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# Reforming higher education in Saudi Arabia: The use of telecommunications technology

Abdullah Altowjry

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**REFORMING HIGHER EDUCATION IN SAUDI ARABIA:  
THE USE OF TELECOMMUNICATIONS TECHNOLOGY**

**Presented to**

**Professor Warren L G Koontz**

**Program Chair of Telecommunications Engineering Technology**

**Rochester Institute of Technology**

**In Partial Fulfillment**

**Of the Requirement for the**

**Master of Science in Telecommunications Engineering Technology**

**BY**

**Abdullah Mohammed Altowjry**

**عبد الله محمد سليمان التويجري**

**[Aburund@gmail.com](mailto:Aburund@gmail.com)**

**Winter 2004/05**

بسم الله الرحمن الرحيم

## Dedication

الإهداء

To my Lovely wife, who sacrificed and still sacrifices to finish this work

إلى رفيقة دربي وزوجتي الصابره التي تحملت وتتحمل الكثير من أجل إنجاز هذا العمل

To my two sweet flowers, Rund and Yara, who often played with this project's papers and files

إلى طفلي رند و يارا اللتين كثيراً ما عبثتا بأوراق وملفات هذه الرساله

To my advisor Professor Warren L G Koontz, who helped me a lot not only with this project but also with his patience and wisdom

إلى مشرفي الدراسي البروفوسور/ وورن كونتز الذي كان له الدور الكبير في انجاز هذا البحث

**I dedicate this work**

اهدي عملي هذا

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## Abbreviations

<b>DL</b>	Distance Learning
<b>SA</b>	Saudi Arabia
<b>MT</b>	Modern Technology
<b>DSL</b>	Digital Subscriber Lines
<b>GSM</b>	Global System for Mobile Communications
<b>E-education</b>	Electronic Education
<b>USDLA</b>	United States Distance learning Association
<b>KFUPM</b>	King Fahad University Of Petroleum And Minerals
<b>KSU</b>	King Saud University
<b>KACST</b>	King Abdullaziz City for Science and Technology
<b>STC</b>	Saudi Telecom Company
<b>KAU</b>	King Abdullaziz University
<b>PC</b>	Personal Computer
<b>ISP</b>	Internet Service Provider
<b>ATM</b>	Asynchronous Transfer Mode
<b>BPS</b>	Bit Per Second
<b>KBPS</b>	Kilo Bit Per Second
<b>MBPS</b>	Mega Bit Per Second
<b>CD-ROM</b>	Compact Disc-Read-Only Memory
<b>WWW</b>	World Wide web
<b>URL</b>	Uniform Resource Locator
<b>VCR</b>	Video Cassette Recorder
<b>GPRS</b>	General Packet Radio Service

# **The Project Proposal**

## **Preface**

Internet technology has become a powerful tool since its advent. Online learning is a byproduct of Internet usage and is instrumental in higher education.

In the United States, the use of online learning, also known as distance learning, is widespread. It is used in almost all educational institutions. Even third world countries, which are traditionally lagging behind in any educational or sociological enterprise, are now attempting to catch up with distance learning education. Some educational institutions in the Middle East, for example, have been using distance learning in place of traditional classroom instruction.

In Saudi Arabia, there is a great need for taking advantage of the whole gamut of telecommunications technologies. The exploration of this need gives this research its foundation.

## **Research Problem**

This research is about how to extend the educational privileges in Saudi Arabia to those who have been thus far deprived of having an equal educational opportunity. The problem this research is attempting to solve is threefold; first is the problem of how to overcome the issue of over-crowdedness of Saudi universities; secondly, is the problem of how to give full access to the educational process to distant inhabitants and urban dwellers; and lastly, is the

issue of how to encourage non-traditional learners to participate in the higher learning process.

### **Objectives**

The main objective of this paper is to help further develop the educational system in Saudi Arabia by expanding its parameters to take advantage of telecommunications technologies and to incorporate the distance learning method. This paper will show the merits of such a method to the concerned authorities in the Kingdom of Saudi Arabia.

### **Significance**

This research is important to me personally as it overlaps with my aspirations to find ways and means for developing the educational system in my country. The research is also significant to the Kingdom of Saudi Arabia as applying the proposed method will help spare the kingdom efforts and money needed elsewhere.

This paper will also focus on the learning process itself. Since many people in the kingdom are enjoying the benefits of the welfare state; thereby relying more and more on computers, the educational process itself will be enhanced and up to date with technology.

Reaching out to people who would otherwise be deprived of education is a value in itself and cannot be taken lightheartedly as one of the inalienable components of human rights. Besides, the new method will ameliorate students' abilities in

having better access to Internet information resources. Any learner can browse at any time and get more resources quickly.

### **Scope**

This research addresses the difficulty of and the inherent resistance to applying the new method in all Saudi educational institutions. Therefore, some institutions will have to be selected for experimentation with the new method to gather if they have the necessary technology for distance learning. The chosen colleges will serve as precursors to a universal application later on.

### **Hypotheses**

This study aims at verifying four different but related hypotheses. Therefore, I will present a brief panoramic picture of my underlying assumptions:

#### **Hypothesis #1**

This research presupposes the existence of a positive relationship between the amounts of information the average student can get through online learning compared to the traditional classroom model. I will provide information from previous research to support this hypothesis.

#### **Hypothesis #2**

This research also hypothesizes that high school graduates, workers, and college professors have the basic computer skills required for distance learning, and as such, they may not need extra training to follow an online educational program.

### **Hypothesis #3**

This study hypothesizes the existence of a positive relationship between applying the new method and reaching a larger number of learners who can be broken down as follows:

- a. Decreasing the number of those who are denied access to higher education and left without an education altogether.
- b. Attracting larger numbers of workers into the educational process who would otherwise never be able to seek formal education if left to the old and traditional method.
- c. Providing a chance for those individuals who live far from the urban centers where universities exist and who would otherwise never be able to seek formal education if left to the old and traditional method.

### **Hypothesis #4**

And finally, this paper assumes that using distance learning would decrease the number of Saudi students who would in the traditional method be seeking higher education outside the kingdom. Their number will decrease when distance learning occurs. It is also assumed that the new method will be less expensive than the old and traditional one.

### **Methodology**

This study will follow a myriad of approaches. Field visits will prove to be beneficial to me, as they will provide an opportunity to see first hand where experiments were done and courses were taken following the method of distance

learning. I will have an opportunity to interview both learners and educators who were involved in the process of distance learning. The scholars who taught courses will shed light on the difficulties that faced them, and the students will provide the necessary feed back.

In a previous, but related study, I was able to establish evidence relying on statistical data, that most students who have received high school diplomas do in fact possess the needed skills for taking online courses. Furthermore, the data showed that students would in fact feel comfortable taking online courses if they were available. Given the availability of many telecommunications links in Saudi Arabia, students' exposure to such technology will not be an unfamiliar task.

The prospective students in this new method will not be limited to high school graduates. Workers and others will become regular online students as well. Therefore, I will be conducting field surveys among prospective learners in order to assess their willingness to participate in online education if the chance is given to them. I will also visit educational institutions where distance learning is applied in order to determine their telecommunications requirements.

### **Outline**

This research will be divided into an introduction, three chapters, and a conclusion. Chapter one will address the *what question*: i.e. the concept of distance learning; definitions, historical synopsis, the status of distance learning in Saudi Arabia and examples will be given in this section.

Chapter Two will examine the *why question*: i.e. the imperatives of distance learning in Saudi Arabia. The third chapter will be dedicated to the *how question*: i.e. the technologies that will be used in the application of distance learning and the available technology in Saudi Arabia to support this. Moreover, telecommunications mediums and their data rates will be discussed. And in the conclusion, the merits of applying this method in Saudi Arabia will be discussed.

### **Sources**

I will be using primary as well as secondary sources (books, articles and journals) to complete this research. Visits and interviews will be utilized extensively. Furthermore, educational websites will serve as one of my more advanced sources.

## **Introduction**

One can never exaggerate the importance of the findings this paper will reveal regarding the learning process and distance learning. Many people in the Kingdom of Saudi Arabia enjoy the benefits of the welfare state, and consequently, rely heavily on computers. This has created an influx in the number of computer literate students and yet, the educational system has not maximized the efficiency of using computers as a tool for outside instruction. The objective of this paper is to argue that distance learning will not hinder, but help to educate the rank and file of college students.

Distance learning is a model that allows students to take classes without the confines of a classroom. The learner can attend the college of their choice and get the same education and attention that the classroom method offers.

Businesses use distance learning to offer training to their employees. In most cases, it is much less expensive for a company to offer this training with the use of technology. Group projects involving individuals from several corporate sites can be accomplished easier. Frequent meetings are feasible because there is minimal or no travel involved.

The goal of this research paper is to illustrate the advantages of using telecommunications technologies as a way to incorporate the distance learning method. Furthermore, the evidence will be presented to professors and educational administrators in the Kingdom of Saudi Arabia who need to be aware of the benefits of such a method as online learning.

The following three chapters will present evidence and facts to support the model of distance learning in the kingdom of Saudi Arabia. Some of the items included in chapters are: terminologies, methodologies, the status of online learning in Saudi Arabia, reasons for the use of telecommunications technologies for educational purposes, and applications for distance learning.

## **Chapter One**

This part of the research will discuss the concepts and terminologies related to distance learning, a historical synopsis of distance education, and the current status of using telecommunications tools as a way of fostering distance learning in Saudi Arabia.

### **Definition of Distance Learning**

Distance learning can be referred to as a method of instruction that utilizes different communications technologies to carry teaching to learners in different places. Both learners and teachers interact with each other via means of computers, artificial satellites, telephones, radio or television broadcasting, or other technologies. It is therefore different from the kinds of instruction that is frequently conducted through the mail. The latter is known as correspondence education. Some experts on education may consider such a method as a means of distance education. Thus, an unintended confusion may exist between the two concepts since distance learning and distance education (e-education) are used interchangeably. [1]

In this research distance learning is referred to as formal or informal learning experiences, and distance education to refer specifically to formal instruction conducted from a distance by an educator (teacher) who plans, guides, and evaluates the learning process.

Telecommunications technologies have become more efficient and more widely available in our days; thereby increasing the numbers of higher institutions that use or offer distance education degrees and/or programs.

As defined by Michael Moore, then director of The American Center for the Study of Distance Education, Penn State: "Distance education is planned learning that normally occurs in a different place from teaching and as a result requires special techniques of course design, special instructional techniques, special methods of communication by electronic and other technology, as well as special organizational and administrative arrangements". [2]

The United States Distance learning Association (USDLA) defines distance learning as "The acquisition of knowledge and skills through mediated information and instruction, encompassing all technologies and other forms of learning at a distance." [3]

### **Brief History of Distance Learning**

Distance education traces its origins to mid-19th century Europe and the United States. The pioneers of distance education used the best technology of their day, the postal system, to open educational opportunities to people who wanted to learn but were not able to attend conventional schools. People who benefited from such correspondence education included those with physical disabilities, women who were not allowed to enroll in educational institutions open only to men, people who had jobs during normal school hours, and those who lived in remote regions where schools did not exist.

The invention of educational radio in the 1920s and the advent of television in the 1940s created important new forms of communication for use in distance education. Educators used these new technologies to broadcast educational

programs to millions of learners, thus extending learning opportunities beyond the walls of conventional teaching institutions.

The development of reliable long-distance telephone systems in the early 1900s also increased the capacity of distance educators to reach new student populations. But telephone systems never played a prominent role in education until the introduction of new teleconferencing technologies in the 1980s and 1990s. Teleconferencing systems made it possible for teachers to talk with, hear, and see their students in real time—that is, with no delays in the transmissions—regardless of location.

Distance education increasingly uses combinations of different communications technologies to enhance the abilities of teachers and students to communicate with each other. With the spread of computer-network communications in the 1980s and 1990s, large numbers of people gained access to computers linked to telephone lines, allowing teachers and students to communicate in conferences via computers. Distance education also makes use of computer conferencing on the World Wide Web, where teachers and students present text, pictures, audio, and occasionally video. A conferencing method known as one-way video/two-way audio uses television pictures that are transmitted to particular sites, where people can reply to the broadcasters with a telephone call-in system. Television pictures can also be transmitted in two directions simultaneously through telephone lines, so that teachers and students in one place can see and hear teachers and students in other places. This is called video-conferencing [1].

### **Tools Used for Distance Learning**

There are many different types of mediums used for distance learning. The simplest is television. Broadcasters such as PBS show educational programming for educators to use in the classroom or to tape and show later. Videotape fits in this category as well.

Video via terrestrial means or satellite can be one-way or two-way. This type of technology is becoming more prevalent on the desktop. Some of the most widely used programs include *CU-SeeMe* from White Pine Software and *Person to Person* (P2P) by IBM. These programs have various hardware requirements that are explained in each programs specification. [4]

### **Telecommunications Technologies Used in Saudi Arabia for Educational Purposes**

In Saudi Arabia, educational institutions do not maximize the available modern technologies at their disposal. Such technologies have been used in some sectors of society such as health, agriculture and information, but their use was limited (in terms of scope) and was conducted in an inchoate way<sup>1</sup>.

The only attempt at using such technologies efficiently was organized by the Open Arab University. This experiment – even though it is not a pure Saudi one – has been functioning (albeit without any formal recognition by the higher

---

<sup>1</sup>. In the sectors of: **Information** (where the **radio** has been used for more than a quarter of a century for educating the masses and for fighting illiteracy, and where **TV** has been used in giving tutorials to different students audiences); **Education** (where closed circuits and video conferences have been used to reach female students who are separated from males at King Saud University); **Health** (where live coverage of surgeries conducted at Saudi hospitals are monitored at the same time via video conferences by famous world medical centers);and **Colleges** (where some students contact their teachers by email).

Ministry of Education) within the Saudi society, and as such is worthy of consideration.

This University, which operates under the auspices of the United Nations (The Arab Gulf Program for United Nations Development Organizations, or the AGFUND.), does not offer full-scale distance education as its charter necessitates - for a student to obtain his or her degree he or she must take at least 25% of the courses on campus. This residency requirement makes the program a mixture of both distance education and the traditional method. What's more, students are required to register in person every semester, and do not have the ability to register or drop/add classes electronically. This requirement, furthermore, alienates students who become disenchanted with the whole program on the one hand, and the fact that the program is not accredited by the Saudi Ministry of Higher Education, makes the prospective students think of it as an exercise in futility to join it on the other hand. It is not, therefore, surprising that the program has not been successful in the Kingdom.

Some officials in Saudi Arabia have alluded to Distance Learning in vague and general terms in their speeches, but until now the subject has not been fully explored by any official establishment in the Kingdom.

Dr. Abdullah Al-Faisal, Director of King Saud University, while presenting recommendations at a symposium, did mention the phrase distance learning without giving any specification to the phrase. In a research paper entitled, "How

to increase University enrollment capacity with a view to meeting future developmental requirements”, he mentioned:

“Opening up of ten new colleges and Universities as to absorb the forecast increase in student population, and making use of the new technology utilized by educators all over the world, encouraging the establishment of new private institutions ..... should be among what we aim to achieve by the year 2020”[6]

One can see that he only referred to “new technologies utilized in the world” without even mentioning the term “distance learning” at all. By the same token, at a Symposium entitled “Future outlook for the Saudi Economy up to the year 2020” Dr. Khaled Al-Sultan, the undersecretary for educational affairs at the Ministry of Higher Education, while presenting his views in a paper on, “A Policy Model for Future Saudi Higher Education”, had this to say:

“Some of the types of remotely conducted education as well as the establishing of private educational institutions might be thought of in the future if we are to catch up with technological developments that are taking place in the world in order to upgrade our educational plans”.[7]

It is clear that these governmental officials were alluding to Distance learning without mentioning the term explicitly. Moreover, these officials do not recognize any courses taken via Internet (online) by any student. In light of such vagueness and total oblivion of the new method by those in charge of the Saudi Educational System, one can assert that introducing the method of distance learning will be an asset to upgrading the system and that the high officials will welcome such an approach.

## Chapter Two

### **Imperatives of Distance Learning in Saudi Arabia**

With regard to the first hypothesis this study sought to prove, it was revealed that the difference in the amount of information the student can get through distance learning compared to the old and traditional classroom method is minimal. Both methods offered almost equal advantages to the learner. However, I was able to discover that distance learning has a significant advantage to traditional methodologies.

A previous study by Dr. John O'Malley, a professor of Management and Business systems at the State University of West Georgia, on *Student Perceptions of Distance Learning, Online Learning and the Traditional Classroom*, yielded statistical evidence supporting the hypothesis that information gained through distance learning was equal to or surpassed that of the traditional college classroom, and illustrates that although similarities exist between the two methods, distance learning outperforms the traditional method. Distance learning in all cases accommodated the students schedule and saved them time, enabling them to carry a heavier course load, and to be tension free at the same time. Moreover, the students' ability to participate in class was higher in distance learning than in the formal traditional method. [8]

The Table below illustrates what dimensions of distance learning (DL) provide advantages relative to traditional methodologies.

**Table 2.1** Advantages of DL according to Dr. John O'Malley [8]

<b>Item Number</b>	<b>Questionnaire Items</b>	<b>t-value*</b>	<b>Alpha</b>
1	I would benefit if there were more DL courses.	-3.907	.000
2	DL does not offer any advantages to me.	5.595	.000
3	DL requires significant changes by a student.	-4.552	.000
4	I believe that I can learn more or would learn more through on-line material than through lectures.	1.396	.165
5	I prefer on-line courses to traditional courses.	2.246	.027
6	On-line courses make me uncomfortable.	1.816	.072
7	I would feel comfortable taking courses on-line.	-3.381	.001
8	DL saves me time.	-6.054	.000
9	DL works well with my schedule.	-8.851	.000
10	DL enables me to attend classes more frequently than traditional courses.	-1.207	.230
11	It is difficult to contribute to class discussions in a DL course.	-4.075	.000
12	DL enables me to take more courses than the traditional methodology in a year.	-4.248	.000
13	I would like to have more courses taught using the DL methodology.	-2.980	.003

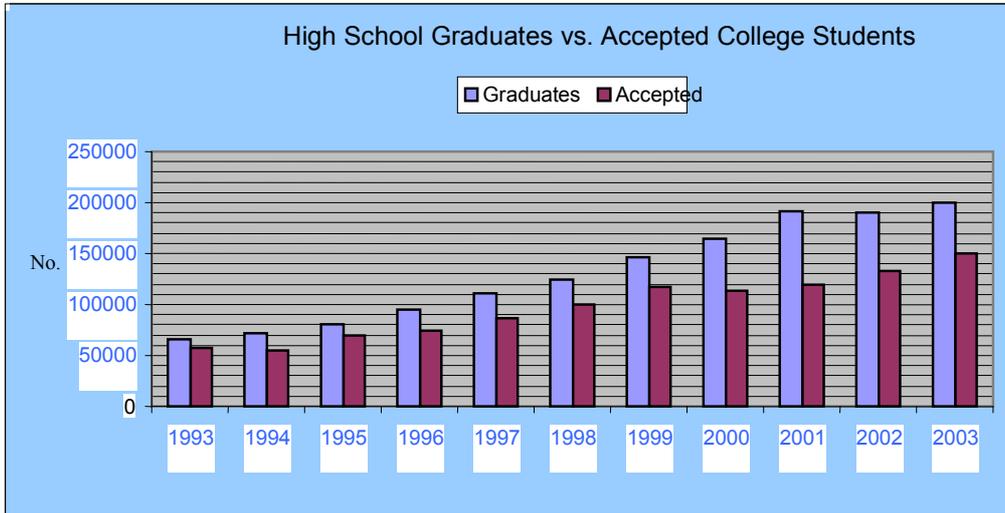
\*- a negative value indicates that students agree with the statement while positive values indicate that a student disagrees with a statement.

Table 2.1 in the previous page lists 13 indicators of distance learning benefits. Items #1, #2, #5, and #13 indicate that DL is beneficial to students. It appears that most of the relative advantage of DL is related to saving time (item #8), scheduling (item #9), and taking more courses (item #12). Overall, students agree that they feel comfortable taking courses on-line (item #7).

It's surprising to note that there are many people in Saudi Arabia who have been deprived of their formal education due to many different reasons. The most compelling of these reasons is the over-crowdedness of Universities, which has precluded some high school graduates from obtaining advanced degrees. The following three graphs show that from 1993 to 2003 the number of high school graduates increased. These graduates are trying to find a place in higher education but are unable to do so because enrollment has surpassed university capacity. These graduates, therefore, are unable to participate in higher education. From these graphs obtained from the paper proposal by Dr. Khaled Al-Sultan, entitled "Saudi Policies for future education," [7] one can notice the following facts and figures: (the reader should note that the numbers and titles have been translated to English from Arabic)

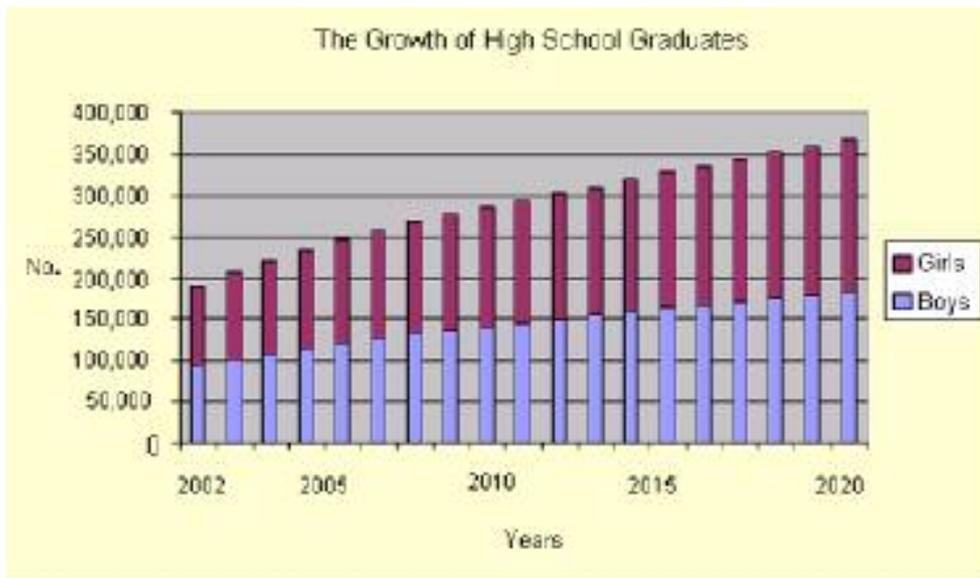
**a). The number of high school graduates is on the rise as it jumps from 70,000 students in 1993 to more than 200.000 students in 2003. The gap between students admitted to the University and those who cannot find a place in higher education also widens. Thus, while in 1993 around 2000**

**students were denied higher education, more than 12,000 students could not find a place in the University in 2003.**



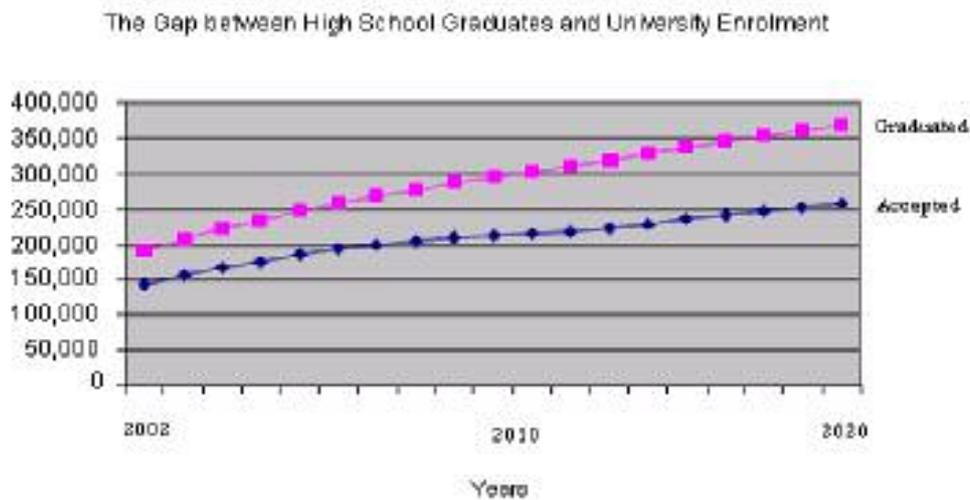
**Figure 2.1 High School Graduates vs. Accepted College Students [7]**

**b). The projected number of high school graduates through the year 2020 will also continue to increase.**



**Figure 2.2 The growth of high school graduates [7]**

**c). The gap will also continue to increase through the year 2020  
between admitted students and those who are not accepted.**



**Figure 2.3 The gap between high school graduates and university enrolment [7]**

This indicates how broad the gap is between students who graduate from high school and those who become successful in finding a place in higher education in the Kingdom of Saudi Arabia. Therefore, I hereby submit that this gap can and will be bridged through the application of the method of distance learning.

The ultimate goal of introducing distance learning will be to include all high school graduates and not to leave them outside the learning process. If the gap is reduced, let alone eliminated, then distance learning will be worth the effort.

The fact that all Universities in the Kingdom are located in major cities accounts for the second dimension of the problem this research focuses on. This problem denies full access to the educational process for many distant inhabitants interested in seeking higher education, who are not in close proximity to the

colleges. Since all eight major Saudi universities are located in Riyadh, Makkah, and the Eastern area, many cities of the Kingdom are without any college or University centers.

The following figures obtained by the Ministry of Planning in Saudi Arabia summarize the problem of unequal access to college universities. [10]

The reader should note that the numbers and titles have been translated to English from Arabic

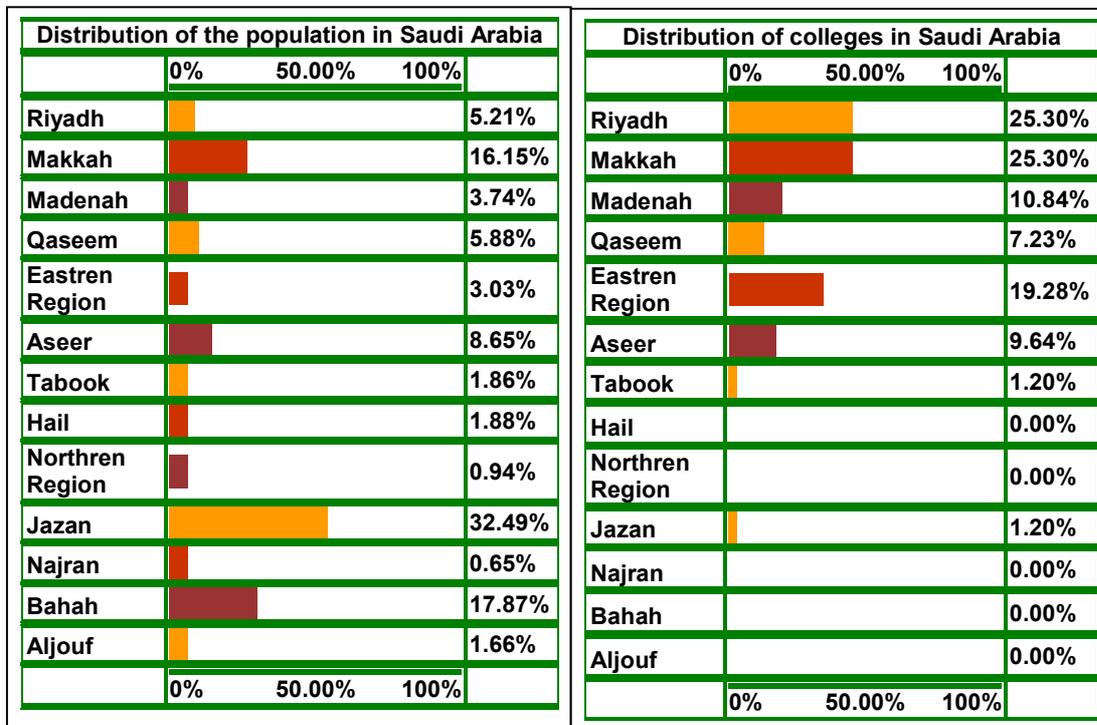


Figure 2.4 Distribution of resident population and college percentages in Saudi Arabia [10]

The information below compares the percentages of College distribution and area populations in twelve districts of Saudi Arabia:

<b>Administrative Districts</b>	<b>Area population</b>	<b>Higher Educational Institutions</b>
Riyadh	5.21 %	25.30 %
Makkah	16.15 %	25.30 %
Madenah	3.74 %	10.84 %
Qaseem	5.88 %	7.23 %
Eastern Region	3.03 %	19.28 %
Aseer	8.65 %	9.640 %
Tabook	1.86 %	1.20 %
Hail	1.88 %	0.00 %
Northern Region	0.94 %	0.00 %
Jazan	32.49 %	1.20 %
Najran	0.65 %	0.00 %
Bahah	17.87 %	0.00 %
Aljouf	1.66 %	0.00 %

**Table 2.2 A Comparison of college distribution by Geography and Demography in SA**

A look at the above data shows that there is an abnormal or asymmetrical distribution of colleges and higher educational institutions in the Kingdom of Saudi Arabia.

While almost one third of the Saudi population is concentrated in the area of Jazan (in the south), the area is deprived of an equal amount of institutions of higher learning as it only houses 1.2% of the college facilities. Conversely, the area of Riyadh (the Capital), which houses more than 25% of the institutions of higher learning in the Kingdom, contains only 5.21% of the entire Saudi population.

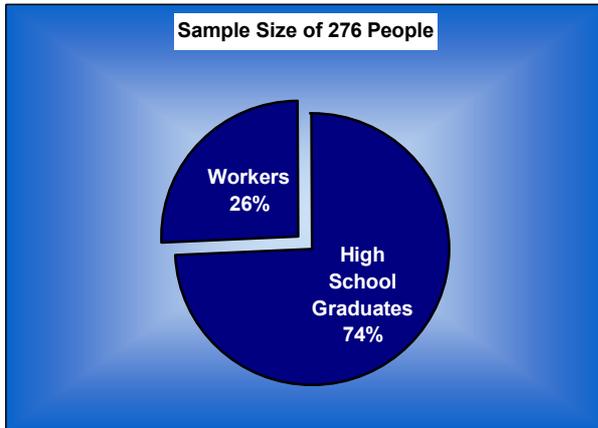
Furthermore, the areas of Bahah, Najran, and AlJouf are inhabited by more than 19% of the Saudi population and are deprived of any higher educational institutions.

This means that the people who live in the areas of Bahah, Najran, and AlJouf will be among those who will benefit from the introduction of distance learning into the Kingdom. Naturally, the existing infrastructure will need to be revamped. Some of the centers will have to be used for disseminating the educational material through the Internet, but the technology and tools available will provide the rudimentary elements for online learning for Saudi Arabia.

In order to target the computer literacy of high school graduates, workers, and professors in Saudi Arabia, two surveys were administered to a random sample of all groups. The groups were asked various questions relating to computer applications, computer ownership, Internet use, and how comfortable the groups would feel with respect to online learning.

The goal of the surveys is to demonstrate that the groups – high school graduates, workers, and professors- have the knowledge and ability to use computer applications necessary for distance learning education in the Kingdom of Saudi Arabia.

The first random survey conducted in the cities of Riyadh and Jeddah, shows the questions and answers given by 276 respondents - 205 high school graduates and 71 workers - who were not accepted into any colleges due to overcrowdedness, notwithstanding their desire to learn.



**Figure 2.5 Percentage of high school graduates and workers in the survey**

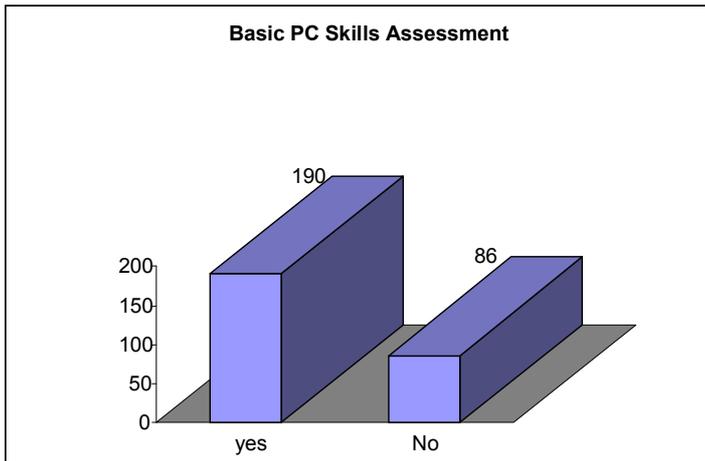
These two groups (high school graduates and workers) were asked 11 questions to assess their computer abilities as shown below:

<b>Questionnaire Items</b>	<b>Yes</b>	<b>No</b>	<b>Total</b>	<b>Percentage</b>
1. Do you have the basic PC skills	190	86	276	0.688
2. If not, will you be willing to learn how to use the computer	64	22	86	0.744
3. Do you have a PC at home	221	55	276	0.800
4. Do you use the Internet	186	90	276	0.673
	<b>Email</b>	<b>Chatting</b>	<b>Surfing</b>	<b>Education</b>
5. If yes, for which if the following objectives:	186	159	186	40
	<b>Dial-Up</b>	<b>DSL</b>	<b>GSM Wireless</b>	<b>Satellites</b>
6. How do you access the Internet	149	12	2	23
	0_2	2_4	4_6	
7. How many hours you spend daily in the Internet	23	60	103	
	<b>Yes</b>	<b>No</b>	<b>Total</b>	<b>Percentage</b>
8. Do you think the Internet is a good tool for learning	245	31	276	0.887
9. Will you be willing to take online courses if available	211	65	276	0.764
10.If you are working, do you access the Internet from work	23	48	71	0.323
11.If you are working now, will be you willing to Continue your education online	59	12	71	0.831

**Table 2.3 Survey questions for high school graduates and workers**

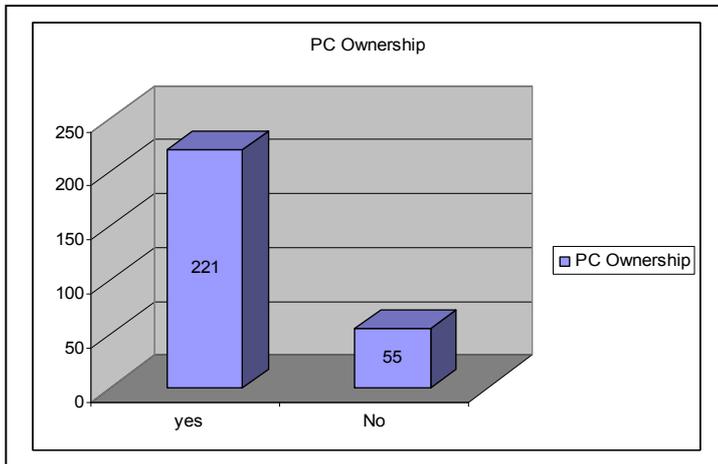
From the above table, one can notice the following:

- a) **About 69% of the respondents have basic pc skills and 74% of those who do not, are willing to learn.**



**Figure 2.6 Basic PC Skills Assessment**

- b) **80% claim to have a personal computer at home; this shows the buying power of Saudi citizens. [11]**



**Figure 2.7 PC ownership**

- c) **Approximately 67% use the Internet through 4 mediums; dial up and satellite being used the most. A majority of those surveyed spend 4-6 hours on the Internet, with a majority using it for recreational purposes (i.e. chatting, email, web surfing) and only 21.5% do so for educational purposes.**

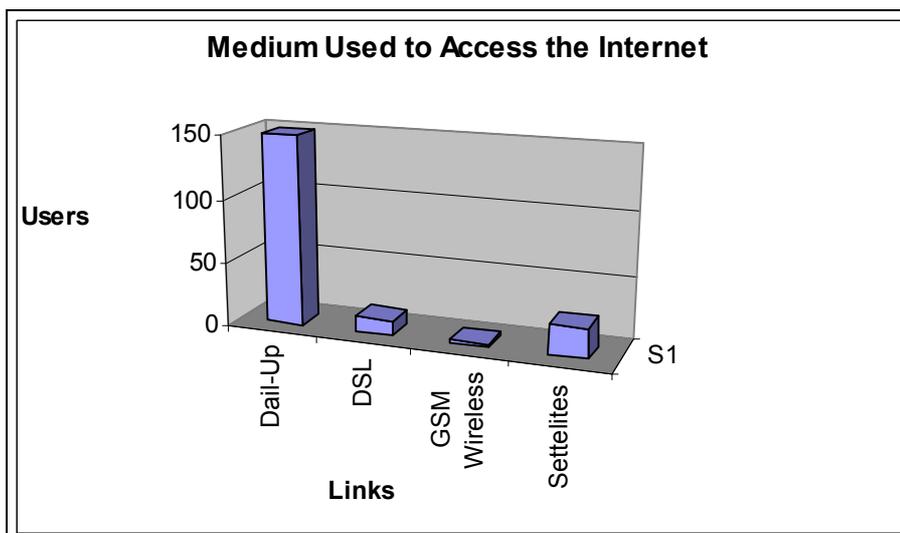


Figure 2.8 Medium used to access the Internet

- d) **A surprising revelation was that over 88% believed that the Internet was a good tool for learning. Moreover, 76.4% were willing to take online classes, showing a positive correlation between the two.**

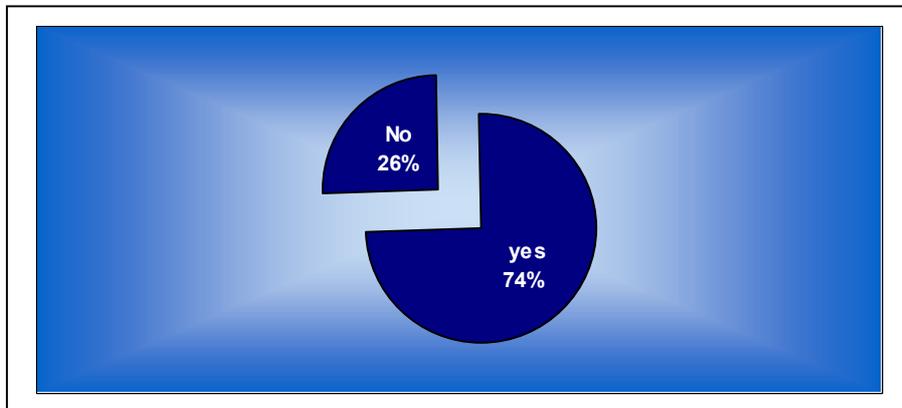
The next survey shows the questions and answers that were given by 105 college teachers from King Saud University (KSU), King Fahad University of Petroleum and Minerals (KFUPM) and King Abdullaziz University (KAU). They were each asked 7 questions to assess their computer abilities.

Questionnaire Items	Yes	No	Total	Percentage
Do you have the basic PC skills	78	27	105	0.74
If not, will you be willing to learn how to use the computer	16	11	27	0.59
Do you have computer access at work	85	20	105	0.80
Do you have Internet access (work, home)	79	26	105	0.75
Would you feel comfortable teaching your students online	67	38	105	0.63
Would you prefer offering courses online using the Internet	71	34	105	0.67
As a teacher, do you think using the DL method will make a difference	62	43	105	0.59

**Table 2.4 Survey questions for professors**

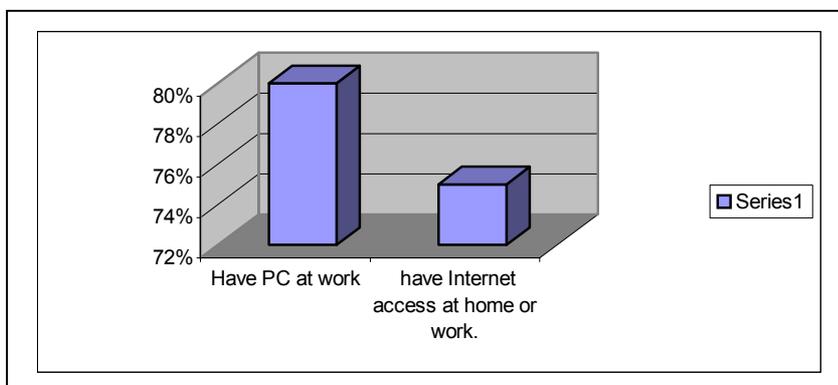
After examining the details of the survey, the following can be concluded:

- a) **74% have basic computer skills and approximately 60% of those who do not have the basic skills are willing to learn how to use the pc if given the training.**



**Figure 2.9 Basic PC skills assessment for college teachers**

- b) **80% have a computer at work; this means that the campus facilities are equipped with modern technology. Furthermore, 75% have Internet access at home or work.**



**Figure 2.10 The percentage of instructors with PC and Internet access**

**c) Overall, a large percentage of the instructors feel comfortable with distance learning and teaching it through the Internet.**

From the first survey, it is clear that most high school graduates and workers have the ability to use the computer and Internet. They are also willing to continue their education through the Internet if given the chance. Most of them believe that the Internet is a good tool for learning. The study was able to reach important conclusions about those who are working and cannot follow any formal education. These people, it was found out, were willing to take courses on the Internet from their homes, as they cannot leave their work site to do so.

Although the survey was conducted in two cities with the largest distributions of college facilities, one can conclude that smaller cities in the South, such as Bahah and Najran, are capable of supporting the model of distance learning based on two known facts. First is the education of the students in Saudi Arabia. Since the educational system is universal and the material taught does not differ between school districts, the computer literacy of students in the South is comparable to that of other students in larger cities. Lastly, Internet technology is also similar in the South. Wireless service is available throughout Saudi Arabia, allowing all students, regardless of location, the ability to access the Internet, a criterion needed for distance learning education.

This suggests that applying distance learning method would help high school graduates and workers to achieve their educational goals by obtaining higher

education degrees. Also, it would help people who have been left without an education.

The second survey provided information supporting the distance learning method with academic instructors. Information gathered that college professors and teachers have computers in their offices, are literate with the PC and Internet, and are willing to obtain training if possible. Furthermore, they entertain the idea of providing and teaching classes online. This fact is one of the most compelling conclusions this study was able to approve.

Obtaining a college degree in Saudi Arabia is crucial for advancement and success in the kingdom. Consequently, this has caused over crowdedness at all eight universities; therefore, students are forced to earn a college degree abroad. According to the higher ministry of education in Saudi Arabia, in 2004 there were more than 15,000 students studying abroad in countries such as Egypt, Canada, the United Kingdom, and the United States. (12) The total number of Saudi students in the U.S. for example is 4835. 3812 have scholarships from the Saudi government and 1023 support themselves. (13) The cost of attendance for the average Saudi Student in the USA is estimated to be more than \$500,000 for an undergraduate degree. It is true that the average cost of a Saudi student in Egypt is less than the cost in the USA, but the cost is exacerbated by the fact that students in Egypt require more time and courses to obtain a degree. This means the average cost of any Saudi student studying abroad stands at higher rates

Not all students who study abroad however, are provided with government assistance. Therefore, these students are financially responsible for their tuition and living expenses. The model of distance learning will be beneficial for students by allowing them to enroll in courses at Saudi universities that have reached maximum capacity. Since education in Saudi Arabia is government funded, these students will not be responsible for their tuition expenses. Using distance learning would decrease the number of Saudi students who would in the traditional method be seeking higher education outside the kingdom. It is also assumed that the new method will be less expensive than the old and traditional one.

Implementing distance learning will be less costly for the government of Saudi Arabia. Sending students abroad involves a large number of expenses that the government has to cover, for example, tuition, health insurance, and living expenses. These funds that the government spends can instead be used to support distance learning technologies in Saudi Arabia. The Saudi government, in the traditional method of classroom learning, has to build new facilities, whereas distance learning will relieve the government of high expenses incurred for building such facilities. This new method can therefore, help reduce the cost of educational process in the entire kingdom.

## **Chapter Three**

### **Technologies Used to Deliver Distance Learning**

Before discussing the distance learning technologies and applications currently used, I will provide a brief overview of the Internet in the Kingdom of Saudi Arabia.

### **Internet in Saudi Arabia**

The Internet was first provided in 1999 for college and government use. A year later, the general public was granted Internet access. The two providers are King Abdulaziz City for Science and Technology (KACST) and the Saudi Telecomm Company (STC). KACST works in cooperation with STC to provide the communication infrastructure in the country. Internet users first connect with an Internet Service Provider (ISP) and then are transferred to the STC and finally to the KACST. It should be noted that the KACST primary responsibility is to evaluate the content of the material the user is obtaining. Some sites may be blocked because of content that is questionable or deemed inappropriate by engineers who work for KACST. This process causes a time lag with respect to accessing information. The following graph shows the Internet network in Saudi Arabia today: [14]

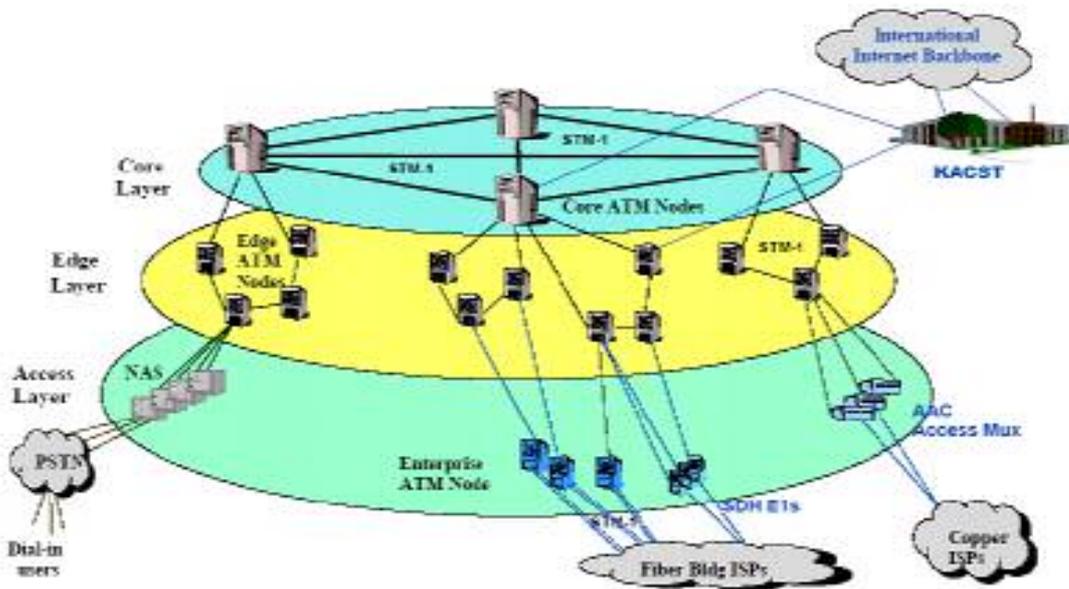


Figure 3.1 Internet network in Saudi Arabia today [14]

The graph below shows the telecommunications links provided by two companies in Saudi Arabia: Lucent and Siemens

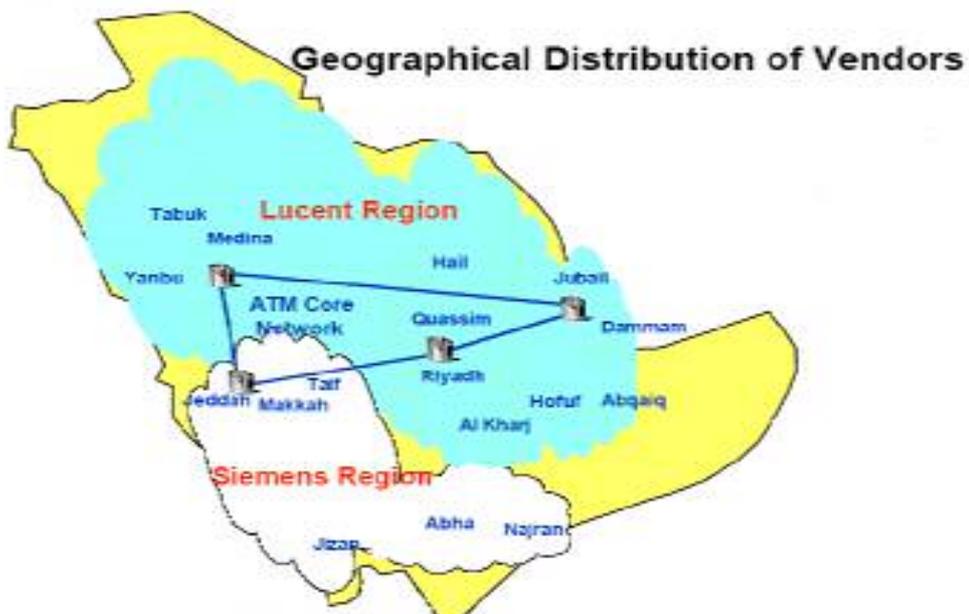


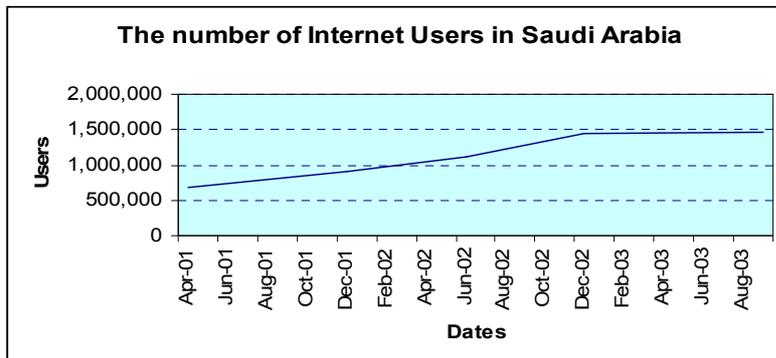
Figure 3.2 Geographical distributions of vendors in SA [14]

Increases in technology and a variety of telecommunications links available in the Kingdom of Saudi Arabia have provided computer users with outlets for recreation and research. Unfortunately more time is devoted to recreational computer use (i.e. web surfing, download music, chat rooms, etc...) and less on research. This technology can be used more effectively and efficiently when it's geared toward the implementation of distance learning.

The number of computer users in the Kingdom of Saudi Arabia has rapidly increased since the introduction of the Internet. Moreover, as telecommunications technologies become more advanced, creating more advantages of owning a PC, there will be a continual increase in PC ownership in the Kingdom. The table and graph below illustrate the influx in computer users and the technologies utilized:

Dates	Users
Apr-01	690,000
Dec-01	900,000
Jun-02	1,110,000
Dec-02	1,453,000
Sep-03	1,462,000

**Table 3.1 The number of Internet users in SA**



**Figure 3.3 The number of Internet users in SA**

The study has demonstrated that using the Internet in Saudi Arabia is commonly accessible by four mediums. Dial-up, DSL, Satellite Access and Wireless networks are all available in the Kingdom almost for every user as shown in chapter two. The four telecommunications links with their respective data rates are shown in the table below:

<b>Telecommunications Links</b>	<b>Data Rates</b>
Dial-up	10 to 40 kbps in each direction
DSL	From 256 kbps to 1.5 Mbps
Satellite link	128 kbps upload speed to 1,024 kbps download speed
Wireless Network (GSM) by GPRS	Between 150 and 200Kbps

**Table 3.2 Telecommunications links and their data rates**

Since most Saudi houses have at least one telephone line available and one personal computer, reaching the Internet via Dial-up – which was evident in the administered survey - the minimum requirement for taking courses online is satisfied.

### **Wireless Technologies and Satellite Links in Saudi Arabia**

Wireless technology in general and third generation wireless in particular is becoming more prevalent in the field of telecommunications technology. Since Saudi Arabia is a large country in terms of area, the decision to convert to wireless technology has been made. Currently, the Saudi Telecom Company (STC) is the only provider of wireless service; however, there is a new company, Mobily, which will provide GSM Third Generation wireless services in mid April of 2005. It will provide high-speed Internet connection using General Packet Radio Service (GPRS) with speeds between 150 and 200Kbps [17] [18]. Its purpose

is to acquire three million subscribers by the end of 2005 by offering wireless service at a lower cost than the Saudi Telecom Company [17]

This service is important for distance learning in the Kingdom of Saudi Arabia because it can support the applications of the distance education. For example, students have the ability through this wireless technology to access the Internet from anywhere in the Kingdom. Also, distance learning applications including video, PowerPoint, teleconferencing, can be accessed by relying on the speed and technology of wireless communications.

The use of Satellites to view television in the Kingdom is a documented fact. This service is a one-time cost for the equipment and does not require the user to pay monthly fees. Students can use this technology in the kingdom to access the Internet at 128 kbps upload speed to 1,024 kbps download speed, allowing them to participate in online learning.

### **Distance Learning Technologies**

There are ample technologies that can be used for distance learning, and as previously stated, they are divided into four general categories: print materials, audio/voice, computer, and video. These categories can also be distinguished by different modalities. For example, audio/voice may have subcategories of telephone, voicemail, audio conferences, audiotape, and radio. Furthermore, the technologies may overlap categories. Audio conferences may be held using the telephone, on-line chat rooms, and two-way radio communications. This chapter will look at the four categories of technology that encompass distance learning

and argue that these technologies are available in the Kingdom of Saudi Arabia and can strengthen higher education if they are used accordingly.

### **Print Materials**

The original form of distance learning was correspondence courses, in which print materials were mailed to students and returned to the teachers through the postal system. Even though there are numerous new options for distance learning, print remains a significant component of most courses.

Print materials may serve as the primary source of instruction, or they may be supplemental. As a primary source, distance students might use a textbook and read various units on a specific timetable. Other technologies, such as e-mail, could then be used to ask questions or send assignments back to the teacher.

### **Voice/Audio Technologies**

Audio or voice technologies offer cost-effective ways to enhance distance learning courses. The audio component of a distance learning course can be as simple as a telephone with voicemail, or it can be as complex as an audio conference with microphones, telephone bridges, audiotapes (cassettes) and speakers.

Since each house in the kingdom of Saudi Arabia has a Television and Video Cassette Recorder (VCR), it is relatively easy for the students to watch videotape or a public broadcast television show. In addition, almost all homes have access to a telephone, enabling the use of voicemail and audio conferencing.

(Audio/Video)

### **Computer Technology**

With the increased popularity of the Internet, computer technologies are receiving more and more attention as a means of delivering distance learning. The primary computer technologies used for distance education include e-mail, online collaborations, videoconferences, CD-ROM and Web-based education.

### **Video Technology**

The ability to see and hear an instructor offers opportunities for behavior modeling, demonstrations, and instruction of abstract concepts. Video techniques for distance learning are often characterized by the transmission media such as videotapes, satellites, television cables, computers, and microwave. [15]

The table in the next page lists the four general categories of distance learning technologies used now, as well as examples of subcategories for each. Also provided are the basic advantages, disadvantages, and hardware requirements:

[16]

Technology	Subcategory Examples	Advantages	Disadvantages	Hardware Requirements
Printed Material	Textbooks Study guides Workbooks Fax	Extremely portable Comfort level high Low cost Readily available Easy to use	No student/teacher interaction Static presentation Requires reading skills Time delay	Fax machine may be required
Voice/Audio	Telephone Voicemail Audio conferences Audiotape Radio	Moderate to low cost Readily accessible Easy to use Comfort level moderate to high	Requires scheduling No visual information Impersonal	Telephone (speaker phone preferable for groups) Tape player (specify cassette/cd) Radio (specify standard or 2-way)
Computer	E-mail Web-based sites Video conferences CD-ROM Collaboration sites	Incorporates text, audio, video, graphics Interactive Provides written record of discussions Moderate expense	Requires hardware and software Generally relies on written communications Computer viruses, hacking No guaranteed performance (network reliability)	Computer Internet connection Video card Sound card CD-ROM burning capability (instructor end) Network capability
Video	Videotape Satellite delivery Microwave Broadcast video Desktop video Video conferences	Incorporates audio and video Interactive Personal communications	Moderate to expensive cost Planning and preparation Requires scheduling Requires technical support	Video player Video recorder Audio system Satellite link

**Table 3.3 Overview of Distance Learning Technologies** [16]

Distance learning can be an effective and efficient method for delivering instruction and education to a variety of students in numerous locations. For distance learning to be effective, two criteria need to be met; first, the instructor must know the target audience. A previous survey in this paper demonstrated that most students and professors in the Kingdom of Saudi Arabia have basic computer skills needed for distance education. This fact is helpful to professors when they determine what assignments are necessary to assess student performance as it relates to the course content. Moreover, such evidence can be used to cajole the Higher Ministry of Education to adopt the model of distance

education. The second criterion is the application of the appropriate technology. Considerations in the selection include target audience, available equipment, goals and objectives of the presentation, cost, and accessibility. The amount of technology available in the Kingdom of Saudi Arabia allows it great flexibility with respect to the appropriate technology. For example, all 8 universities in Saudi Arabia are equipped with Information Technology software, such as web pages and email servers that allow students to check records, grades, etc, with a personal email account. The universities also have networking through the Saudi Telephone Company that provides high speed Internet connection. This type of networking allows professors to research and gather course information and send out email messages to students quickly.

### **Types of Distance Learning Instruction**

There are two types of distance learning categories - synchronous and asynchronous. The synchronous model requires the participation of all students and instructors at the same time. The advantage of synchronous instruction is that interaction is done in "real time" and information can be disseminated expeditiously. Examples include teleconferencing, computer conferencing, and Internet chats.

Asynchronous instruction does not require the simultaneous participation of all students and instructors. This type of delivery provides greater flexibility for the student because they are not required to meet at a specific time or a specific day and can therefore adjust their schedule to meet outside demands, such as work

and family. Examples of asynchronous delivery include e-mail, audiocassette courses, videotaped courses, and WWW-based courses.

The asynchronous model, based on its definition, would be the most effective form of instruction used in the Kingdom of Saudi Arabia; allowing students and faculty to participate fully in the course at nearly anytime from almost anyplace. The convenience of the asynchronous model for both faculty and students will undoubtedly play an integral in the success of distance education in Saudi Arabia.

## **Conclusion**

Having reviewed the findings in each section of the preceding study, one can conclude that this study has addressed and proven each of the hypothesized statements to be accurate.

**1-** With regard to the first assumption this study sought to ascertain, it was found that the difference in the amount of information the average student can obtain through distance learning compared to the old and traditional one is minimal or insignificant. Both methods offered almost equal advantages to the learner. This has been verified through previous studies examined in Chapter two. However, we have seen that while similarities sometimes did exist between the two methods, distance learning still has an edge over the traditional method as the new method in all cases fitted into the learners schedule and saved them time, enabling them to carry a heavier educational load, and to be tension free at the same time. Moreover, it was surprisingly found out that the students' ability to participate in class was higher in distance learning than in the formal traditional method. Students and workers in Saudi Arabia will undoubtedly have a positive disposition toward the flexibility of this model.

**2-** The second hypothesis stating that high school graduates, workers, and college professors have the basic computer skills required for distance learning was validated by two surveys. Furthermore, the surveys underscored that the students and professors would not require additional training to engage in online

learning. Applying this model will be seamless because both groups already have the minimum requirements to fully participate in distance learning.

**3-** It was found that a positive relationship did exist between applying the new method of distance learning and decreasing the number of students who drop out of the educational process for many reasons. Overall, this model will reach and attain a large percentage of learners.

**a.** The study was able to prove that students, who do not obtain education beyond high school because of circumstances such as over crowdedness and the location of the college institution, were willing to continue their education through the medium of distance learning. This posits that if this method were being used, a smaller percentage of people would not be left without an education.

**b.** The study was able to reach important conclusions as to those who are working and cannot enroll in college courses. These people, it was found, were willing to take courses on the Internet from their home, as they cannot leave their work site to do so. This was in fact one of the most compelling conclusions this study was able to reach.

**c.** The study was also able to illustrate the disproportionate locations of higher education institutions and the population of residents in Saudi Arabia. Consequently, individuals living in distant cities could not commute to the universities, which are mainly located in the major cities in the Kingdom. This problem can be resolved by using distance learning so that individuals do not have to leave their abodes to obtain an advanced degree.

**4.** Information from the research revealed that students studying abroad for higher education have a favorable disposition to learn at home through online courses. This suggests that the number of Saudi students interested in seeking higher education outside the Kingdom will decrease when adopting distance learning as the medium of instruction.

As for the fourth hypothesis - the one related to the costs of students going abroad for college - it was found that the cost of using distance learning inside the Kingdom is less expensive than studying outside of Saudi Arabia. Expenses related to studying abroad will be eliminated and will allow the government more funds that can be used to introduce distance learning in the Kingdom. Furthermore, since all colleges are equipped with the necessary technologies, the cost of implementation will be insignificant compared to constructing a new facility for additional classrooms to accommodate the growth in college enrollment. This new method can therefore help reduce the cost of higher education in the entire Kingdom should it be adopted on a large-scale basis.

Information gathered from the study shows that almost every home in Saudi Arabia has at least a telephone line and a television. Dial up technology has the ability to handle most of the components of distance technologies, but certain distance learning applications require high-speed connection. Therefore, wireless technology will be available to address this need. This technology already exists, but is not fully distributed in the kingdom. The new company, Mobily, will soon

offer 3-G wireless communication features throughout all of Saudi Arabia. The complete features of 3-G wireless communications will allow students to obtain high-speed Internet access from any location in the Kingdom and the ability to receive and send most distance learning applications (i.e. video, audio, teleconferencing, etc).

Also, Satellite use is now common for television viewing, but this technology can instead provide students with the opportunity to obtain high-speed Internet connection needed for online learning. Since Saudi Arabia already has the modern technologies needed for distance learning, it would not be costly for the learner to use the technologies associated with online learning.

Introducing the method of distance learning in the Kingdom of Saudi Arabia is a matter that should be given the highest priority by the responsible people in the Kingdom. This paper did not espouse a specific method to be used, but examined and explained the numerous options that are available in my country for distance education, which should be evaluated by Saudi officials. There should be a phased plan for introducing the Internet to some selected classes in some schools or Universities in the Kingdom. In the USA, this has proven to be useful even in the most advanced countries.

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