at home.
9. There is not a statistically significant correlation between the students' achievement in computer science curriculum and the level of use of a computer at home.
10. There is not a statistically significant correlation between the students' achievement in computer science curriculum and the level of use of a computer outside of home.

Limitations of the Study

The study used male and female students, age 18 years old. The Saudi rules state that students can attend high school if they are 15 years of age or older. All of the groups of students who participated in the study were selected randomly from regular classes in the third level of the high schools in Riyadh, Saudi Arabia. Another limitation of this study was that it was applied to only one educational region. Therefore, generalizations beyond this sample group and geographic location are not possible. Another limitation was that the study focused mainly on the computer curriculum, rather than on all curricula. The third limitation of this study was that it only represented a snapshot of the 2007/2008 school year. This was a limiting factor when considering that technology implementation is subject to change within even a relatively short time. The fourth limitation of the study was that it is strongly focused on investigating the effect of home

computers on students' academic achievement scores in the computer curriculum of the third year of high school in Riyadh, Saudi Arabia. A generalization to home computer use for other curricula is not possible.

Delimitations

The participants in the study included 240 randomly selected students from four districts in Riyadh, Saudi Arabia. Students were in classes of the third year in high school with a Computer Curriculum. Due to all of these circumstances, the study environment provided a valuable opportunity to study the effect of home computers on students' academic achievement in the computer curriculum of the third year in female and male high schools in Riyadh, Saudi Arabia.

Definitions of Terms

The following definitions are provided to facilitate a better understanding of the terms used in this study.

The Home Computer: Personal computers used in the home.

Students of the Third Year of High School: The students who are in their last year (third level) of high school in Saudi Arabia.

The Ministry Of Education: The organization responsible for the development and fulfilment of the strategy for K-12 education (Al-Oteawi, 2002).

Chapter 2

REVIEW OF RELATED LITERATURE

Introduction

This chapter presents a review of the literature related to using home computers and student academic achievement in the kingdom of Saudi Arabia. The review describes the correlation between using home computers and student academic achievement in the computer curriculum elements in the 12th grade. For the purposes of this study, collaborative leadership, teacher collaboration, professional development, student response, colleague support, and parents' communications were investigated in support of describing the correlation between using home computers and students' academic achievement in the third level of the fourth stage, 12th grade, within the educational system in the Kingdom of Saudi Arabia.

The early 21st century is challenging and an exciting era for educational technology in the world. Teachers have an ethical imperative to help all students to realize their highest potential. One means for providing this support is the integration of the latest educational technology in classes and in student's homes to support academic achievement. This chapter examines a brief history of the Kingdom of Saudi Arabia, the education system in the Kingdom of Saudi Arabia, the literature regarding information

technology, the definition and the concept of information technology, the importance of the application of information technology in education and the effects of technology resources on students' achievement.

Computers are very important tools in every field of our daily lives. Within the field of education, the effective application of computers in our schools and homes may lead to the accomplishment of many educational goals within a short period of time by enabling qualitative improvements in teaching and learning. Depending upon the demands of the society and new technology, the Kingdom of Saudi Arabia reforms its educational system from time to time in order to develop new educational environments. Presently, the decision makers want to infuse comprehensive technology and staff development programs into the school system to enable the students to meet their needs and empower them to deal with a new technological environment in schools.

Brief History of the Kingdom of Saudi Arabia

The Kingdom of Saudi Arabia was established and founded in 1932 by King Abdul Aziz bin Abdul Rahman Al Saud. The Kingdom of Saudi Arabia occupies approximately 2,250,000 square kilometres (868,730 square miles) encompassing about four-fifths of the Arabian Peninsula, a land mass which constitutes a distinct geographical entity, bordered on the west by the Red Sea, on the south by the Indian Ocean and on the east by the Arabian Gulf. The Kingdom itself is bounded on the North by Jordan, Iraq and Kuwait, on the East by the Gulf, Bahrain, Qatar and the United Arab Emirates, on the South by the Sultanate of Oman and Yemen, and on the West by the Red Sea. The importance of the Kingdom of Saudi Arabia's geographical position is quickly apparent: it is strategically located between Africa and mainland Asia, lies close

to the Suez Canal and has frontiers on both the Red Sea and the Arabian Gulf. Riyadh, which lies in the central region of the country, is the capital and also the largest city of the Kingdom of Saudi Arabia (The Handbook of the Kingdom of Saud Arabia, 2000).

The Education System in the Kingdom of Saudi Arabia

K-12 education in the Kingdom of Saudi Arabia is managed by two government organizations. The first government organization is the Ministry of Education, which was established in 1953, and has overall management responsibility of all male private and public schools. The Ministry of Education was given the largest responsibility for developing and planning education in the Kingdom of Saudi Arabia. The second government organization is the Presidency of Girls Education, created in 1960, and has overall management responsibility of all female public schools (Presidency of Girls' Education, 1998). In 2002, the Kingdom of Saudi Arabian government combined the two organizations of education related to male and female into one organization. There are four stages of schooling below higher education in the Kingdom of Saudi Arabia for males and females. The four stages are pre-school, elementary, intermediate, and secondary school.

The First Stage

In the pre-schools there are three different programs: infant centres, which accept children under four years old, nurseries accept children between the ages of four and five, and the last program is kindergarten which accepts children between the ages of five and six and a prepares children for elementary school. Most of these programs are private and there is no defined curriculum for the kindergarten program (Aldawood, 2000).

The Second Stage

Elementary education is the basis for students once they reach the age of six years old. Elementary education is based on a six-year course of study beginning with first grade and ending at the sixth grade. The curriculum is centrally produced by the Ministry of Education. Students are promoted to the next level by examination. When students have successfully completed six years of elementary school, then they are able to attend the next stage, referred to as intermediate school.

The Third Stage

Students enter intermediate level school when they are about 13 years old. At this stage, there are three levels in intermediate school; they are promoted from one level to another by examination.

The Fourth Stage

Secondary school is comprised of three years, which are equivalent to high school in the U.S. educational system. In the third year of secondary school, students take a general national examination. When they have successfully completed three years of study at this stage, they have the opportunity to enter colleges and universities to pursue higher education. This study focused on the last level of the fourth stage.

There are more educational institutions in the Kingdom, the Institute of Public Administration (adult education) was created in 1960; the Ministry of Higher Education (post secondary university level education and junior college level education) was created in 1975; and the General Organization for Technical Education and Vocational Training (specialized schools for vocational training) was created in 1980. All of these institutions functioned independently of each other (Al-Alwani, 2005).

The educational system in the Kingdom has been based on Islamic philosophy and tradition. It is charged with three goals: (1) to provide at least basic education for all citizens; (2) to provide students with skills that are required by the changing needs of the economy; and (3) to educate students in the beliefs, practices and values of the Islamic culture (Aldawood, 2000). The schools are organized into 42 educational districts. The current education system consists of four stages of education below higher education. As previously discussed, the four stages are: (1) pre-school, (2) elementary, (3) intermediate, and (4) secondary school. There are six years of elementary school, three years of middle school, and three years of high school (Al-Oteawi, 2002).

Within the Ministry of Education, schooling for females is administered by the Girls' Education Administration called the General Presidency for Girls' Education operating under the umbrella of the Ministry of Education. The female school system curriculum is similar to that of the male. The girls' curriculum includes Islamic science, Arabic science, science, computer science, English language, social studies, art, and home economics (Al-Alwani, 2005). Schooling for males is administered by the Ministry of Education. The male school system curriculum is the same as that of the female's for the computer science curriculum The boys' curriculum includes Islamic science, Arabic science, science, computer science, English language, social studies, and art (Al-Alwani, 2005).

The Kingdom has eight major universities: King Saud University in Riyadh, founded in1957; Islamic University the in the Holy City of Madinah, founded in 1961; King Abdul Aziz University in Jeddah, founded in 1967; Imam Muhammad bin Saud Islamic University in Riyadh, founded in 1953; King Faisal University in Dammam,

founded in 1975; King Fahad University, founded in 1975; King Khalid bin Abdul Aziz University in Abha, founded in 1998; Umm Al-Qura University in the Holy City of Makkah, founded in 1979. The subjects studied by university students in the Kingdom of Saudi Arabia may be categorized as education, medical sciences, medicine, engineering, natural sciences, economics, humanities, agriculture, administration, and Islamic studies, etc. (The Handbook of the Kingdom of Saud Arabia, 2000).

Curriculum in General

During the last 10 years, there has been an explosion in our knowledge of the ways in which humans develop and learn. However, schools' curriculum continues to play an important role in achieving educational goals. The curriculum of school also contains values that lead students to be good citizens in their societies. Curriculum can be looked at differently by different people. While for some it is only the plan for the course of study, others think it is the strategies an instructor is planning to use, the general learning environment or even the actual content of a course. Oliver (1977) said that curriculum is all the experiences that a child has, all experiences the leaner has under the guidance of the school, and all the courses offered by a school. Glatthorn (1987) states that curriculum is what is taught. Henderson and Hawthorne (2000) point out that curriculum comes from the Latin term "currere" which means "the course to ....run" (p. 3) which emphasizes the notion of a program of study. It would make sense then that curriculum is all the experiences learners have under the guidance of the school.

Curriculum Development in the Kingdom of Saudi Arabia

Curriculum development, in the Kingdom, consists of various technical, humanistic, and artistic processes that allow schools and school people to realize certain

educational goals. Ideally, all those affected by a curriculum should be involved in the process of its development. Given our definition above, curriculum is what students should know, be able to do, and be committed to (content), how it is taught (instruction), how it is measured (assessment), and how the educational system is organized (context). All of these areas should be addressed in a district's curriculum development process (Schwab, 1983). Also, in developing a curriculum it's very important to consider the philosophical, social, psychological, and cognitive domains of the learners and the society. Usually these domains impact the success or failure of the curriculum.

The curricula used throughout the educational system in the Kingdom undergoes a constant process of change and improvement in response to social need and the economic developments in the Kingdom, as well as international developments in technology. National committees, established by the Ministry of Education in 1984, are devoted to curricula development and review, and advise the Educational Development Department of the Ministry (Al-Salloom, 1995).

These committees study the subjects being taught in schools at different levels and deal with special issues such as adult education, measurement and testing, and special education. There is close cooperation between the Ministry of Education and the General Presidency of Girls' Education on curriculum development, and experts from both agencies participate in the national committee activities every year. There have been many innovations in curriculum development in the last several years, such as the development of new mathematics texts for secondary education. Schools have been equipped with a variety of audio-visual media including television monitors, slide and overhead projectors, and school broadcasting facilities that have been integrated into the

teaching of mathematics, science, and geography. Language laboratories have been built for the study of English and other foreign languages. School libraries have been converted into comprehensive educational resource centres (Al-Salloom, 1995). Special training courses have been developed to show teaching assistants how to use and produce a broad range of educational materials and media. In addition, two-week training courses have been designed to acquaint teachers with new educational technology.

There have been several recent changes that affect adult education programs in Saudi Arabia. The administrative structure governing these programs has been reorganized to better integrate the efforts of professional educators from many institutions, including the Ministry of Education, the General Presidency of Girls' Education, Saudi universities and local school districts. A standard curriculum with specially developed textbooks is used throughout the Kingdom and all students must take examinations. Committees at the Ministry of Education and the General Presidency of Girls' Education oversee the development of textbooks in every subject for all educational stages. Textbooks are generally written by subject specialists. Similar textbooks are used by male and female students who also follow the same academic curricula. The government provides textbooks to private schools free of charge. Supplementary textbooks are sometimes used by private schools for the extra subjects that are not available in the public schools such as when beginning English is offered in elementary schools or when offering French as a foreign language (Al-Salloom, 1995).

Computers in the Kingdom of Saudi Arabia

The Ministry of Education in the kingdom Saudi Arabia has increasingly realized the significance of computer and information technology integration into the curriculum.

In 1991, the Ministry of Education founded a new department called the General Administration for Educational Technology (GAET). Its mission was to develop and improve the quality of education through the use of information technology (Al-Oteawi, 2002).

The integration of computers in the male high schools passed through three stages. According to Al-Oteawi (2002), the first stage was in conjunction with high school's curriculum revision in 1985. Within the new curriculum system, male high schools students were obliged to complete 168 credit hours. Computer courses were provided as part of the curriculum for every student. However, students with particular majors were provided more computer courses. The program was divided into two courses, which included Computer Introduction for two credit hours and Basic Programming Language for three credit hours (Al-Oteawi). The mandated curriculum reform experienced serious implementation problems, and it soon became evident that there was a lack of computers in the schools.

As a result of this problem, the Ministry of Education cancelled courses and introduced another general computer course into the curriculum for every male high school student. The nature of the new course was theoretical and was not structured around the student having access to a computer. Realizing the limitations of this course, a third computer-related curriculum revision occurred in 1994 by the Ministry of Education to motivate students and reduce the anxiety of students toward using computer technology. This revision called for the implementation of computers in schools (Al-Oteawi, 2002). Since 1994, the Ministry of Education in the Kingdom has encouraged teachers whose majors were science and math to enroll in training programs at the Public

Management Institute (PMI). Once trained, teachers helped teach computer literacy in high schools. Training programs included many topics in computer curriculum: Disk Operating System (DOS), WINDOWS, word processing, spreadsheets, databases, and BASIC Language. In that time, the program did not include a focus that enabled teachers to study and consider how to use computer technology as an instructional material (Al-Oteawi).

Within girls' education, the General Presidency for Girls' Education did not implement a similar emphasis on computer-related instruction. Girls' schools didn't teach computer skills at all until 1992 (Al-Oteawi, 2002). Presidency of Girls' Education (1998) reported that they began to teach computer literacy in some high schools in the academic year of 1999. They have established a committee to discuss and issue a curriculum of computer literacy to enhance teaching and learning (Al-Oteawi).

In sum, great changes have occurred in education in the Kingdom of Saudi Arabia since 1953. The numbers of students, schools, and budgets have steadily increased. Statistics show that development holds true for both male and female students, who benefit from education in the primary, intermediate and secondary schools (Al-Yaqeen, 1997).

According to the Internet World State, there are 4,700,000 the Internet users in the Kingdom of Saudi Arabia as of August, 2007 (Internet World State, 2007). Also, according to the National Plan of Information Technology in the Kingdom of Saudi Arabia in 2003, the 13% of the population in the Kingdom of Saudi Arabia were users of personal computers, and in 2004 the Internet users comprised 10.3% of the population (Ministry of Communications and Information Technology, March 2006).

Computers in the Kingdom of Saudi Arabia Schools

The Kingdom, like other countries in the world, has sought to develop technology in its various institutions. In 1962, the computer was introduced to the Kingdom government when the Ministry of Finance and National Economy (MFNE) used an International Business Machines (IBM) sorter machine to do statistical data related to the Kingdom structure. Also, during the 1960s and early 1970s the computers were introduced to other the Kingdom institutions such as the Ministry of Defense, and King Fahad University of Petroleum and Minerals (KFUPM) (Al-Oteawi, 2002).

In 1980, computers became prevalent in many the Kingdom institutions. The total cost of the Kingdom imports of computers and their equipment between 1980 and 1989 was about $1.65 billion (Al-Oteawi, 2002). This is a clear sign that the government seeks the benefit of computers. Consequently, the Kingdom has been the largest marketplace for computers in the Middle East for the past 10 years. In the period between 1980 and 1986, the total number of computers imported by the Kingdom was more than 47,500 units (Al-Oteawi). In 1989, it increased to 80,000 units, which means the number is the second highest existing in any developing country after Brazil. In 1992, statistics indicated that the number of PCs sold in the Kingdom was 45,000 units. This shows that Saudis want to learn and use computers. In future years, the younger generation will be much more familiar with computers and their attitudes toward computers use will be even more positive (Al-Oteawi).

SAUDINF (2004), the Saudi Arabian Information web site, reveals that there is an anticipated growth of 15% in the personal computer market in the Kingdom of Saudi Arabia where 422,000 units were sold in 2004. Also, according to Business Monitor

International (2005), Saudi Arabia information and technology reports in 2005 show that computer sales in the Kingdom of Saudi Arabia were estimated at $1.2 billion, up from $1.1 billion in 2004 . The computer market has grown 15% since 2002, server sales are estimated at $384 million in 2005, laptop sales are increasing several times faster than computers overall, accounting for around 37% sales in 2004 (SAUDINF).

Computer literacy in the Kingdom schools began in 1985 when the Ministry of Education decided to teach computers skills in Developed Secondary Schools (DSS), with focus on instruction in three categories (1) computers structures, (2) computer programming, and (3) computer software application (Al-Oteawi, 2002). In 1990, the computer was brought into administration by the individual efforts of the educational staff at some schools in the Kingdom with the goal of helping the administrators in their schools (Aldwaian, 1994). The Ministry of Education thought that computers were more appropriate for instructional use than for administrative use in the Kingdom public schools. The current status of computers in administrative use in the Kingdom public schools is optional and not required by the Ministry of Education. Computer use varies from school to school depending on the computer literacy of each school's administration (Al-Oteawi, 2002).

According to Ministry of Education the number of high schools in the Kingdom of Saudi Arabia is 2007 schools (The Ministry of Education in the Kingdom of Saudi Arabia, 2007). Also, according to Aljuofe Educational District (2006) the Ministry of Education added 29,685 new computers to computer labs in schools.

Teachers and Students Development for Educational Technology

According to Nasseh (1998), "teachers and students should learn basic technologies such as e-mail, the Internet applications, and word processing software in order to be effective in their careers and as members of an information society" (p. 7). In the schools, technology can be an effective tool if the educators can use it and can envision how to utilize it in their process of optimizing teaching. Also, Nasseh mentioned that "the teacher's knowledge of the potential of technology can help students design a practical and needed technology-based curriculum and participate as designer and content provider in the development of computer-based applications" (p. 8). On the other hand, Plair (2008) believes that "policymakers and school administrators need to appreciate the difficulties many veteran teachers experience with integrating technology into comfortable, existing pedagogy" (p. 73). Also, there are two development factors that have enhanced the teachers' views in a technology-base learning environment: (1) the source of influence on technology adoption, and (2) the nature of influence occurring when using technology in the classroom (Levin & Wadmany, 2008). Real reform starts at the top and works its way down from the Ministry of Education to the classroom teacher. Teachers need support, training, and effective models to feel comfortable relying on technology as an important tool in the classroom. Teachers need to be able to see the benefits and effects this change will have on student achievement. Although the teacher, in the end, is the key to successful implementation, they cannot succeed alone. The responsibility must be shared among all the members of the educational community (Papa, 2003).

The Benefits of Information Technology in Teaching and Learning Styles

There are five teaching styles that each teacher possesses in varying degrees. These five teaching styles are:

1. Formal authority style – this style presents teachers as possessing knowledge, and transmitting information to the students.
2. Personal mode – this style features teaching by personal example, and encourages a student to observe and then to emulate the instructor's approach.
3. Expert style – this style represents the traditional presentation and is typical in a teacher-centred environment.
4. Facilitator style – emphasizes the personal nature of teacher-student interactions. The general classroom methods for this style include cooperative learning strategies. In this style, the teacher encourages students to develop independent styles, ideas, and works with students on their projects.
5. Delegator style – in this style the teacher is a resource person, but students are expected to work (Grasha, 1996).

Teachers also benefit from the application of educational technology in education. Those who are knowledgeable about educational technology can communicate and collaborate among their peers in real time; enabling each other by sharing across educational groups across computer networks and the Internet (Boysen, 1994). When students use technology in their classes and homes, they increase their academic progress. The ability to work independently, at one's own rate, allows students often to exceed expectations; specifically in their level of learning in mathematics and writing (Boysen).

Substantive Issues in the Integrative Adoption of Information Technology

How should today's teacher proceed as they struggle with the explosive growth in information technology in teaching, and learning styles? By clarifying planning issues, and continuously training teachers to face this issue. Many teachers argue that classrooms of 21st century should work and look very differently from those of today. According to (Badke, 2007), teachers now have the technology to make the research task so much more productive than it was 15 years ago. They can discover, in a few moments, data that would have once taken days, if ever, to locate. Also, we can expand our horizons, collaborate in our research, and improve our understanding in unprecedented ways (Badke). According to Oncu, Delialioglu, and Brown (2008),

> teachers identified some reasons for using technology that can appropriately be communicated as objectives. Objectives included: (1) to help students apply what they have learned, (2) to get students involved in the classroom interaction, (3) to help students be familiar and comfortable with technology, and (4) to learn how to use and incorporate technology for instructional purposes. (p. 37)

Attitudes toward Change

If renewing occurs in an organization, initiating agents of change should have the support of those at the low level and the high level, as well as the teacher level in the educational institution. With regard to Saudi administrators, according to Aldawood's (2000) review of Bin-Baker's study of the use of computer technology by Saudi administrators in higher education in four universities in the Kingdom of Saudi Arabia,

> 66% of the subjects use computers for text processing, 60% for research, and

> 48% for instruction. Almost 50% use computers for database applications and maintenance of personnel and student records. The male administrators reported using computer applications more often than female administrators, with a higher performance level in all of the applications. The administrators reported a positive attitude toward computers and a high level of interest in developing their skills in utilizing them. (pp. 37-38)

After reviewing related literature in his study, Aldawood (2000) concluded that the following points can be applied to implementing change with respect to attitudes of educational administrative professionals toward computers:

1. Experience with computers is generally related to reduced computer anxiety and increased self-confidence in using computer technology.
2. Principals tend to have a positive view toward microcomputers and their uses for administrative applications.
3. The attitudes of principals who have had many hours of training on microcomputer use were more positive than the attitudes of those principals who have had few or no hours of computer training.
4. The attitudes of principals who own computers were more positive than the attitudes of those principals-who do not own computers.
5. The majority of those studies showed variables such as age, sex, and degree level, and the number of years of administrative experience was not a factor in the administrator's attitudes toward computers. (p. 39)

Aldawood mentioned that the results indicated a need for training and exposure to computer-related technology for administrators since their lack of experience might have

an influence on their decisions on the implementation and use of computers related technology in their schools.

Resistance to Change

Teachers of school, workers at institutions, and members of organizations might resist change for several reasons. According to Tozer (1997) there are various reasons to prevent carrying out of change, these reasons are:

> (1) ingrained norms and habits, (2) lack of confidence in plans, (3) fear of failure, (4) lack of understanding the reason why, (5) threats to status, (6) perception of self/others, (7) fear of loss, (8) fear of the unknown, (9) lack of social proof, (10) conflicting priorities, (11) confusion, (12) unclear benefits, (13) fear of redundancy or lack of skills, (14) lack of information, and (15) lack of motivation. (p. 256)

According to Al-Oteawi (2002), the technology educational index project has six steps that help planners in developing and improving a technology change plan. These six steps are: (1) establish that change is needed and is possible, (2) initiate an in-depth analysis of the problem, (3) devise a solution to the problem, (4) introduce the solution, (5) ensure that the solution is being implemented, and (6) evaluate the effectiveness. Also, Tozer (1997) offers three questions which are fundamental for creating the rationale for a change plan. The process of creating a rationale may remove some resistance to change. These three questions are: "(1) where are we now? (2) where are we going? and (3) how do we get there?" (p. 262).

Diffusion of Innovation

Schone (1989) reported that "Diffusion research has only recently matured into a conceptual framework consisting of an integrated compilation of concepts and generalization" (p. 10). According to Rogers (1995) diffusion is "the process by which an innovation is communicated through certain channels over tine among the members of a social system" (p. 5). Rogers found that adoption of new innovation is an active process that involves constant reinvention. Schone stated that diffusion is "a specific type of communication concerned with the exchange of information pertaining to new ideas, and results in an agreement upon the meaning attached to them" (p. 11). In 1994, education diffusion studies numbered 359 or 9% of the overall diffusion research (Rogers). This will be important in terms of the social system in Riyadh.

Home Computers

The short definition of a home computer is a personal computer for use in the home. A home computer often has better graphics, sound and animation than business computers, and is usually sold for purposes of education, word processing, and games. The home computer, as the name indicates, tends to be used in the home rather than in business. These are also members of the class known as personal computers. These computers typically cost much less than business, scientific or engineering-oriented desktop personal computers, and are generally less powerful in terms of memory and expandability. According to Didday (1977) "home computers or personal computers are computers (almost always microcomputers) that people use in their home, with friends, or in small business, that is, that are not used industry or universities for scientific or engineering problems or for large commercial data processing jobs" (p. 4). Currently, the

home computer is cheaper for the general public due to the mass production of the silicon chip and abundant production. Also, it is often connected directly to the family TV set as a video display and sound system. So, the home computer is specially configured for use in a home rather than an office. In addition, computer companies often bundle educational packages, and recreational software with home computers. The home computer is supposed to cost less than $800, and is supposedly used for educational software, recreational programs, and it also has the ability to access the Internet. Educational software is used to improve students' skills in reading and writing.

Computers and Student Achievement

Relatively recent research reveals mixed outcomes related to the use of computers in supporting student achievement. For instance, Ury (2004) found that the online delivery method was successful, but the online students showed an important lower mean score as measured by their final course grades than students enrolled in traditional sections of the course. Underscoring this finding, Guan (2007) reported that "some researchers have found that there is no significant difference in learning performance between students in online course and traditional course" (p. 38). Roberts (2002) investigated the instructional technique of collaborative learning, in conjunction with the use of computers as a learning tool. Roberts found that this technique facilitates learning better than any other such combination of variables investigated. He reported that the findings support Jonassen's postulate that the way computers are used in instruction determines the extent to which they affect learning (Jonassen, 2004).

Jonassen (2004) reported that "two large meta-analysis on the effectiveness of computer-assisted instruction concluded that use technology markedly improved learning

outcomes" (p. 797). Also, Jonassen (2004) mentioned that "computer-assisted cooperative learning, compared with competitive and individualistic efforts at the computer, promoted:

1. A higher quantity of daily achievement.
2. A higher quality of daily achievement.
3. Greater mastery of factual information.
4. Greater ability to apply one's factual knowledge in test questions requiring application of facts.
5. Greater ability to use factual information to answer problem-solving questions.
6. Greater success in problem solving" (p.798).

Studies of the Impact of Home Computer on Student Academic Achievement

If personal computers are used to facilitate teaching and learning in schools, then a home computer as a tool to improve student academic achievement might be considered a potential input in an educational production function if we design educational programs to use in schools. Moreover, integrating computers into classroom instruction without supplying the means to use them in their home pedagogically lessens the chance for a positive impact of the computers on student achievement. So, it is very important to integrate the new computers into the curriculum.

Golden (2007) conducted a study that focused on the impact in-home access to computers and the Internet has on student skills and achievement, this research study was conducted with an experimental design of 355 fifth grade students across 22 schools in four urban school districts in Pennsylvania. Students were selected through the recruitment of households without in-home computers, and then randomly assigned to

treatment or control groups. The treatment families were provided with in-home computers and the Internet access. The study results indicated that the provision of a refurbished computer and the Internet access to families who otherwise did not own a computer increased students' computer skills and their use of computers for school and recreation, and it changed their attitudes and self-beliefs about computers. It also had a significant impact on their home activities and parental involvement. In regard to this the researcher advised further studies in this field.

The home computer is not only to improve student academic achievement, but also to develop minds and bodies of children. Li, Atkins, and Stanton (2006) conducted a study examining the impact of computer use on school readiness and psychomotor skills. The number of children who participated in this study were 122 children. Children in the experimental group were given the opportunity to work on a computer for 15-20 minutes per day with their choice of developmentally appropriate educational software, while the control group received a standard Head Start curriculum. The results of study indicated the importance of early childhood computer use in the development of minds and bodies of children.

Judge (2005) conducted a study that examined the relationship between academic achievement of young African American children and access to and use of computers in their school and home. The purpose of this research was to study the relationship between academic achievement and computer use. The number in the sample was 1,601 African American public school children who attended kindergarten and 1st grade. The results indicated that access to and use of a home computer was positively correlated with academic achievement.

Tsikalas and Gross (2002) conducted a study that focused on the effects of computing on students' educational performance and progress. It examined direct relationships between computer-based activities and schoolwork and/or attitudes about school and education. The sample size of this study was 89 students, 43 males and 46 females, and ranging in age from 12 to 15 years. Participants were enrolled as seventh or eighth grades at one of two public middle schools in New York city. The results revealed that positive impacts would be observed with greater frequency among students who used computers at home. Students that engage in home computing practices that maximize psychological need fulfilment are more likely to report positive attitudes about school, themselves, and the impact of home computing thereon.

Media Comparison Studies

Historically, controversies have also arisen about the relationship between information technology and pedagogy. A classic example of this is the debate between Clark and Kozma on the role of media in influencing learning. Clark (1983) argued that media are mere vehicles that deliver instruction but do not influence students' achievement any more than the truck that delivers our groceries causes changes in our nutrition. Kozma (1991) responded to Clark's argument. He argued that media surely influences learning, so media selection is significant in instruction. Kozma reframed Clark's question as to whether cognitively relevant characteristics of technologies, symbol systems, and processing capabilities affect learning outcomes. Also, Kozma argued that various studies showed that innovative application of new media resulted in improved learning outcomes. Clark argued that the most currently summarized and meta-

analyzed of media comparison studies suggested that media did not influence learning under any conditions.

Learning Theories

According to Dede (2006), there are various learning theories in the field of education. There are three competing schools of thought on how people learn: (1) behaviorism; learning is based on experience, (2) cognitivism; learning involves both experience and thinking, and (3) constructivism; learning involves constructing one's own knowledge, instruction centers on helping learners to actively invent individual meaning from experience. These theories attempt to explain the complex process of learning. Also, Dabbagh (2009) asserted that there are basic principles of instructional learning theories: (1) behaviorism believes that learning happens when a correct response is demonstrated following the presentation of a specific environmental stimulus, (2) cognitivism believes that learning is a change of knowledge state, and (3) constructivism believes that learners build personal interpretation of the world based on experiences and interactions. This study concentrates on the constructivist learning theory. Constructivists advocate that learning will be affected both by the framework in which an idea is taught and individual student beliefs and attitudes (Jones, Palinscar, Ogle, & Carr, 1987). According to Rogers (1995) who developed the humanist learning theory, the student has a natural eagerness to learn new things. However, this eagerness is replaced by resistance when they have to give up what is currently being held true. Also, Rogers believed that learning should include these ideas: (1) the need to learn should come from within the student, (2) learning should bring a change in the student's behavior and attitude, and (3) the student is the best judge of whether the instruction meets the learning needs.

Summary

The purpose of this chapter was to present the research and literature related to technology use in education, focusing on the computer curriculum in the Kingdom of Saudi Arabia and the impact of home computers on academic achievement. Great changes have occurred in the education system in the Kingdom of Saudi Arabia since 1953 when the Ministry of Education was established. The number of schools, students, teachers, funds, and budgets are increasing every year, drawing statistical information that this trend holds true for both male and female schools, which benefit from education in pre-school, elementary, intermediate, secondary stages of education, and develop infrastructure of schools. The literature, by and large, reveals using home computers can be correlated positively with students' academic achievement. This literature review considers the constructivist learning theory. Constructivists' advocate that learning will be affected both by the framework in which an idea is taught and individual student beliefs and attitudes. These provide the backdrop and theoretical framework as this researcher investigates the impact of home computers on 12th grade students' achievement in computers science curriculum in Riyadh, Saudi Arabia.

Chapter 3

METHODOLOGY

This chapter provides a description of the study methodology including the study population, a description of the study sample and the criteria followed for choosing the sample. It also addresses the tools used in collecting the data and testing it for reliability and validity. A description of the field test is given, followed by the study procedures and the statistical tests that were used in this study.

Population

The population of the study is a subset of the 12^{th} grade male and female students in Saudi high schools in the city of Riyadh. The Riyadh region consists of four educational districts. According to the educational system in Saudi Arabia, male students' schools are separated from female students' schools. Also, the parts of computer science curriculum are exactly the same between the two genders.

The Study Sample

The researcher sought a pool of 240 male and female students from 12th grade students in Riyadh's schools from all four educational districts. There are two school types in each district, one type of school is for males and the other type of school is for females. A total of eight schools were selected from the districts. The schools were

selected randomly by writing down all the male schools' names from within a district individually, placing the names in one box, and picking only one. The same procedure repeated for the female schools. This procedure was repeated for all the districts' schools. Students were selected randomly from each school. These divided into two categories for each school, students with home computers and students without home computers. From each category 15 male and 15 female students were selected randomly.

The sample selected was based on the characteristics of gender and district as shown in the following table.

Table 1

Distribution of the Study Sample According to their Characteristics: 12th Grade Students

Education Center	Males		Females		
	U.H.C	N.U.H.C	U.H.C	N.U.H.C	Total
Riyadh North	15	15	15	15	60
Riyadh East	15	15	15	15	60
Riyadh West	15	15	15	15	60
Riyadh South	15	15	15	15	60

U.H.C = Using Home Compute, N.U.H.C = Not Using Home Computer

Criteria for Study Sample Selection

Qualifications for students to fit into any particular group were based on the following. First, for a student to fit into the "students having a home computer" sample, students met the following criteria: (1) the student was 18 years of age or older, (2) the student was selected randomly, (3) the student was in the third level of high school, (4) the student was in Riyadh city, Saudi Arabia, (5) the student was in only one educational

region, (6) the student was enrolled in the computer science curriculum, (7) the student had a home computer, (8) the student had the computer for a minimum of one year in order to cover the computer curriculum, and (9) the student was using the computer on a daily or almost daily basis.

Second, for a student to fit into the "students not having a home computer" sample, the student met the following criteria: (1) the student was 18 years of age or older, (2) the student was selected randomly, (3) the student was in the third level of high school, (4) the student was in Riyadh city, Saudi Arabia, (5) the student was in only one educational region, (6) the student was enrolled in the computer science curriculum, (7) the student did not have a home computer, and (7) the student was not using a computer outside the home on a daily basis.

Study Design

This study used a descriptive design and quantitative method to analyze the data. There were two main groups of students in this study: (1) students who use a home computer, (2) students who do not use a home computer. Each of the two groups were divided into subgroups according to the educational district (North, South, East, and West districts) and according to the gender (male or female). The researcher used a descriptive comparative design to compare the student sample groups in order to determine the effect of using home computers on the male and female students' achievement in the computer science curriculum for the 12^{th} grade student in the city of Riyadh. Analysis was also conducted to determine whether or not that effect changed according to the educational district and the students' gender.

Hypotheses

1. There is not a statistically significant difference in the mean scores of students' achievement in the computer science curriculum between students who use home computers and students who do not use home computers.
2. There is not a statistically significant difference in the mean scores of students' achievement in the computer science curriculum between male and female.
3. There is not a statistically significant difference in the mean scores of students' achievement in the computer science curriculum among the school districts.
4. There is not a statistically significant interaction between gender and student types (those who use home computers – those who do not use home computers) in the mean scores of students' achievement in the computer science curriculum.
5. There is not a statistically significant interaction between school district (North, South, East, and West) and student types (those who use home computers – those who do not use home computers) in the mean scores of students' achievement in the computer science curriculum.
6. There is not a statistically significant interaction between school district (North, South, East, and West) and gender in the mean scores of students' achievement in the computer science curriculum.
7. There is not a statistically significant interaction among student types (those who use home computers – those who do not use home computers), gender and school district (North, South, East, and West) in the mean scores of students' achievement in the computer science curriculum.

8. There is not a statistically significant correlation between the students' achievement in the computer science curriculum and the length of the time using a computer at home.
9. There is not a statistically significant correlation between the students' achievement in the computer science curriculum and the level of use of a computer at home.
10. There is not a statistically significant correlation between the students' achievement in the computer science curriculum and the level of use of a computer outside of home.

The Study Instruments

To investigate the hypotheses and reach the goals of this study, the study used two instruments, a survey and an achievement test, which are described below.

The Survey

The researcher created a survey to collect demographic data from the students. The survey included gender and educational districts. The survey also contained questions that enabled the researcher to decide whether or not the students surveyed fit the study criteria and the classifications used (those who use or do not use a home computer). See Appendix A for the survey.

To support development of the survey, the researcher consulted a group of 10 graduate students who were asked to evaluate the survey and give the researcher feedback on the translation into Arabic; also the researcher sent the instruments to the computer science curriculum educators in Saudi Arabia using an E-mail list provided by

the Computer Club in Riyadh City for the same purpose. Based on the graduate students' and educators' comments, some items of the instruments were adjusted.

After designing the survey in English, the survey was translated into Arabic. To maintain the consistency of the concepts in their original form, an Arabic expert in the Department of TESL (Teaching English as a Second Language) at Indiana State University reviewed the Arabic version and provided his translation back into the English language. Finally, a specialist in Arabic and English languages reviewed the final version and compared it with the original one to ensure that the language of the survey appropriate for the computer science curriculum.

The Achievement Test

The researcher used an achievement test that had been developed by the curriculum specialists in the Ministry of Education in conjunction with the curriculum science teachers from all male and female schools in the districts. The achievement test covered the content of six chapters from the text of the curriculum; this test included the following:

1. Problem solving procedure
2. Introduction to programming
3. Programming using Visual Basic
4. Computer networking
5. The Internet
6. New technology

The achievement test covered the six chapters in the computer science curriculum texts. The test was constructed with 25 multiple choice questions cover the six chapters.

Field Test

The computer science achievement test was recently developed and had not yet been tested with the students in the district; therefore, a field test was conducted to determine the reliability and validity of the test. The researcher conducted a field test of the district achievement test on a small sample of 15 male and 15 female students who had already completed the computer science curriculum in the previous year. The researcher examined the reliability by conducting the Cronbach's Alpha Coefficient to establish internal consistency of the test. The Cronbach's Alpha Coefficient for the test was 0.91; the test demonstrated very good internal consistency. To establish criterion-related validity, a Pearson's Correlation was conducted to examine if the achievement test scores correlated with these students' regular achievement scores from the previous year. The result showed that there was a statistically significant correlation between the achievement test scores and the students' regular achievement scores from the previous year; $r = .85, p < .005$. The test demonstrated very good validity. The field study also helped the researcher discover any difficulties to be faced when conducting the actual study. No difficulties were encountered.

Study Procedures

The researcher used the following steps in conducting the study and in collecting and analyzing the data to answer the research questions of the study:

1. The researcher obtained the necessary IRB approval to conduct the study.
2. The researcher obtained other required approvals in the country under study (i.e., Kingdom of Saudi Arabia).

3. The researcher, with the expressed permission of the Ministry of Education, met with the Educational Training Department to discuss the study procedures. Because the Educational Training Department was the liaison and intermediary between the researcher and the schools, it was important for the procedures to be clear to not only ensure a good return but also to ensure that the unit understands the importance of the study.
4. Because all students in Saudi schools must be at least six years old to begin school, all students in the 12^{th} grade are 18 years of age or older. Therefore, parental permission is not required. For this reason, anonymous consent forms were developed for the students alone. The researcher sent the consent forms to the Educational Training Department to ensure the departments' knowledge of the forms.
5. The researcher created packets for each of the students who participated in the study. In the packet, the anonymous consent form, the survey and the achievement test were stapled together so that there was no need for individual students to enter their names on either. The teacher of each class was given written directions for administering the survey and test with the attached anonymous consent forms. Before the teacher returned the survey and achievement test to the Educational Training Department, the teacher recorded the student's test scores for his or her own records as the test was part of what all students complete and the teacher needed that score for configuring final grades. The teacher returned the survey and achievement tests to the Educational Training Department who, in turn, returned the packets to the researcher.

6. Once the researcher received the surveys and tests, the surveys and test were divided by district, school, and student computer use. From these divisions, the researcher drew the random sample as outlined earlier. Once the selections were made, the researcher checked the score to ensure the test had been scored accurately.
7. The researcher collected the data and organized it in tables for his statistical analysis.

Statistical Analysis

For this study, there is one dependent variable that represents academic achievement in the computer science curriculum of the 12^{th} grade students. There are three independent variables which are the student types (those who use home computers – those who do not use home computers), gender (male or female), and school district (North, South, East, or West). Therefore, the most suitable statistical analysis to be used in comparing between the groups of study is a fixed effect 2 X 2 X 4 analysis of variance (ANOVA). In the case of a statistically significant interaction appearing, the researcher continued additional analyses using tests of simple main effects. Due to the fact that the educational district contains four levels, in the case of statistically significant differences among these levels, the researcher conducted Scheffé as a post hoc test in order to test all pair-wise comparisons across district levels.

Pearson's correlation was used in this study to determine the relationship between the following variables:

1. The students' achievement in the computer science curriculum and the length of the time using a computer at home.

2. The students' achievement in the computer science curriculum and the level of use of a computer at home.
3. The students' achievement in the computer science curriculum and the level of use of a computer outside of home.

Chapter 4

PRESENTATION OF RESULT AND ANALYSIS OF DATA

Overview

The purpose of this chapter is to describe the results found in the quantitative data collected in both a single achievement exam and a single survey from a sample of 240 Saudi high school students. Both survey and achievement exam were split equally between male and female students. The primary purpose of this study was aimed at specifying the impact of home computer use on academic achievement in the computer curriculum of the 12^{th} grade students in Riyadh, Kingdom of Saudi Arabia. In particular, the study attempted to determine if the use of home computers would be an effective tool for increasing students' academic achievement. This chapter contains a presentation of results and analysis of data with regard to the ten study questions.

Characteristics of the Participants

The participants of the study are a subset of the 12th grade male and female students in Saudi high schools in the city of Riyadh, Kingdom of Saudi Arabia. The Riyadh region consists of four educational districts. According to the educational system in Saudi Arabia, male students' schools are separated from female students' schools. However, the content of the computer science curriculum is exactly the same between the

two genders. A total of 240 students, 120 female and 120 male, participated in the study's survey and the achievement exam.

Results - First Seven Hypotheses

To investigate the first seven hypotheses, Univariate ANOVA was conducted with achievement exam as the dependent variable and student types, gender, and district as independent variables. This analysis test created three main effects and four interactions which are:

1. The interaction between student types, gender, and district.
2. The interaction between student types and gender.
3. The interaction between student types and district.
4. The interaction between gender and district.
5. The main effect of student types.
6. The main effect of gender.
7. The main effect of school district.

Interaction between Student Types, Gender, and District

There was no statistically significant interaction between student types, gender and district in the mean scores of students' achievement in the computer science curriculum, $F(3,224) = .80$, $p = .494$ (See Table 11). That means, all three independent variables (student types, gender, and district) do not interact to create differences in the exam grade. Therefore, no additional analyses for this question were needed.

Interaction between Student Types and Gender

There was a statistically significant interaction between student types and gender in the mean scores of students' achievement in the computer science curriculum, $F(1,224)$

= 21.13, p<.001, (partial η^2 = .09) (See Table 11). To test the interaction between student types and gender in the mean scores of students' achievement in the computer science curriculum, tests of simple main effects were conducted in order to examine differences between male and female students within each student type. Male students in the two groups (students who have a home computer and students who do not have a home computer) had significantly higher scores in achievement in the computer science curriculum, when each group of them was compared with their partners in the female group (See Tables 2 and 3).

Table 2

One Way ANOVA Results for Differences between Home Computer across Gender

H.Computer	Source	*SS*	*df*	*MS*	*F*
Yes	Between Groups	38306.13	1	38306.13	209.48*
	Within Groups	10107.73	224	182.86	
No	Between Groups	11623.01	1	11623.01	63.56*
	Within Groups	42418.58	224	182.86	

Note. The F values presented in table 2 have been recalculated based on the initial Mean Square Error (182.86) which was obtained from the original factorial ANOVA analysis (Table 11). $*p < .05$.

Tests of simple main effects were conducted in order to examine differences between students who have a home computer and students who do not have a home computer within each gender. Students who have a home computer in the two groups (male and female) had significantly higher scores in achievement in the computer science curriculum when compared with their partner students who do not have a home computer (See Tables 10 and 11).

Table 3

One Way ANOVA Results for Differences between Gender across Home Computer

Gender	Source	*SS*	*df*	*MS*	*F*
Male	Between Groups	52208.41	1	52208.41	285.51*
	Within Groups	26904.18	224	182.86	
Female	Between Groups	19763.33	1	19763.33	108.08*
	Within Groups	25622.13	224	182.86	

Note. The F values presented in table 3 have been recalculated based on the initial Mean Square Error (182.86) which was obtained from the original factorial ANOVA analysis (Table 11). $*p < .05$.

Interaction between Student Types and District

There was a statistically significant interaction between student types and district in the mean scores of students' achievement in the computer science curriculum, $F(3,224) = 5.27$, $p = .002$, (partial $\eta^2 = .07$) (See Table 11). To test the interaction between student types and district in the mean scores of students' achievement in the computer science curriculum, tests of simple main effects were conducted in order to examine differences between students who have a home computer and students who do not have a home computer within each district. For all districts (North, East, West, South) the students who have a home computer had significantly higher scores in achievement in the computer science curriculum compared with their partner students who do not have a home computer (See Table 4).

Table 4

One Way ANOVA Results for Differences between Districts across Computer

District	Source	*SS*	*df*	*MS*	*F*
North	Between Groups	18305.07	1	18305.07	100.10*
	Within Groups	29528.53	224	182.86	
East	Between Groups	9300.15	1	9300.15	50.86*
	Within Groups	34140.43	224	182.86	
West	Between Groups	29040.00	1	29040.00	158.81*
	Within Groups	18149.33	224	182.86	
South	Between Groups	14353.07	1	14353.07	78.49*
	Within Groups	15221.33	224	182.86	

Note. The F values presented in table 4 have been recalculated based on the initial Mean Square Error (182.86) which was obtained from the original factorial ANOVA analysis (Table 11). $*p < .05$.

Tests of simple effects, followed by post hoc comparisons using Scheffé, were also conducted to examine differences in the mean scores of students' achievement in the computer science curriculum among the districts for each student types group. For the students who have a home computer, there was statistically significant difference among the districts in the mean scores of students' achievement in the computer science curriculum, $F(3,224) = 5.34, p<.05$. For the students who have a home computer, those in the West district scored significantly higher than those in the East and North districts. Additionally, the students who have a home computer in the South district scored significantly higher than those in the East and North districts (See Tables 5 and 6). For the students who do not have a home computer, there were statistically significant

difference among the district in the mean scores of students' achievement in the computer science curriculum, F (3,224) = 4.54, p<.05. For the students who do not have a home computer, those in the South district scored significantly higher than those in the North and West districts. Additionally, the students who do not have a home computer in the East district scored significantly higher than those in the North and West districts (See Tables 5 and 6).

Table 5

One Way ANOVA Results for Differences between Home Computer across Districts

H.Computer	Source	*SS*	*df*	*MS*	*F*
Yes	Between Groups	2928.00	3	976.00	5.34*
	Within Groups	45485.87	224	182.86	
No	Between Groups	2487.83	3	829.28	4.54*
	Within Groups	51553.77	224	182.86	

Note. The F values presented in table 5 have been recalculated based on the initial Mean Square Error (182.86) which was obtained from the original factorial ANOVA analysis (Table 11). * $p < .05$.

Table 6

Total Mean and Standard Deviation Values for Each Group

Group	District	*M*	*SD*	*N*
Students who have a home computer	North	66.27	20.50	30
	East	64.53	25.53	30
	West	76.67	14.78	30
	South	73.07	16.67	30
	Total	70.13	20.17	120
Students who do not have a home computer	North	31.33	24.46	30
	East	39.63	22.92	30
	West	32.67	20.18	30
	South	42.13	15.71	30
	Total	36.44	21.31	120

Interaction between Gender and District

There was a statistically significant interaction between gender and district in the mean scores of students' achievement in the computer science curriculum, $F(3,224) = 10.41$, $p<.001$, (partial $\eta^2 = .12$) (See Table 11). To test the interaction between gender and district in the mean scores of students' achievement in the computer science curriculum, tests of simple main effects were conducted in order to examine differences between male and female students within each district. For all districts (North, East, West, South) the male students had significantly higher scores in achievement in the computer science curriculum, when each district was compared with their partners in the

female group.

Tests of simple effects, followed by post hoc comparisons using Scheffé, were also conducted to examine differences in the mean scores of students' achievement in the computer science curriculum among the districts for each gender group. For male students, there were no statistically significant difference among the districts in the mean scores of students' achievement in the computer science curriculum, $F(3,224) = 2.07, p > .05$. (See Tables 7, 8, and 9).

For female students, there were statistically significant differences among the districts in the mean scores of students' achievement in the computer science curriculum, $F(3,224) = 12.94$, $p<.05$. (See Tables 7, 8, and 9). The female students in the South district had significantly higher achievement scores in the computer science curriculum than the female students in the East and North districts. There was no statistically significant difference in the achievement scores in the computer science curriculum between the female students in the West and South districts (See Table 10).

Table 7

One Way ANOVA Results for Differences between Gender across Districts

Gender	Source	*SS*	*df*	*MS*	*F*
Male	Between Groups	1137.49	3	379.16	2.07
	Within Groups	77975.10	224	182.86	
Female	Between Groups	7098.00	3	2366.00	12.94*
	Within Groups	38287.47	224	182.86	

Note. The F values presented in table 7 have been recalculated based on the initial Mean Square Error (182.86) which was obtained from the original factorial ANOVA analysis (Table 11). $*p < .05$.

Table 8

One Way ANOVA Results for Differences between Districts across Gender

District	Source	*SS*	*df*	*MS*	*F*
North	Between Groups	16666.67	1	16666.67	91.14*
	Within Groups	31166.93	224	182.86	
East	Between Groups	24847.35	1	24847.35	135.88*
	Within Groups	18593.23	224	182.86	
West	Between Groups	6161.07	1	6161.07	33.69*
	Within Groups	41028.27	224	182.86	
South	Between Groups	4100.27	1	4100.27	22.42*
	Within Groups	25474.13	224	182.86	

Note. The F values presented in table 8 have been recalculated based on the initial Mean Square Error (182.86) which was obtained from the original factorial ANOVA analysis (Table 11).

* $p < .05$.

Table 9

Total Mean and Standard Deviation Values for Each Gender

Gender	District	*M*	*SD*	*N*
Male	North	65.47	26.08	30
	East	72.43	19.88	30
	West	64.80	30.40	30
	South	65.87	26.26	30
	Total	67.14	25.78	120
Female	North	32.13	19.86	30
	East	31.73	15.68	30
	West	44.53	22.15	30
	South	49.33	13.75	30
	Total	39.43	19.53	120

Main Effect of Using Home Computer

The main effect of using a home computer was statistically significant in the mean scores of students' achievement in the computer science curriculum, $F(1, 224) = 372.46$, $p<.001$ (partial $\eta^2 = .62$) (See Table 11). Students who have a home computer accrued significantly higher scores in the computer science curriculum than students who do not have a home computer.

Main Effect of Gender

The main effect of gender was statistically significant in the mean scores of students' achievement in the computer science curriculum, $F(1, 224) = 251.92$, $p<.001$

(partial $\eta^2 = .53$) (See Table 11). The male students accrued significantly higher scores in the computer science curriculum than the female students.

Main Effect of District

The main effect of district was statistically significant in the mean scores of students' achievement in the computer science curriculum, $F(2, 224) = 4.60$, $p = .004$ (partial $\eta^2 = .06$) (See Table 11). Post hoc comparisons using Scheffé were conducted. The students in the South district accrued significantly higher mean scores in the computer science curriculum than the students in the North district. There were no statistically significant differences in mean scores in the computer science curriculum between the students in the East and West districts (See Table 10).

Table 10

Descriptive Statistics: Summary of Achievement across Groups

Gender		North		East		West		South	
		U.H.C $n = 30$	*N.U.H.C* $n = 30$	*U.H.C* $n = 30$	*N.U.H.C* $n = 30$	*U.H.C* $n = 30$	*N.U.H.C* $n = 30$	*U.H.C* $n=30$	*N.U.H.C* $n=30$
Male	*M*	85.07	45.87	89.33	55.53	90.40	39.20	87.20	44.53
$n= 120$	*SD*	8.07	22.82	3.27	13.99	2.95	22.38	9.94	18.81
Female	*M*	47.47	16.80	39.73	23.73	62.93	26.13	58.93	39.73
$n=120$	*SD*	6.91	16.30	4.65	18.73	6.32	15.85	7.00	12.04

U.H.C = Using Home Computer, N.U.H.C = Not Using Home Computer

Table 11

Univariate ANOVA Summary Table

Source	*SS*	*df*	*MS*	*F*	*Sig.*	η^2
Using Home Computer	68107.70	1	68107.70	372.46	.001*	.62
Gender	46065.10	1	46065.10	251.92	.001*	.53
District	2525.25	3	841.75	4.60	.004*	.06
Using Home Computer * Gender	3864.04	1	3864.04	21.13	.001*	.09
Using Home Computer * District	2890.58	3	963.53	5.27	.002*	.07
Gender * District	5710.25	3	1903.42	10.41	.001*	.12
Using Home Computer * Gender * District	439.85	3	146.62	.80	.494	
Error	40960.40	224	182.86			
Total	852057.00	240				

* $p < .05$.

Results of the Eighth Hypothesis

To investigate whether there is a statistically significant correlation between the students' achievement in the computer science curriculum and the length of the time using a computer at home a Pearson's Correlation was conducted. The result showed that there is a statistically significant negative correlation between the students' achievement in the computer science curriculum and the length of time using a computer at home, $r = -.215$, $p = .018$ (See Table 12).

Results of the Ninth Hypothesis

To investigate whether there is a statistically significant correlation between the students' achievement in the computer science curriculum and the level of use of a computer at home a Pearson's Correlation was conducted. The result showed that there is not a statistically significant correlation between the students' achievement in the computer science curriculum and the level of use of a computer at home, $r = .116$, $p = .208$ (See Table 12). Regarding the level of use, for students using home computers, 82.5% indicated that they used the computer for multiple tasks while only 2% reported using it for learning exclusively. Approximately 11% reported using computers for browsing, 3% for gaming, and less than 1% for chatting. No students selected the Other category. Neither did any students select any of the remaining categories. Moreover, some students did not indicate any response for that question.

Results of the Tenth Hypothesis

To investigate whether there is a statistically significant correlation between the students' achievement in the computer science curriculum and the level of use of a computer outside of home a Pearson's Correlation was conducted. The result showed that there is not a statistically significant negative correlation between the students' achievement in the computer science curriculum and the level of use of a computer outside of home, $r = -.010$, $p = .895$ (See Table 12). Regarding the level of use, for students using computers outside the home, 20% reported that they used the computer for multiple tasks while none reported using it exclusively for learning, though 2% did report they used it for programming. Approximately 5% reported using the computer for chatting, and one student indicated use of the computer that fell into the Other category

but the student did not specify what that use was. Neither did any students select any of the remaining categories. Moreover, some students did not indicate any response for that question.

Table 12

Correlation and Descriptive Statistics

Grade	*r*	*p*
The Length of the Time Using a Computer at Home	-.215	.018*
The Level of Use of a Computer at Home	.116	.208
The Level of Use of a Computer Outside of Home.	-.010	.895

* $p < .05$.

Summary

The purpose of this study was to determine the impact of home computers on 12th grade students' achievement in the computer science curriculum in Riyadh, Kingdom of Saudi Arabia. Specifically, this study sought to determine if there were statically significant differences in students' achievement when they use their home computers. The results of this study were displayed throughout this chapter. There were 10 findings in this study as the researcher performed ANOVA analysis on the scores collected from both male and female schools.

The finding for the first hypothesis was that there was no statistically significant interaction between student types, gender and district in the mean scores of students' achievement, $F(3,224) = .80$, $p = .494$

The finding for the second hypothesis was that there was a statistically significant interaction between student types and gender in the mean scores of students'

achievement, $F(1,224) = 21.13$, $p<.001$. Tests of simple main effects were conducted in order to examine differences between male and female within each student type. Males in the two groups (students who have a home computer and students who do not have a home computer) had significantly higher scores in achievement when each group of them was compared with their partners in the female group. Also, students who have a home computer in the two groups (male and female) had significantly higher scores in achievement compared with their partner students who do not have a home computer.

The finding for the third hypothesis was that there was a statistically significant interaction between student types and district in the mean scores of students' achievement, $F(3,224) = 5.27$, $p = .002$. Tests of simple main effects were conducted in order to examine differences between students who have a home computer and students who do not have a home computer within each district. For all districts (North, East, West, South) the students who have a home computer had significantly higher scores in achievement compared with their partner students who do not have a home computer. Also, tests of simple effects, followed by post hoc comparisons using Scheffé, were conducted to examine differences in the mean scores of students' achievement among the districts for each student type group. For the students who have a home computer, there was a statistically significant difference among the districts in the mean scores of students' achievement, $F(3,224) = 5.34$, $p<.05$. For the students who have a home computer, the student in the West district scored significantly higher than those in the East and North districts. Additionally, the students who have a home computer in the South district scored significantly higher than those in the East and North districts. For the students who do not have a home computer, there was a statistically significant

difference among the districts in the mean scores of students' achievement, F (3,224) = 4.54, p<.05. The students in the South district scored significantly higher than those in the North and West districts. Additionally, the students who do not have a home computer in the East district scored significantly higher than those in the North and West districts.

The finding for the fourth hypothesis that there was a statistically significant interaction between gender and district in the mean scores of students' achievement, F(3,224) = 10.41, p<.001.Tests of simple main effects were conducted in order to examine differences between male and female students within each district. For all districts (North, East, West, South) the male students had significantly higher scores in achievement in the computer science curriculum, when each district was compared with their partners in the female group. Tests of simple effects, followed by post hoc comparisons using Scheffé, were also conducted to examine differences in the mean scores of students' achievement among the district for each gender group. For male students, there were no statistically significant differences among the districts in the mean scores of students' achievement, F(3,224) = 2.07, p>.05. For female students, there were statistically significant differences among the districts in the mean scores of students' achievement, F(3,224) = 12.94, p<.05. The female students in the South district had significantly higher achievement scores than the female students in the East and North districts. Also, there was no statistically significant difference in the achievement scores between the female students in the West district and all other three districts.

The finding for the fifth hypothesis was that the main effect of using a home computer was statistically significant in the mean scores of students' achievement in the

computer science curriculum, $F(1, 224) = 372.46$, $p<.001$. The students who have a home computer accrued significantly higher scores in the computer science curriculum than students who do not have a home computer.

The finding for the sixth hypothesis was that the main effect of gender was statistically significant in the mean scores of students' achievement, $F(1, 224) = 251.92$, $p<.001$. The male students accrued significantly higher scores in the computer science curriculum than the female students.

The finding for the seventh hypothesis was that the main effect of district was statistically significant in the mean scores of students' achievement, $F(2, 224) = 4.60$, $p = .004$. Post hoc comparisons using Scheffé were conducted. The students in the South district accrued significantly higher mean scores in the computer science curriculum than the students in the North district. There were no statistically significant differences in mean scores in the computer science curriculum between the students in the East and West districts.

For the eighth hypothesis a Pearson's Correlation was conducted to examine if there is a relationship between the students' achievement in the computer science curriculum and the length of the time using a computer at home. The result showed that there is a statistically significant negative correlation between the students' achievement and the length of the time using a computer at home, $r = -.215$, $p = .018$.

For the ninth hypothesis a Pearson Correlation was conducted to examine if there is a relationship between the students' achievement and the level of use of a computer at home. The result showed that there is not a statistically significant correlation between the students' achievement and the level of use of a computer at home, $r = .116$, $p = .208$.

The students indicated that they used computers for multiple purposes, not for learning alone.

For the tenth finding hypothesis a Pearson's Correlation was conducted to examine if there is a relationship between the students' achievement in the computer science curriculum and the level of use of a computer outside of home. The result showed that there is not a statistically significant negative correlation between the students' achievement in the computer science curriculum and the level of use of a computer outside of home, $r = -.010$, $p = .895$. Finally, the students indicated that they used computers for multiple purposes, not for learning alone.

Chapter 5

DISCUSSION AND RECOMMENDATIONS

The goal of this study was to determine if using a home computer was effective in 12th grade students' academic achievement in the computer science curriculum in Riyadh, Kingdom of Saudi Arabia. This chapter contains a discussion of the study results. In addition, it includes a summary of the study and interpretation of the significant findings of this study, recommendations for future research, a conclusion, and the researcher's reflections.

Discussion of the Study Results

In this research, various aspects related to the impact of home computers on 12th grade students' academic achievement in the computer science curriculum in Riyadh, Kingdom of Saudi Arabia, were tested and the results gathered. The discussion in this study emphasizes the following aspects.

First Research Question

The first question stated, "Is there a statistically significant difference in the mean scores of students' achievement in the computer science curriculum between students who use home computers and students who do not use home computers?" The results of the study revealed that there was a statistically significant difference in the mean scores

of students' achievement in the computer science curriculum. The study results showed that the students who used a home computer had significantly higher scores in achievement in the computer science curriculum than the students who did not use a home computer in the computer science curriculum. These results have agreed with the results of other studies which revealed that the students' access to and use of a home computer were correlated positively with academic achievement (Judge, Puckett, & Bell, 2006).

Other studies also mirror the results of this study. Al-hazmi's (1987) study, which was conducted in the Junior College for Teachers in Saudi Arabia, was to test if the use of a computer can make a difference in students' achievement level in algebra. The result of the study revealed a significant difference in algebra achievement in favor of the students who used the computer as a supplementary learning tool. Another study by Al-hareky (1983) evaluated the effectiveness of modern educational technology on the mathematics performance of elementary students in Saudi Arabia. The experimental design of this study was the 3 x 2 factorial, pretest-posttest. Two classes of 20 students each were used as computer groups (one class was male and the other was female). This study found a significant difference in the total mean achievement score between the computer group and the control group, with the computer group having the higher mean score.

In Throm's (1998) study, the primary purpose was to examine the effect of use of computers on students' academic achievement. The result was a positive correlation between computers and teaching as well as computers and student achievement. In this study, the students who used a home computer had significantly higher scores in

achievement in the computer science curriculum than the students who did not use a home computer in the computer science curriculum. In light of the outcomes of this study, and supported by other related studies, the researcher recommends that technologies, including computer labs, networking and online learning communities, should be adopted in all Saudi schools to address access issues for students. These varieties of technologies in schools may help promote students using and adopting computers in their homes.

Second Research Question

The second question stated, "Is there a statistically significant difference in the mean scores of students' achievement in the computer science curriculum between males and females?" The results of the study revealed that there was a statistically significant difference in the mean scores of students' achievement. The male students accrued significantly higher scores in the computer science curriculum than the female students. Therefore, the results showed that there were differences between them in which the male students who use home computers had higher mean scores than the female students who use home computers. In addition, the male students who did not use home computers had higher mean scores than the female students who did not use home computers. It can be noted that the differences between the male and the female students were not entirely clear. Therefore, these differences could be attributed to the individual differences of the participants in the study or to the nature of cultural expectations for different genders in Saudi Arabia. For example, life practices for females are different from that of males. In general, the results showed that male students achieved higher than female students in using home computers in the computer science curriculum. Also, in higher education in

Saudi Arabia, the male students gravitate to computers science more than the female students. According to King Saud University (2006) the number of male students was more than the female students in computer science, and the number of male students was 373 in Computer and Information Sciences College, more than the female students which were 277 in the academic year 2005/2006.

This result is consistent with the results of previous studies in multiple cultures that examined differences between males and females with respect to attitudes toward computers, aptitude, and actual use. The results of this body of research showed that males used computers more than females. Kay (1992) analyzed 32 previous studies. He found that the results of most studies (78%) mentioned that males clearly used computers more than females. Also, another study conducted by Bain and Rice (2006) investigated whether gender has an effect on students' attitudes toward, and their uses of, technology. Data was collected from 59 sixth grade students to examine their attitudes toward and uses of technology. One of the major findings of this study indicated that gender does affect students' attitudes toward technology; several males indicated they were more compatible at using the computer than females (Bain & Rice). Males in the study preferred scientific specialization while females preferred humanities and social sciences. Sommers (2008) mentioned that women earn more Ph.D.s than men in the humanities, social sciences, and education. Sommers indicated that parents and teachers believe that computers are male tools because they are related to sciences and math, which are preferred by male students. There are noteworthy efforts to engage women in computer science, among them is the computer science women's network at Purdue University which is dedicated to helping women stay in the field and prosper (Mason, 2007). Still,

efforts are hampered. This is typified in the question examined by Lally (2002): "Is the home computer pink or blue?" (p. 157).

Nevertheless, the College of Computer and Information Sciences at King Saud University started the development of a new Bachelor of Science degree majoring in Information Technology for female students due to the rapid developments in technology and the market of computers. For this reason, King Saud University (KSU) encouraged a resurgence in developing teaching information sciences for female students in Saudi Arabia by scheduling several conferences to debate multiple issues that are related to technology development for female students (Al-Khalifa, Al-Ghreimil, & Al-Yahya, 2008).

The results from this study showed that male students achieved higher than female students in using home computers in the computer science curriculum. As documented through this study, the achievement of female students in the third level of high school in using computers for the computer science curriculum was not as strong as the males' achievement. The researcher recommends that the Ministry of Education consider providing incentives and rewards for female students to use after-school technology centers several times a week while in high school to test whether this will narrow the gap with their male counterparts. This should support achievement and overcome deficiencies due to the lack of computer-based technology in their homes.

Third Research Question

The third question stated, "Is there a statistically significant difference in the mean scores of students' achievement in the computer science curriculum among the school districts?" Post hoc comparisons using Scheffé were conducted. The results of the study

revealed that there was a statistically significant difference in the mean scores of students' achievement. The students in the South district accrued higher scores in the computer science curriculum than the students in the North district. Also, there were no significant differences in scores in the computer science curriculum between the students in the East and West districts. There are three important factors that have an impact on students' academic achievement across the four districts. The first factor is the social life in the district. There is a social variety among students in those four districts, it reflects on students' educational activities and affects their academic achievement. The second factor is the degree of reinforcement that the students receive from their parents. School is a social institution; it works in agreement with functionalists' theory (deMarrais & LeCompte, 1999). This theory argues that society operates like the human body. The body's organs should all work together to maintain the health and the balance of the entire body. Also, functionalists' theory has been adopted by many researchers as an analytic tool used to interpret the social system. Functionalists' theory targets the connections between the components of a societal system, and the relations between different elemental systems of a society (deMarrais & LeCompte). The parents, teachers, principals, and members of society should all work together between the components of a societal system to accomplish school's goals. The third factor is the differences in each individual school's resources. The differences in students' academic achievement across districts could be attributed to differences in each individual school's resources. Greenwald, Hedges, and Laine (1996) in their study revealed that there is strong relationship between school resources and students achievement.

As an implication from this study, there are three important factors that have an impact on students' academic achievement across the four districts. The first factor is the social life in the districts. In this study, challenges in the socially-disadvantaged and economically poor district were associated with less achievement for students. These findings should be discussed through the parents' councils in light of suggestions and strategies that were provided from parents and school management to improve students' achievement in these socially and economically disadvantaged districts. The educational administration is encouraged to open technology centers in these districts to improve students' skills needed to support achievement in the computer science curriculum.

A second factor is the degree of reinforcement that the students receive from their parents, teachers, principals, and members of society for appropriate use of the computer to support academic achievement. As suggested by the work of deMarris and LeCompte (1999), these individuals should all work together as components of a societal system to accomplish the school's goals. Parents should be encouraged to share in the school activities because students are likely to be stronger socially and academically when parents share in the educational activities at school. Additionally, parents may offer more help and support to their children because of a greater understanding of school activities. Parents may also be able to reinforce classroom procedures at home to improve the skills of students to use technology in their homework.

Finally, a third factor is the difference in each individual school's resources. Schools should provide a rich technology environment that will be an important factor to develop student skill in using computers to support their academic achievement. Therefore, the educational districts should consider allowing a larger budget for school's

resources such as computers, labs, and networking to increase technology's effect on student achievement in their classrooms. The schools could also prepare special workshops in technology which focus on the teachers' knowledge and skill levels in using and integrating technology into the computer science curriculum. The impact of these three factors was apparent in the students' achievement in this curriculum, the districts with more resources were the districts with higher achievement. Consequently, to improve the quality of Saudi education in the computer science curriculum, our children should be encouraged to use computers to do homework whether those computers are in the home or in a district-supported technology center. Furthermore, parents and other stakeholders must understand that education is only one social institution and it cannot effectively function without support from the entire community.

Fourth Research Question

The fourth research question stated, "Is there a statistically significant interaction between gender and student types (those who use home computers versus those who do not use home computers) in the mean scores of students' achievement in the computer science curriculum?" The results of the study revealed that there was a statistically significant interaction between gender and student types in the mean scores of students' achievement in the computer science curriculum. To test the interaction between student types and gender in the mean scores of students' achievement in the computer science curriculum, tests of simple main effects were conducted in order to examine differences between male and female students within each student types. Male students in the two groups (students who have a home computer and students who do not have a home computer) had significantly higher scores in achievement in the computer science

curriculum, when each group of them was compared with their partners in the female group. Tests of simple main effects were conducted in order to examine differences between students who have a home computer and students who do not have a home computer within each gender. Students who use a home computer had significantly higher mean scores in achievement in the computer science curriculum than the students who did not use a home computer in the computer science curriculum.

These results parallel other studies where their findings revealed that the students who use home computers were correlated positively with academic achievement (Judge et al., 2006). However, using school computers was strongly enhanced by the students' home computer experience. These findings underscore the importance of computer use in the development of students' minds. So, the effect of computer use at school was strongly enhanced by the students' home computer experience (Li et al., 2006).

Results of the study revealed that male students in the two groups (students who have a home computer and students who do not have a home computer) had significantly higher scores in achievement in the computer science curriculum when each group of them was compared with their partners in the female group. In Saudi Arabia, based on the social and cultural influences, female students cannot use computers in the Internet cafes, while male students can use the Internet cafes to increase their awareness in computer skills. The results highlight the need to build after-school technology centers to help female students increase their technological skills in using computers in socially acceptable settings. The schools should also increase female students' awareness and provide guidelines for using distance learning technology in their homes. This will

address the cultural realities in Saudi Arabia and will, perhaps, help parents understand appropriate use.

Fifth Research Question

The fifth research question stated, "Is there a statistically significant interaction between school district (North, South, East, and West) and student types (those who use home computers versus those who do not use home computers) in the mean scores of students' achievement in the computer science curriculum?" There was a statistically significant interaction between student types and district in the mean scores of students' achievement in the computer science curriculum. To test the interaction between student types and district in the mean scores of students' achievement in the computer science curriculum, tests of simple main effects were conducted in order to examine differences between students who have a home computer and students who do not have a home computer within each district. For all districts (North, East, West, South) the students who have a home computer had significantly higher scores in achievement in the computer science curriculum compared with their partner students who do not have a home computer.

Tests of simple effects, followed by post hoc comparisons using Scheffé, were also conducted to examine differences in the mean scores of students' achievement in the computer science curriculum among the districts for each student types group. For the students who have a home computer, there were statistically significant differences among the districts in the mean scores of students' achievement in the computer science curriculum. For the students who have a home computer, those in the West district scored significantly higher than those in the East and North districts. Additionally, the students

who have a home computer in the South district scored significantly higher than those in the East and North districts. For the students who have a home computer, those in the West district scored significantly higher than those in the South district.

Diversity of culture and disparate social levels can create a climate for or against the use of information technology in an educational county or district. Buragga (2001) found that design, development, implementation, and management of information systems and the degree to which they accommodate cultural differences are key issues. There is a social variety among students in those four districts, and it reflects on students' educational activities and affects their academic achievement.

Guided Inquiry is a dynamic way of developing the teaching methodology and enhancing the curriculum through using educational technology in those four educational districts. Also, the social support is not as strong in the East and North districts. Schools principals should encourage parents for sharing in school conferences, and support educators to develop pedagogical methods. There are two general approaches to learning. The first approach to learning is a transmission approach which is based on the teacher and the transmission of text to the student. It is an old method in learning. The second approach to learning is the constructivist approach; it is based on the active process of constructing deep understanding. Several educational theorists, such as Dewey, Vygotsky, Burner, Piaget, and Kelly, support the second approach to learning (Kuhlthau, Caspari, & Maniotes, 2007).

For the students who do not have a home computer, those in the South district scored significantly higher than those in the West and North districts. Additionally, the students who do not have a home computer in the East district scored significantly higher

than those in the West and North districts. For the students who do not have a home computer, those in the South district scored significantly higher than those in the East district. Also, for the students who do not have a home computer, both the South and East districts in Riyadh had significantly higher mean scores than those students in the North and West districts because the students in the South and East district.

Students learn differently based on what they have in their educational environment; these tools in their educational environment, such as computers, will support them to gain their educational goals (Beach, Thein, & Parks, 2008). Kozma (1991) believes that instruction should foster learning rather than control it because every learner learns differently. We should understand the students in their social districts. The style and significance of the district affects student scholastic life.

Results of the study revealed that the students who have a home computer scored higher on the achievement test and there were statistically significant differences among the districts in the mean scores of students' achievement in the computer science curriculum. Diversity of culture and disparate social and economic levels can create a climate for or against the use of information technology in any educational district. As promoted heretofore, the researcher suggests that funds be devoted to all districts equally to allow for access to technology. After-school technology centers must be properly staffed to promote appropriate use to support achievement in the computer science curriculum. Furthermore, efforts to involve parents in the education and educational settings of their students should be encouraged in order to promote parental oversight of student use of technology. For the students who do not have a home computer, there were statistically significant differences among the districts in the mean scores of

students' achievement in the computer science curriculum. Students learn differently based on what they have in their educational environment; tools such as computers in their educational environment will support them in gaining their educational goals as supported by this study's data. The researcher recommends opening computer centers in schools to allow students who do not have a home computer to use them after-school to improve skills in the computer curriculum.

Sixth Research Question

The sixth research question stated, "Is there a statistically significant interaction between school district (North, East, West, and South) and gender in the mean scores of students' achievement in the computer science curriculum?" There was a statistically significant interaction between gender and district in the mean scores of students' achievement in the computer science curriculum. To test the interaction between gender and district in the mean scores of students' achievement in the computer science curriculum, tests of simple main effects were conducted in order to examine differences between male and female students within each district. For all districts (North, East, West, and South), the male students had significantly higher scores in achievement in the computer science curriculum when each district was compared with their partners in the female group.

Tests of simple effects, followed by post hoc comparisons using Scheffé, were also conducted to examine differences in the mean scores of students' achievement in the computer science curriculum among the districts for each gender group. For male students, there were no statistically significant differences among the districts in the mean scores of students' achievement in the computer science curriculum. For female students,

there were statistically significant differences among the districts in the mean scores of students' achievement in the computer science curriculum. The female students in the South district had significantly higher achievement scores in the computer science curriculum than the female students in the East and North districts. There was no statistically significant difference in the achievement scores in the computer science curriculum between the female students in the West and South districts. These results have agreed with the results of previous studies that examined differences between males and females with respect to attitudes toward computers, aptitude, and actual use. The results of their research showed that males used computers more than females, and the male students achieved higher than female students in using home computers in the computer science curriculum (Bain & Rice, 2006; Kay, 1992; Mason, 2007; Sommers, 2008).

This study revealed that with male students, there were no statistically significant differences among the districts in the mean scores of students' achievement in the computer science curriculum. However, for female students, there were statistically significant differences among the districts in the mean scores of students' achievement in the computer science curriculum. The results highlight the need to build after-school technology centers to help female students increase their technological skills in using computers. The school should also increase female students' awareness and provide guidelines for using distance learning technology in their homes and/or in technology-centers for improving their skills in computer science. These guidelines will not only support the instruction teachers give, but may also enhance parents understanding and ability to support and guide their child.

Seventh Research Question

The seventh research question stated, "Is there a statistically significant interaction among students types (those who use home computers versus those who do not use home computers), gender, and school district (North, East, West, and South) in the mean scores of students' achievement in the computer science curriculum?" There was no statistically significant interaction between student types, gender, and school district in the mean scores of students' achievement in the computer science curriculum: all three independent variables (student types, gender, and school district) do not interact to create differences on exam scores. In a summary discussion of the significant findings for the first set of research questions of the study, the results showed that the students who use a home computer had significantly higher scores in achievement than the students who did not use a home computer. The male students who use home computers had higher mean scores than the female students who use home computers. The students in the North district accrued lower scores in the computer science curriculum than the students in the South district and, there were no significant differences in scores in the computer science curriculum between the students in the East and West districts. The male students in the two groups (students who have a home computer and students who do not have a home computer) had significantly higher scores in achievement in the computer science curriculum when each group of them was compared with their partners in the female group. The students who have a home computer, those in the West district scored significantly higher than those in the East and North districts. Additionally, the students who have a home computer in the South district scored significantly higher than those in the East and North districts. The female students in the South district had

significantly higher achievement scores than the female students in the East and North districts, and there was no statistically significant difference in the achievement scores between the female students in the West and South districts. There was no statistically significant interaction among the three independent variables which are student types, gender and district to create differences on exam grades. Given this outcome, an earlier suggestion that access to after-school technology centers may increase achievement in the computer science curriculum is reinforced.

Eighth Research Question

The eighth research question stated, "Is there a statistically significant correlation between the students' achievement in the computer science curriculum and the length of the time using a computer at home?" To investigate the relationship between the period of possessing a home computer and academic achievement for those students who have home computers, a Pearson's Correlation was conducted to examine if there is a relationship between the students' achievement in the computer science curriculum and the length of the time using a computer at home. The results showed that there is a statistically significant negative correlation between the students' achievement in the computer science curriculum and the length of the time using a computer at home. This result agreed with the students' answers to the tenth question of the survey. When the researcher asked the students about the purpose of using their home computers, most students answered that not only do they use home computers in the computer science curriculum, but also they use home computers for other purposes such as chatting, games, email, etc. The students' answers show that the time on home computers may be used not only for the computer science curriculum but also in other tasks. The time of using a

home computer is distributed on the multiple purposes of computing. There is a statistically significant negative correlation between the students' achievement in the computer science curriculum and the length of the time using a computer at home. Therefore, the researcher encourages parents to monitor home use to promote use for homework.

Ninth Research Question

The ninth research question stated, "Is there a statistically significant correlation between the students' achievement in the computer science curriculum and the level of use of a computer at home?" To investigate the relationship between the frequency of using a home computer and academic achievement for those students who have home computers, a Pearson's Correlation was conducted to examine if there is a relationship between the students' achievement in the computer science curriculum and the frequency of use of a computer at home. The result showed that there is not a statistically significant correlation between the students' achievement in the computer science curriculum and the level of use of a computer at home. This result agreed with the students' answers to the tenth question of the survey: when the researcher asked the students about the purpose of using their home computers, most students answered that not only do they use home computers in the computer science curriculum, but also they use home computers for multiple purposes such as chatting, games, etc. So, the time using home computers may be used not only for the computer science curriculum, but also in other tasks. As suggested earlier, to mediate this situation, the researcher encourages parents to monitor the students at home and promote computer use for homework. The school administration and teachers should encourage students to research many topics which relate to their

school curriculum through home computers. Parents and school principals should know how to enhance student achievement and encourage the students' critical thinking with innovative educational tools and technologies. As the Ministry of Education enhances the technological learning environments to develop students' educational experiences, it is believed that these interventions will help students achieve greater success. In this way, the Ministry of Education is preparing and building future educational plans that are based on practical tools and strategies for effective technology and curriculum integration.

Tenth Research Question

The tenth research question stated, "Is there a statistically significant correlation between the students' achievement in the computer science curriculum and the level of use of a computer outside of home?" To investigate the relationship between the frequency of using computers outside the home and academic achievement for those students who use computers outside their home, a Pearson's Correlation was conducted to examine if there is a relationship between the students' achievement in the computer science curriculum and the level of use of a computer outside of home. The result showed that there is not a statistically significant negative correlation between the students' achievement in the computer science curriculum and the level of use of a computer outside of home.

In a summary discussion of the significant findings for the second set of research questions of the study, the results showed that there is a statistically significant negative correlation between the students' achievement and the length of the time using a computer at home. There is not a statistically significant correlation between the students'

achievement and the level of use of a computer at home. This result agreed with the students' answers to the tenth question of the survey: when the researcher asked the students about the purpose of using their home computers, most students answered that not only do they use home computers in the computer science curriculum, but also they use home computers for multiple purposes. There is not a statistically significant negative correlation between the students' achievement and the level of use of a computer outside of home. Also, students use a computer outside of home for multiple purposes such as email, chatting, games, etc. Therefore, the time using computer outside of home may be used not only for the computer science curriculum, but also in other tasks. As promoted in response to other findings of this study, parents should encourage their children to use a computer whether inside or outside of home to do school assignments and their academic research. The school administration and teachers should encourage the students to research many topics which relate to their school curriculum. Also, as the Ministry of Education enhances the technological learning environment to develop students' educational experiences it should help them achieve greater success in their academic environment.

Recommendations for Practice

In light of the results of the current study, specific educational applications can be recommended. First, formulate measurable, clear and realistic educational goals. These goals should dominate the educational process especially when designing the computer science curricula in the secondary schools. Also, the computer science curriculum should be designed based on these educational goals which are compatible with educational plans and devised by talented educators who can efficiently and sufficiently integrate the

educational goals into a creative curriculum. For instance, curriculum developers should add more educational applications to student books, and the purpose of these applications should be to help students improve their technological skills in their homes. The computer science curriculum developers in the Ministry of Education should consider the impact of home computers on students' achievement in the computer science curriculum when they develop the computer science and technology curriculum. The stated goals in the educational plans for the computer science curriculum must be properly represented in the curriculum. The results of this study supports that goals to improve using home computers should be included in the curriculum development discussion.

The accomplishment of goals determines the success of teaching computer science in the secondary schools. The computers science curriculum should be designed based on the educational goals by curricula experts in the Ministry of Education, and also the educational goals should be sufficiently integrated to attain a creative technology in the computer science curriculum, including various software applications. Also, a comprehensive assessment is essential to assess the attainment of the educational goals. Therefore, a variety of measurement tools should be developed, reviewed, and revised continuously by experts, including tests, surveys, technological applications and concept maps.

Appropriate assessment tools should be developed by qualified professionals in the Ministry of Education rather than teachers. Therefore, the Ministry of Education should assign specialists in the computer science curriculum to create such tools and make them available to be used by the computer teachers in the secondary schools. The researcher suggests qualified professionals rather than teachers because they have wide

experiences in assessment of the computer curriculum from 42 educational administrations in Saudi Arabia and they also have received many comments and ideas from the teachers in the schools in development of the curriculum of computer science. Also, appropriate assessment tools can help teachers to assess the achievement of the educational goals through students' performance. This data will then contribute to curriculum refinement.

One of the factors that influence educational outcomes is the involvement of other competent commercial institutes of technology for training students' after-school. Therefore, the educational supervision administration should cooperate with these institutes to develop an agenda based on the topics of the computer science curriculum for training students' after-school.

One of the efforts which can be done to reach this goal is providing workshops for institutes of technology to explain the educational goals of the computer curriculum and suggest ways for accommodating and contributing to them. Educators' preparation programs should be reconsidered in Saudi universities and educators' institutions; educator preparation should emphasize the importance of using technology in education and encourage educators to use it in their classrooms. Although teachers and their preparatory programs were not directly addressed in this study, it was assumed that an efficient professional preparation would contribute to improving students' attitudes in technology and encourage them to use computers in and outside their homes to support academic achievement. Next, teacher preparation should emphasize the importance of educational goals and support using technology in the curriculum. Moreover, achieving

these educational goals requires appropriate instructional activities, and consequently, future teachers should possess necessary instructional technology skills.

The achievement of female students in the third level of high school towards using computers in the computer science curriculum was not as strong as their male counterparts. Therefore, the Ministry of Education should be providing incentives and rewards for female students to use computer labs or technology-centers several times a week due to the lack of technology in their homes.

Also, as an implication from this study, there are three important factors that have an impact on students' academic achievement across the four districts of Riyadh city. The first factor is the social life in the district; the social life and societal problems in the socially and economically poor district were associated with less achievement for students. These findings should be discussed through the parents' councils in light of suggestions and strategies that were provided from parents and school management to improve students' achievements in these socially and economically poor districts. Also, the educational administration should open technology centers in these districts to improve students' skills in using computers for academic achievement and for browsing the Internet.

The second factor is the degree of reinforcement that the students receive from their parents, teachers, principals, and members of society. These groups should all work together as the components of a societal system to accomplish the school's goals. School principals should encourage students' parents to share in the school activities because students are stronger socially and academically when the parents are taking part in the educational activities at school. Additionally, parents may offer more help and support to

their children because of a greater understanding of school activities and they can reinforce classroom procedures at home to improve technological skills of students to use technology in their homework. The third factor is the difference in each individual school's resources. Schools should be providing a rich technological environment that will be an important factor for developing computer skills. Therefore, the educational districts should allow a higher budget for school resources such as computers, labs, and networking to increase technology's effect on student achievement in their classrooms. The school should also be preparing some special workshops in technology which focus on the teachers' knowledge and skill levels in using and integrating technology into the computer science curriculum.

Every school administration should choose a suitable strategy to encourage students to use their computers at home. Parents should attempt to treat the difficulties which students face when trying to get computers in their homes. Therefore, more attention must be given to reducing computer prices in order to solve the difficulties that prevent families from getting computers.

Also, the Internet will help students to become culturally diverse and promote technology among students. The educational administration should cooperate with school principals to open technology-centers in schools to allow students to use computer labs after-school to improve students' skills in technology. Building after-school technology centers for female students can help them increase their technological skills in using computers and browsing the Internet. The schools should also increase female students' awareness and provide guidelines for using distance learning technology in their homes for improving their skills in computer science.

The researcher encourages parents to monitor home computer use to promote computers for homework. Students use a home computer for multiple purposes such as email, chatting, games, etc. Therefore, the time using home computers may be used not only for the computer science curriculum but also in other tasks. Therefore, the researcher encourages parents to monitor home use to promote use for homework. The school administration and teachers should encourage the students to research many topics related to their school curriculum through home computers or in technology-centers for those who do not have home access. Parents and school principals should know how to enhance student achievement and encourage the students' critical thinking with innovative educational tools and technologies. In this way, the Ministry of Education will enhance the technological learning environment to develop students' educational experiences and help them achieve greater success. The Ministry of Education will be preparing and building future educational plans that are based on practical tools and strategies for effective technology and curriculum integration.

Recommendations for Future Research

The interdependent nature of this study emphasizes the importance of conducting further studies to explore related aspects of this study. According to the results reached in the current study, the researcher suggests investigating the extent of the computer science curriculum goals which are represented in secondary schools, for studying the impact of the home computers on the students' achievements in other grades. Specifically, the researcher recommends that future studies:

1. Examine the effectiveness of the computer science curriculum in other grades based on each grade's goals.

2. Measure the impact of using home computers by conducting pre-tests and post-tests on students.
3. Investigate the reasons that contribute to the power of learning by using home computers and their impact on students.
4. Study differences in the cognitive components between the male students and female students to find correlations that might lead to better interventions to develop educational skills which students use in computer curriculum.
5. Survey computer science educators to explore their awareness of the subject goals and how they integrate them into their daily lesson plans to urge students to use home computers for doing their assignments.
6. Identify problems that may interrupt the achievement of the computer science goals and suggesting practical solutions for them.
7. Identify programs and plans that contribute to high involvement of the other technology institutions.
8. Determine the impact of the school computers in the labs on the academic achievement in the computer science curriculum instead of the home computers.

As seen in this study, home computers improved achievement scores in computer science curriculum. The proposed additional studies will determine the impact of the school computers on the academic achievement of the students. The students will receive the instructions from an instructor immediately in the computer lab which might prove to be an effective educational environment. Improvement in the students' final learning outcomes could be expected. By enhancing the role of instructor and using school

computers, the instructor will also act as a motivator to the students and ensure that the students will use their computers in this effective educational environment. Additionally, this study did not explore the instructors' knowledge, experiences, and pedagogy regarding using home computers. This study emphasized students' need to use their home computers to increase their academic achievement in the computer science curriculum. Consequently, further research needs to be conducted regarding implementation to suggest the best methods for using home computers.

Conclusion

In review of the results of the study, it is asserted that home computers were important to support the students in their academic achievement in the computer science curriculum. More specifically, the home computers play the largest role in reducing the academic difficulties which students face in solving the mathematical operations in the computer science curriculum. Therefore, in Saudi school's curriculum, and especially the computer science curriculum, more attention must be given to the use of home computers for all students. Nowadays, the technology has improved many educational issues. Also, choosing a suitable strategy for using computers in school computer labs is important to gain and aim our educational goals. Moreover, we should attempt to treat the difficulties which students face for getting computers in their homes. Therefore, more attention must be given to reducing computer prices in order to solve the difficulties that prevent families from getting computers.

Summary

The interpretation of the results of this study is considered by discussing each question separately. During this discussion, the researcher manipulated the functionalism

theory to interpret the results and to explain how other social and educational factors may relate to these results. The researcher emphasizes the constitutive importance of using home computers to increase students' achievement. Finally, several educational implementations and studies were recommended by the researcher in light of the outcomes of this study.

Researcher's Reflections

Given the outcomes of this study, and the fact that the researcher works diligently to support the learning needs of the students examined in the study, a set of recommendations that reach beyond the parameters of the study are offered in service of meeting the general needs of the learning community. The researcher believes that technologies, including computer labs, networking and online learning communities, should be adopted in all Saudi schools. The curriculum administration in the Ministry of Education should author students' guide booklets on how best to use home computers as this may support growth, and perhaps, parental involvement.

Computers should be introduced to the students in the classroom environment and integrated into the curriculum of all subject areas. Teachers should be encouraged to model computer-based learning by using technology in their daily classroom teaching. Schools should provide targeted professional development in the integration of instructional technology to support such. As teachers become more proficient, they will be better able to help students in the classrooms by appropriately integrating these learning experiences into classroom instruction. Moreover, the Ministry of Education might consider including scientific computer-based competitions to create interesting,

interactive competition between students and their districts. This might promote interest among students and parents, and in turn, foster further understanding of the curriculum.

The Ministry of Higher Education encourages and should continue to encourage teaching information sciences for female students in Saudi Arabia. This can be done by preparing several futuristic plans to debate the many issues that are related to technological development for female students. The Ministry of Higher Education encourages and should continue to encourage female colleges to teach female students about online courses and encourage willing female students to take courses through distance learning. It is further believed that the curriculum administration in the Ministry of Education should develop the current curriculum and author extra scientific books in computer science to develop the curriculum of computer science for all high schools in all districts.

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APPENDIXES

APPENDIX A

English Version of the Achievement Exam and Survey

In the Name of Allah, the Most Beneficent, Most Merciful

Dear Student:

The vast and fast development in technology has vitally affected all aspects of our lives especially educational technology. Thus, it is very important that these technologies are utilized specially with the excitement and entertainment they carry in them. The interaction technology creates between students and the world is a great aspect that should be used to enhance learning. The researcher conducted a study in which he investigated the effect of the home computer on achievement in computer subject in the third year in high school in the city of Riyadh.

I point out that the tool of this study divided two parts:

Part one: Achievement exam of the computer science curriculum

Part two: Survey, it is included participants' information.

Dear Student:

Your participation in answering the test and the survey will help in improving learning. I would request your honest and sincere answers. All the answers and the data collected will be kept in complete secrecy. It will only be used for the research and only the researcher will have access to that information. Thank you for your cooperation to attain the study goals.

Researcher
Mohammed A. Aljuwaiber
Indiana State University, USA
maljuwaiber@indstate.edu

Part one: Achievement exam of the computer science curriculum

Dear student: For each statement below, please indicate the correct phrase by placing an (✓) between brackets.

1. The goal of the solving problem is:
   A) Ability to think to solve problems ( ).
   B) To know the computer's storage capacity ( ).
   C) A and B are both correct ( ).

2. The definition of algorithm is:
   A) A group of data ( ).
   B) A group of even numbers ( ).
   C) A group of rules and operations ( ).

3. The procedures for solving problems are:
   A) Interpreting program to machine language ( ).
   B) Printing the program ( ).
   C) Deleting the program from memory ( ).

4. Which statement is correct?
   A) Computers can solve any problems ( ).
   B) A flowchart represents an algorithm ( ).
   C) Procedures for solving problems are dependent on computers ( ).

5. Determining processing operation means:
   A) Determining arithmetic and logical operation ( ).
   B) Determining programming operations ( ).
   C) Determining input and output ( ).

6. The scope for using FORTRAN language is:
   A) Commercial ( ).
   B) Geometrical ( ).
   C) Managerial ( ).

7. The scope for using COBOL language is:
   A) Commercial ( ).
   B) Scientific ( ).
   C) Geometrical ( ).

8. A computer program is a:
   A) Group of even numbers and odd numbers ( ).
   B) Group of numbers and characters ( ).
   C) Group of commands and instructions ( ).

9. Machine language is:
   A) Combination of numbers and characters ( ).
   B) Combination of numbers and symbols ( ).
   C) Combination of 0 and 1 ( ).

10. Programming languages are divided into two sections:
   A) Machine language and assembly language ( ).
   B) Programming language and interpreter language ( ).
   C) Low language and high language ( ).

11. Visual Basic works on:
   A) Traditional environment ( ).
   B) Visual environment ( ).
   C) A and B are both correct ( ).

12. Machine language is:
   A) Easy to understand by computer ( ).
   B) Easy to understand by programmer ( ).
   C) A, and B are both correct ( ).

13. The algorithm comes from:
   A) Math scientist Mohammed Alkawarezmi ( ).
   B) Math equations ( ).
   C) Kawarezm city in Kurasan ( ).

14. Visual Basic is one of programming language by....:
   A) Machine language ( ).
   B) Traditional language ( ).
   C) Visual language ( ).

15. Local area network is a:
   A) Network for limited place ( ).
   B) Network for far distance ( ).
   C) Network between countries ( ).

16. Network is divided into two parts, which are:
   A) Printer and mouse ( ).
   B) Server and client ( ).
   C) Mouse and keyboard ( ).

17. Modem devices allow transferring data across .....:
   A) Tel communication ( ).
   B) Network communication ( ).
   C) Digital communication ( ).

18. The operating system for the server is:
    A) Windows Vista ( ).
    B) Windows XP ( ).
    C) Windows NT ( ).

19. We need these tools for preparing a network:
    A) Computer, network interface card, transmission media, and switch ( ).
    B) Computer, printer, switch, and screen card ( ).
    C) Computer, mouse, keyboard, and switch ( ).

20. The definition of the Internet is a:
    A) Limited local network ( ).
    B) Global network ( ).
    C) Government network ( ).

21. The code (gov) in the Internet page means:
    A) Organization ( ).
    B) Government ( ).
    C) Commercial ( ).

22. Which program is used to browse the Internet?
    A) Microsoft Word ( ).
    B) Microsoft Excel ( ).
    C) Windows Explorer ( ).

23. The function of the Internet browsing program is:
    A) Importing and browsing the Internet pages ( ).
    B) Editing the Internet's pages ( ).
    C) Programming the Internet pages ( ).

24. The address of the Ministry of Education in Saudi Arabia on the Internet is:
    A) www.scs.org.sa ( ).
    B) www.moe.gov.sa ( ).
    C) www.mohe.gov.sa ( ).

25. The protective provider (Security Proxy) in the Internet works by:
    A) Identifying the abusive websites and blocking them ( ).
    B) Increasing the speed of browsing ( ).
    C) Protecting information security across the Internet ( ).

Part two: Survey, it is included participants' information

Please, complete the items below as accurately as possible:

1. **Name** (Optional) : ----------
2. **Age:** ----------
3. **School:**----------
4. **Are you repeating this level?** Yes ☐ No ☐
5. **Educational Center**: North ☐ East ☐ West ☐ South ☐
6. **Gender:** Male ☐ Female ☐

7. **Do you have a computer at home?** Yes ☐ No ☐

   If your answer is "YES", please complete the following questions. If your answer is "NO", please, go to question 11

8. **How long have you had a computer at home?**

   Less than a year ☐ 1-3 years ☐ More than 3 years ☐

9. **How frequently do you use a computer at home?**

   9.1. I do not use it ☐

   9.2. Daily ☐

9.3. At least once a week ☐

9.4. At least one a month ☐

10. What is the purpose of using your home computer? (You can choose more than one)

The Internet browsing ☐ Chatting☐ Email☐ Games ☐ Design ☐

Word-processing ☐ Programming ☐ Others ☐ specify .....

11. Do you use a computer outside your home? Yes ☐ No ☐

If your answer is "YES", please complete the following question. If your answer is "NO", please stop.

12. Where are you using it? School ☐ The Internet café ☐ Others ☐ specify .....

13. How frequently do you use a computer outside your home?

13.1. Daily □

13.2. At least once a week □

13.3. At least once a month □

14. What is the purpose of using a computer outside your home? (You can choose more than one)

The Internet browsing □ Chatting□ Email□ Games □ Design □

Word-processing □ Programming □ Others □ specify .....

End of questions, Thank you

APPENDIX B

Arabic Version of the Achievement Exam and Survey

بسم الله الرحمن الرحيم

السلام عليكم ورحمة الله وبركاته. وبعد ،

عزيزي الطالب :

يشهد العصر الحاضر تطورات هائلة ومتسارعة في العلم والتقنية، أثرت هذه النقلة وتؤثر في جميع نواحي الحياة لاسيما في مجال التقنية التربوية ، الأمر الذي يحتم علينا الاستفادة من آليات هذه التقنية من خلال عنصري الإثارة والتشويق بالاضافة الى تفاعل الطالب مع عالم التقنية كاسلوب جديد في التحصيل العلمى. وقد قام الباحث بإجراء دراسة ا لهدف منها استقصاء تأثير استخدامِ حاسبِ المنزل على إنجازِ الطلابِ الأكاديميِ في منهجِ الحاسبَ للصف الثالث الثانوي بمدينة الرياض.

وأشير إلى أن أداة هذه الدراسة مقسمة إلى قسمين :

القسم الاول : الاختبار التحصيلي لمفردات الكتاب المدرسي.

القسم الثاني : الإستبانة وتحوى بيانات المفحوصين.

عزيزي الطالب :

إن مشاركتك في الإجابة على أسئلة الاختبار التحصيلي والاستبانة سيساهم – إن شاء الله تعالى – في تطوير العملية التعليمية نحو الأفضل ، لذا آمل الإجابة على جميع الأسئلة بكل حرص وإتقان . ويسعدني أن اؤكد لك أن جمي ع الإجابات للإختبارالتحصيلي ، والمعلومات التي ستدونها فى الإستبانة ستحفظ بسرية تامة وستستخدم في البحث فقط ولن يطلع عليها إلا الباحث . أشكر لك تعاونك وإسهامك في تحقيق أهداف البحث.

الباحث

محمد بن عبدالكريم الجويـــبر

جامعة إنديانا – الولايات المتحدة الأمريكية

maljuwaiber@indstate.edu

القسم الاول : الاختبار التحصيلي حول مفردات الكتاب المدرسي

عزيزي الطالب : ضع علامة (✓) أمام العبارة التي تمثل الإجابة الصحيحة من وجهة نظرك فيما يلي :

1 : نهدف من تعلم صياغة حل المسائل بواسطة الحاسب .... :

أ - القدرة على التفكير لحل المشكلات ( ).

ب - معرفة طاقة الحاسب لتخزين البيانات ( ).

ج - ما ذكر في الفقرتين (أ) و (ب) ( ).

2 : الخوارزم (الخوارزمية) تعرف بأنها .... :

أ- مجموعة من المعلومات والبيانات المعرفة جيدا لحل المشكلة في عدد محدد من الخطوات ( ).

ب- مجموعة من الأعداد الزوجية والفردية المعرفة جيدا لحل المشكلة في عدد معين من الخطوات( ).

ج - مجموعة من القواعد والعمليات المعرفة جيدا لحل المشكلة في عدد محدد من الخطوات ( ).

3 : من خطوات حل المسائل ما يلي .... :

أ - ترجمة البرنامج الى لغة الآلة ( ).

ب -طباعة البرنامج ( ).

ج - حذف البرنامج من الذاكرة ( ).

4 : أي من العبارات التالية صحيحة .... :

أ - يستطيع الحاسب حل جميع المسائل والمشاكل اليومية ( ).

ب -مخطط الانسياب هو تمثيل بياني للخوارزم - الخوارزمية ( ).

ج -تعتمد خطوات صياغة حل المسائل على الحاسب ( ).

5 : يقصد بعمليات المعالجة .... :

أ - تحديد الخطوات المنطقية والعمليات الحسابية ( ).

ب -تحديد العمليات البرمجية والخطوات المنطقية ( ).

ج -تحديد الخطوات المنطقية فقط ( ).

6 : تستخدم لغة فورتران (FORTRAN) في المجال ....:

أ - التجاري ( ).

ب -الهندسي ( ).

ج -الاداري ( ).

7 : تستخدم لغة الكوبول (COBOL) في المجال .... :

أ - التجاري ( ).

ب -العلمي ( ).

ج -الهندسي ( ).

8 : يعتبر برنامج الحاسب عبارة عن مجموعة من .... :

أ – الأرقام الفردية والزوجية ( ).

ب –الحروف والرموز ( ).

ج –التعليمات والأوامر ( ).

9 : لغة الآلة مكونة من .... :

أ – أرقام وحروف ( ).

ب – أرقام ورموز ( ).

ج – الصفر والواحد ( ).

10 : تنقسم لغات البرمجة إلى قسمين، هما .... :

أ – لغة الآلة ولغة التجميع ( ).

ب –لغة البرمجة ولغة الترجمة ( ).

ج –اللغة البسيطة واللغة العالية ( ).

11 : تعمل لغة البرمجة المرئية على أنظمة التشغيل ... :

أ – ذات البيئة الرسومية ( ).

ب –ذات البيئة التقليدية ( ).

ج – ما ذكر في الفقرتين (أ) و (ب) ( ).

12 : تعتبر لغة الآلة .... :

أ – سهلة الفهم بالنسبة للحاسب ( ).

ب –سهلة الفهم بالنسبة للمبرمج ( ).

ج –ما ذكر في الفقرتين (أ) و (ب) ( ).

13 : الخوارزم (الخوارزمية) مشتقة من .... :

أ – اسم عالم الرياضيات محمد الخوارزمي ( ).

ب –المعادلات الرياضية الخوارزمية ( ).

ج –مدينة خوارزم في خراسان).

14 : تعد لغة فيجول بيسك (Visual Basic) إحدى لغات .... :

أ – البرمجة بلغة الآلة ( ).

ب – البرمجةالتقليدية ( ).

ج – البرمجة المرئية ( ).

15 : شبكة الحاسب المحلية هي عبارة عن شبكة .... :

أ – مخصصة لمساحة مكانية محددة ( ).

ب –تمتد لمناطق بعيدة ( ).

ج -تربط بين دول متعددة ( ).

16 : تحوي شبكة الخادم والعميل نوعين من الأجهزة، هما .... :

أ - الطابعة والفأرة ( ).

ب -Server و Client ( ).

ج -لوحة المفاتيح والطابعة ( ).

17 : جهاز المودم يسمح بنقل البيانات عبر .... :

أ - خطوط الاتصالات التليفونية ( ).

ب -خطوط الاتصالات الشبكية ( ).

ج -خطوط الاتصالات الرقمية ( ).

18 : نظام التشغيل الذى يعمل على أجهزة الخادم Server هو .... :

أ - Windows Vista ( ).

ب -Windows XP ( ).

ج -Windows NT ( ).

19 : نحتاج لتكوين شبكة حاسب عدة مكونات، من أهمها جهاز حاسب .... :

أ - وبطاقة شبكية وناقل للاتصال ومحول ( ).

ب -وطابعة ومحول وكرت شاشة ( ).

ج -وفأرة ولوحة مفاتيح ومحول ( ).

20 : تعتبر شبكة الانترنت شبكة حاسب .... :

أ - محلية محدودة ( ).

ب -عالمية ضخمة ( ).

ج -حكومية ( ).

21 : الرمز gov في عنوان صفحة الانترنت يرمز إلى .... :

أ - هيئة أو منظمة ( ).

ب -جهة حكومية ( ).

ج -مؤسسة تجارية ( ).

22 : من برامج التصفح لشبكة الانترنت .... :

أ -برنامج Microsoft Word ( ).

ب -برنامج Microsoft Excel ( ).

ج -برنامج Windows Explorer ( ).

23 : وظيفة برنامج التصفح للشبكة .... :

أ - جلب وعرض صفحات الموقع ( ).

ب -التعديل في صفحات الموقع ( ).

ج -برمجة صفحات الموقع ( ).

24 : عنوان موقع وزارة التربية والتعليم في المملكة العربية السعودية على الانترنت هو .... :

أ - www.scs.org.sa ( ).

ب -www.moe.gov.sa ( ).

ج -www.mohe.gov.sa ( ).

25 : مزود الحماية (Security Proxy) في شبكة الانترنت يقوم بـــ ....:

أ - التعرف على عناوين المواقع السيئة عبر الشبكة وحجبها ( ).

ب -زيادة سرعة تصفح المواقع عبر الشبكة ( ).

ج -المحافظة على سرية المعلومات عبر الشبكة ( ).

القسم الثاني : الإستبانة وتحوى بيانات الطلاب المفحوصين

الرجاء الإجابة عن الأسئلة التالية بدقّة قدر الإمكان:

1. **الاسم:**(اختياري).....
2. **العمر:**.....
3. **المدرسة:**.....
4. **هل سبق لك الإعادة في الصف الثالث الثانوي ؟** نعم ☐ لا ☐
5. **فى أي جهة من مدينة الرياض تقع مدرستك ؟** شمال ☐ شرق ☐ غرب ☐ جنوب ☐
6. **الجنس :** ذكر ☐ أنثى ☐

7. **هل لديك حاسب في المنزل ؟** نعم ☐ لا ☐

إذا كانت إجابتك للسؤال بـ (**نعم**) أكمل الأسئلة التالية ، وإذا كانت إجابتك للسؤال بـ (**لا**) انتقل إلى السؤال رقم 11.

8. **منذ متى لديك حاسب في المنزل ؟**

أقل من سنة ☐ 1- 3 سنوات ☐ أكثر من 3 سنوات ☐

9. **كم مرة تستخدم الحاسب المنزلي؟**

9.1. لا استخدمه مطلقا ☐

9.2. استخدمه يوميا ☐

9.3. استخدمه مرة في الأسبوع على الأقل ☐

9.4. استخدمه مرة في الشهر على الأقل ☐

10. **ما الغرض من استخدامك للحاسب في المنزل ؟ يمكنك تحديد أكثر من غرض.**

تصفح الانترنت ☐ الاتصال والمحادثة ☐ البريد الإلكتروني ☐ الالعاب ☐

معالجة النصوص ☐ التصميم والرسم ☐ البرامج التعليمية ☐ البرمجة ☐

أغراض أخرى لم ترد ☐ رجاء أذكرها: .....

11. **هل تستخدم حاسب خارج المنزل؟** نعم ☐ لا ☐

إذا كانت إجابتك للسؤال بـ (**نعم**) أكمل الأسئلة التالية، وإذا كانت إجابتك للسؤال بـ (**لا**) توقف عن إكمال الاستبانة.

12. **أين تستخدمه؟** في المدرسة ☐ في مقهي الانترنت ☐ في أماكن أخرى ☐ رجاء أذكرها .....

13. **كم مرة تستخدم الحاسب خارج المنزل؟**

13.1. استخدمه يوميا ☐

13.2. استخدمه مرة في الأسبوع على الاقل ☐

13.3. استخدمه مرة في الشهر على الاقل ☐

14. **ما هو الغرض من استخدامك للحاسب خارج المنزل ؟ يمكنك تحديد أكثر من غرض.**

تصفح الانترنت ☐ الاتصال والمحادثة ☐ البريد الإلكتروني ☐ الالعاب ☐

معالجة النصوص ☐ التصميم والرسم ☐ البرامج التعليمية ☐ البرمجة ☐

أغراض أخرى لم ترد ☐ رجاء أذكرها: .....

انـــتـــهـــت الأســـئـــلـــة ، شكرًا لك ،،

APPENDIX C

Arabic Version of Permission from Riyadh General Directorate of Education (Males)

بسم الله الرحمن الرحيم

المملكة العربية السعودية
وزارة التربية والتعليم
الإدارة العامة للتربية والتعليم بمنطقة الرياض (بنين)
إدارة التخطيط والتطوير

الرقم : ٩١١٦٧
التاريخ : ١٤١٩/٤/٢٨هـ
المرفقات : ...

إلى : مدير مدرسة الثانوية وفقه الله
من : مدير عام التربية والتعليم بمنطقة الرياض " بنين "
بشأن: تسهيل مهمة باحث

السلام عليكم ورحمة الله وبركاته وبعد :

بناء على تعميم معالي الوزير رقم ٥٥/٦١٠ وتاريخ ١٤١٦/٩/١٧هـ القاضي بتفويض الإدارات العامة للتربية والتعليم بإصدار خطابات السماح للباحثين بإجراء البحوث والدراسات . تقدم إلينا الباحث / محمد بن عبدالكريم الجويير ـ أحد طلاب الدراسات العليا المبتعث من قبل الوزارة لنيل درجة الدكتوراه من جامعة ولاية إنديانا بالولايات المتحدة الأمريكية ـ بطلب إجراء دراسة بعنوان: ((تأثير حاسب المنزل على الإنجاز الأكاديمي لطلاب وطالبات الصف الثالث الثانوي في منهج الحاسب الآلي في مدينة الرياض بالمملكة العربية السعودية)) وتتطلب الدراسة تطبيق أداة البحث على عينة من طلاب الصف الثالث في المدارس الثانوية بمدينة الرياض .

ونظرا لاكتمال الأوراق المطلوبة . نأمل تسهيل مهمة الباحث مع ملاحظة أن الباحث يتحمل كامل المسؤولية المتعلقة بمختلف جوانب البحث ولا يعني سماح الإدارة العامة للتربية والتعليم موافقتها بالضرورة على مشكلة البحث أو على الطرق والأساليب المستخدمة في دراستها ومعالجتها .

والله يحفظكم ويرعاكم ....

٤/٢٨

د. عبدالعزيز بن محمد الدبيان

Kingdom of Saudi Arabia
Ministry of Education
Riyadh General Directorate of Education
in Riyadh Sector (Males)
Planning & Improvement Administration

Number: 51167
Date: May 4th 2008
Attachments: None

To: Dear High School Principal:
From: General Director of the Education Office in the Riyadh Sector (Males)
Subject: Facilitating research

With reference to the instructions in the memorandum of the Minister of Education number 610/55 dated Feb 7, 1996, which authorizes general administrations in the Ministry of Education to issue letters to schools asking them to facilitate researchers' tasks in conducting their research, Mohammed Abdulkarim Aljuwaiber, one of the graduate students funded by the Ministry of Education to pursue his doctorate degree in Indiana State University in the USA, has submitted a request to conduct research as a part of his preparation of his dissertation titled " The Impact of Home Computers on 12th Grade Students' Achievement in Computers Science Curriculum in Riyadh, Saudi Arabia." The study tools need to be conducted on a sample of the 12th grade students in high schools in Riyadh.

Aljuwaiber has submitted all the necessary documents. Therefore, we request your kind help in facilitating his research task. Please note that giving the permission for the researcher to conduct his study does not mean the general administration agrees to the study problem, surveys, or tests used, which are the complete responsibilities of the researcher.

Dr. Abdulaziz Mohammed Al-Dubian

APPENDIX D

Arabic Version of Permission from Riyadh General Directorate of Education (Females)

المملكة العربية السعودية
وزارة التربية والتعليم
شئون تعليم البنات
الإدارة العامة للتربية والتعليم للبنات بمنطقة الرياض
إدارة الإشراف التربوي

بسم الله الرحمن الرحيم

وزارة التربية والتعليم
Ministry of Education

الرقم : ٢٠/٧٩٥٩٧
التاريخ : ١٤٢٩/٥/٧هـ
المشفوعات : .....

إلى/ مديرة الثانوية ٤ - ١٠ - ٥٥ - ٩٩ حفظها الله

من/ المساعد للشئون التعليمية

بشأن: تسهيل مهمة الباحث/ محمد عبدالكريم الحويب

السلام عليكم ورحمة الله وبركاته وبعد..

إشارة إلى خطاب مدير عام البحوث ذي الرقم ٥٧٤ وتاريخ ١٤٢٩/٤/٢٧هـ بشأن تطبيق دراسة الباحث/ محمد عبدالكريم الحويب بعنوان (تأثير حاسب المنزل على الإنجاز الأكاديمي لطالبات الصف الثالث الثانوي في مدينة الرياض) للحصول على درجة/ الدكتوراه

عليه نأمل تسهيل مهمة الباحث بتعبئة الاستبانة المرفقة من قبل طالبات الصف الثالث الثانوي

وإعادتها لإدارة الاشراف التربوي في موعد أقصاه ١٤٢٩/٥/١٩هـ.

كما نؤكد على ضرورة كتابة اسم الباحث على المظروف الخارجي تسهيلاً لعملية فرز الاستبانات.

شاكرين لكم تعاونكم،،
و الله الموفق،،

د. البندري بنت عبدالله آل سعود

Kingdom of Saudi Arabia
Ministry of Education
Female Education Administration
Riyadh General Directorate of Education
in Riyadh Sector (Females)
Educational Supervision Administration

Number: 30/79597
Date: May 12, 2008
Attachments: 4 files

To: Dear High School Principal: 4, 10, 55, and 99
From: Assistant for the Educational Affairs
Subject: Facilitating the research of Mohammed Abdulkarim Aljuwaiber

This letter is in reference to the letter of the General Director for Research number 205720 and dated May 3, 2008, regarding the doctorate research study of Mohammed Abdulkarim Aljuwaiber titled "The Impact of Home Computers on 12th Grade Students' Achievement in Computers Science Curriculum in Riyadh, Saudi Arabia." The study needs to be conducted on a sample of the 12th grade students in high schools in Riyadh. We hope that you help in facilitating the task for the researcher by allowing the 12th grade students to fill in the survey and then return the filled in surveys to the educational supervision administration by May 24, 2008.

Please remember to write the researcher's name on the back of the envelope.

Thank you very much for your help and cooperation.

Dr. Al-bandari Bint Abdullah Al-Saud