

## CHAPTER ONE

### Education and Information Technology Context

#### *Introduction*

The Kingdom of Saudi Arabia is a modern state in the Arab Peninsula. It was founded approximately 70 years ago by King Abdul Aziz Ibn Saud. It is the largest country in the region that follows the Islamic faith (Burkhart, 1998). Marcinkiewicz (1995) notes that before statehood, the area was controlled by diverse tribes and lacked the contemporary infrastructure that is fundamental for any society. In 1933 AD (1953H), the modern country was born and the founder started to develop and create the organizations necessary for a modern society.

One of the first organizations was the Ministry of Education. Marcinkiewicz (1995) stated in his study that the government funded the entire educational system, beginning with kindergarten and going through the college level. There are eight universities which are centers for diverse sciences. The King Fahad University of Petroleum and Minerals in Saudi Arabia has accreditation by a U.S. Educational Board.

Marcinkiewicz's (1995) description of the transformation that occurred was, "Since statehood, life has changed from something like a dark ages or a land untouched by technological advance to a country with much political influence, possession of one of the world's five super computers... and regional communications satellite" (p.20).

Presently, Saudi Arabia is the main market for information technology in the Middle East. Computer sales were roughly \$1.65 billion, which represented 40% of the sales in the Middle East (U.S. Department of Commerce, 2000). As a result of this country's development of modern institutions of higher education, a need has arisen

for modern technology to meet the growing demands for information and research. This has created a need for Saudi Arabia to invest in information technology. The government realized that the Internet and computer technology had to be included in all of the educational institutions. The Internet Project was approved in 1997 and its servers started in 1998. The diffusion of the Internet began with a central organization, the King Abdulaziz City for Science and Technology (KACST). A firewall was installed to prevent all inappropriate materials that conflict with or have negative effects on the culture (Burkhart, 1998).

### *The Need for Information Technology*

Information technology (IT) has become the backbone of a global society. Today's world is marked by increasingly rapid social, political and technological change. The ability to increase productivity, time-saving efforts, and improving job quality has caused a rapid expansion of information technology (Tuller & Oblinger, 1997). Tuller and Oblinger reported that Information technology is "...changing every institution, every business, and every individual in profound ways" (1997, p. 33). Sepecht (2000) stated that the information technology infrastructure is widespread across all organizations in different sectors, both private and public, including educational institutions.

According to Scheffknecht (2000),

The maturity of the information technologies is sufficient today, with prospects for stability and long-term development, for decision makers, at various levels of responsibility to feel authorized, or even encouraged, to make choices for the long term and agree to make the investments needed to enable these technologies to be used in schools.

(p. 23)

Recognizing the growing role of technology in the workplace and in everyday life, educational reformers have stressed the need to provide students with skills to succeed in an information-based economy. Educational technology is seen as an essential tool in schools for improving the present situation, in teaching, learning, and in administration (Sandholtz, Ringstaff & Dwyer, 1997). Lucas (1999) states that information technology includes “Three components of IT—computers, database, and communications networks—are transforming organizations, markets, and education” (p. 5). In this research, information technology includes the contemporary and value components that compose computers, the Internet, networking, and communication tools.

#### *Investment in Information Technology and Growth of Its Use*

In the United States, information technology increases daily with the support of the federal government. Moursund (1998/1999) points out that the United States has invested billions of dollars in grades K-12 during the last twenty years. At the present time, they have increased their spending to six billion dollars annually for information technology. This represents two percent of the school budget. Ely (1995) has determined that the computer-to-student ratio has undergone rapid change. In 1983, the ratio was 1:125; in 1988-1989, it was 1:22; and in 1995, it was 1:12. This indicates that information technology is considered a valuable part of a school’s curriculum. Integration of the Internet into the classroom has drastically increased in recent years. Yoder (2001) indicates that the use of the Internet in the classroom maximized from 3 percent in 1994 to 51 percent in 1998, and the percentage of schools that integrated the Internet maximized from 35 percent in 1994 to 89 percent in 1998. The federal government’s investment in educational technology increased from \$23 million in 1993 to more than \$3 billion currently.

Brown, Brudney, Waugh and Hy (2000) cited the National Association of Schools of Public Affairs and Administration (NASPAA), which suggested in a policy in 1986, that students had to be information technology literate. This suggestion prompted the Federal Government to increase spending to \$200 billion over a decade on information technology. The investment in information technology is expected to be over \$45 billion in 2001.

In addition, Moursund (1998 & 1999) indicated that information technology was the backbone for businesses as well as education as shown in Table 1.

Table 1

*Information Technology in Business and Education.*

Business	Education
<ul style="list-style-type: none"><li>• The IT industry is now more than</li></ul>	<ul style="list-style-type: none"><li>• Many students are successfully learning</li></ul>

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eight percent of all USA business.

It is successful and growing.

- Computer-assisted learning and distance learning are successfully used in staff and customer learning.

- IT tools that support the individual worker are relatively well-integrated in the workplace. Business has invested heavily in this area.

about IT. State and national standards

and goals are being developed.

- Computer-assisted learning and distance learning are successfully used with students and for staff development.

- Progress is occurring on integrating IT tools with curriculum, instruction, and assessment, but educational investment levels lag significantly behind business.
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Note. From “Is Information Technology Improving Education?” By D. Moursund, (1998 & 1999), *Learning & Leading with Technology*, 26(4), 4-5.

According to Davis and Naumann (1997), “the use of information technology in knowledge work is pervasive. It complements the mental and clerical capabilities of humans and enhances the performance of most knowledge work activities” (p. 18).

The preceding researchers point to the significance of information technology in the work place and the infusion into schools as a new method for teaching and learning to increase the knowledge and skills of the learners, solve problems, and increase the organization’s performance.

*Information Technology Planning*

Ambitious West Ed web site (2001) indicates that the information technology plan in schools is based on the point of views of the stakeholders (administrators, teachers, parents and community members) and includes business and public organization members who try to develop and integrate their information and ideas to develop a reasonable plan that works as comprehensive guideline for all activities of school. McCredie (2000) states that, “An effective IT planning process helps leaders determine the appropriate roles for information technology in learning and teaching, research, outreach, and management and predict how these roles might change over time” (p. 15). Moreover, McCredie asserts that information technology planning can enhance the educational institutions’ environment and can perform the programs smoothly. Augustine, Oliphant and Armiri (2000) mentioned the importance of utilizing information technology in instruction, research, and administrative work. But they reported, “to accomplish such an ambitious agenda requires careful planning from all areas of the institutions” (p. 48).

Anderson (1999) emphasized the word “plan” and pointed out that it includes both a verb and a noun aspect. The active part of the plan should encompass the attitude of the members toward the new information technology plan. It should also include their support in order to ensure its implementation. The second aspect relates to “plan” being a noun and includes all the documentation that makes it formal and assists in its implementation. In fact, Anderson provides strong statements which assert that information technology plans need both the positive attitudes of stakeholders to be participants in constructing the plan, as well as the documentation of the plan, which should be written to function as a road map in order to implement it successfully.

Foster and Hollowell (1999) espouse that educational institutions should start adopting information technology because of its significant potential effect in teaching, learning, communication, and research. Indeed, schools should classify information technology as a part of school planning. Furthermore Foster and Hollowell claim,

Ignoring the new need to make technology planning an integral part of institutional planning would be like ignoring the traditional need to plan for space, library holdings, and staffing when deciding to implement a new academic program. (1999, p. 9)

Computer technology is part of information technology. In the classroom, teaching creates more student-centered learning, where learning takes place in the form of collaboration. Computer technology supports interaction between students and instructors both in and out of the classroom. While computer technology has considerable potential for improving the current educational system, this potential cannot be realized unless schools can successfully incorporate the technology into their regular activities (Clark & Grant, 1991). Additionally, Pan (2000) provides a study that clarifies how information technology plays a vital role in the changes education made in Singapore. Thus Pan confirmed that,

Information technology can be a change agent in education and national development. IT has been a catalyst and enabler of the shift from didactic, passive instruction to interactive, learner-centered and learner-directed instruction (p. 2).

The need for an information technology plan to guide schools to effective uses of information technology in their classroom is critical to the successful use of information technology in the classroom. The information technology plan can be used as a guide for implementation and evaluation of the teaching and learning

processes in conjunction with technology. How an organization plans and then implements the use of technology can determine the rejection or acceptance of this technology. According to Jonassen (1996),

Computers are frequently used in schools and the workplace as tools to help students or workers produce work—as productivity tools. Using computers in this way involves computers as a medium to help the user accomplish some task, making the user more productive. (p. 17)

To realize the benefits of technology, schools must develop a plan for integrating information technology into the curricula and other aspects of the school environment. Teachers should understand the value of infusing information technology in the school's daily activities that enhance learning and teaching (Lai, 1999). North Central Regional Education Laboratory (NCREL, 1999), National Center for Technology Planning (NCTP, 1994) and Lumley & Bailey (1997) indicate that an effective information technology plan is based on the shared vision of educators, parents, community members and business leaders who have technological expertise. It ensures that technology strengthens existing curricula and supports meaningful, engaged learning for all students. It also specifies how the technology will be paid for and will support education reform. To be successful, an information technology plan must promote meaningful learning and collaboration, provide for needed professional development and support, and provide flexibly in order to adjust to needed changes.

Schools that effectively use technology have a carefully designed information technology plan that is a part of the overall school improvement. A technology plan that is not integral to the overall improvement plan of a school is likely to be short-lived (Cradler & Bridgeforth, 1996). As part of the school improvement plan,



information technology should support the curricular goals of the school. The information technology plan should include a mission statement, goals, objectives and a strategy that confirms the mission of the school.

### *Funding of education in Saudi Arabia*

Funding is an essential element of the education sector which is provided solely by the government and that is based on the educational needs of the learners. The funding increased from one year to another and that advanced and spread the basis of education in only a few years, bringing the Kingdom from an age of darkness to an age of enlightenment.

There were only seventeen schools at the beginning in 1960, only 4,908 students and the budget was 2,000,000 million riyals or approximately 600,000 U.S. dollars. In 1999 (1419/1418 H), the number of schools was 8,114 and the number of students was 1,703,246. The budget was roughly eighteen billions Saudi riyals, or approximately five billion U.S. dollars (Ministry of Education, 1998, Ministry of Education, 2000).

When the government established the Ministry of Education instead of the Directory of Education in 1953 (1373 H), the number of schools was 323 and the number of students was 41,999. In addition, the budget was twelve million Saudi riyals, or approximately three million U.S. dollars (Ministry of Education, 1998). In 2000 (1420/1421 H) the Ministry of Education indicated that the number of schools was 10,114, the number of students was 1,111,970, and the budget was roughly twenty billion Saudi riyals, or approximately 6 billion U.S. dollars (Ministry of Education, 2000). As well, the government supports the Presidency of Girls' Education that supervised K-12 girls' education.

That indicates that the government's annual support of the K-12 schools improved education and allowed more children to enter schools, and the increase in the number of students has helped to improve the growth of society.

### *Statement of the Problem*

In this time, information technology became essential in our daily life and increases its advantages in school activities. Information technology works as a supplement and a tool for instruction and to support students and teachers in the acquisition of information that has a positive effective on their activities. Information technology plays a crucial role and 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).

The Ministry of Education and the Presidency of Girls' Education are very interested in the use of technology in the industrialized countries, such as the United State, that are fostering the use of information technology in schools. Based upon the knowledge they acquire, the Ministry of Education and Presidency of Girls' Education hope to improve their administration system. They desire to use information technology in classrooms to enhance the outcomes of the schools so that they can meet the needs of society.

In Saudi Arabia, K-12 education needs planning for information technology that includes teachers' needs to develop their knowledge and to acquire information technology skills that energize them. This will enable them to implement information technology in their classrooms in order to enhance teaching, learning and administrative work. Administrators who have knowledge of information technology will encourage and persuade their teachers to utilize information technology in the

real world. The benefits gained by using information technology must be based on a rational plan that directs its implementation.

The educational system in Saudi Arabia requires planning for and implement of information technology in order to employ its features in educational setting that include teaching, learning and administrative work. This impelled the researcher is to investigate high school teachers' and administrators' perceptions toward utilizing information technology in instruction, administrative work, and its planning. The researcher further seeks to determine their knowledge of the development of an information technology plan and information technology staff development.

#### *The Purpose of the Study*

Saudi Arabia is growing fast in all sectors, including education. The government of Saudi Arabia has supported computer literacy in high schools since 1985 because it is necessary for improving the production of industry and organizations, as well as the recent Presidency of Girls' Education. The lack of information technology planning made it ineffective. Implementation of information technology requires a comprehensive plan that ensures optimal performance of all tasks in the educational.

The use of information technology is fast becoming a necessary tool in the workplace and education. The Ministry of Education and the Presidency of Girls' Education have realized the importance of information technology in education. Their goals are to improve the knowledge and skills of students in order to be able to encounter problems and find ultimate solutions. This is their rationale for using information technology (IT) in schools. There are still deficiencies in the development of an information technology plan and in information technology staff

development. This inhibits the schools in the proper use of computers and the Internet, including the web and communication tools.

Administrators and teachers are important in the development of an information technology plan and staff development plan for their schools. Schools plans can be used by the Ministry of Education and the Presidency of Girls' Education to develop a comprehensive information technology plan and staff development plan for the country. Teachers should work as facilitators in the classroom. Presently, students work passively. By implementing information technology, staff development and an information technology plan the teachers' and students' roles may change so that students and teachers work as a group in order to develop their knowledge through their interactions.

To ensure that information technology is effectively integrated into the schools, educators, administrators, parents, *public sector and private sector members* must collaborate to create a formal information technology plan. Developing a plan for using information technology to support educational reform means more than providing for the acquisition of computers, software and the Internet. To be successful, an information technology plan must promote meaningful and collaborative learning, providing needed professional development, support and a flexible response to change. Another important component of the technology plan is professional development and support for teachers. No plan, no matter how well conceived, will be of any value if it is not implemented at building and classroom levels. Staff development activities should help teachers become comfortable and proficient with the technology and give them the opportunity to devise ways to use it in their classroom. Recommendations to the Ministry of Education and the

Presidency of Girls' Education will be made based on the results of these research results and the researcher's knowledge of information technology.

### *Research Questions*

#### *Part one: Descriptive Questions*

1. What are the perceptions of respondents toward using information technology in instruction?
2. What are the perceptions of the respondents toward the development of an information technology plan?
3. What are perceptions of the respondents toward using information technology to assist with administrative work?
4. What are the perceptions of the respondents toward the skills of information technology?
5. What are the perceptions of the respondents toward staff development (SD)?
6. What type of method of teaching and philosophy do they use?

#### *Part Two: Hypotheses Testing*

- 7a. Is there any significant interaction between position levels and the level of genders  
on a combination of information technology in instruction and information technology plan?
- 7b. Are there significant differences between teachers and administrators on a combination of information technology in instruction and information technology plan?
- 7c. Are there significant differences between male and female on a combination of information technology in instruction and information technology plan?

### *Significance of the Study*

Information technology is growing rapidly in the field of education. This study focuses on the current use of information technology in Saudi Arabian education and how the resources can help the decision makers to improve school environments. The advantages of integrating information technology in schools are numerous in the areas of teaching and learning, curricula, administration, and communication. The significance of this study is to help the Ministry of Education and Presidency of Girls' Education in Saudi Arabia to make rational decisions pertaining to the future of education in the country based on this extensive research, which represents the perspective of administrators and teachers toward information technology and its uses in schools, as well as their current knowledge of information technology. This would help the decision makers to adopt the appropriate staff development program models. Today, information technology in the classroom is seen as an important issue in changing and preparing students to cope with the new demands at work. In fact, it is necessary for students to meet these demands of the real world.

#### *The Delimitations and Limitations of the Study*

It is important for the researcher to clarify the limitations of the study. That will help to make the study reasonable. The limitations of the study are represented in the following:

1. The study included both male and female administrators (principals and assistant principals) and teachers in the high schools of Riyadh, Saudi Arabia.
2. The study was limited by the questionnaire created by the researcher.
3. The study was completed in the summer quarter of the academic year of 2002.
4. Accuracy and honesty of the data was based on the responses of the respondents.

### *Scope of the Study*

The researcher constructed the study to cover the essential elements. It is critical that they be studied together and that they work as a border for this study.

### *Education in Saudi high schools*

The study discusses education in high schools and includes grade levels, budget, and information technology in order to determine the present situation in the high schools.

### *Constructivist and humanist theories*

The constructivist theory is based on studies by Piaget, Bruner, and Vegotsky. This theory focuses on the learners who are active and able to seek information from different resources in order to construct their knowledge and help them develop optimizing solutions. The Internet and courseware that include multimedia, hypertext, and hypermedia are based on the constructivist theory. The humanist theory is based on individual needs that range from a basic level, such as food, to the highest level, self-actualization. They are vital to a discussion of a base line for the study.

### *Staff Development Plan*

Staff development is the heart of the implementation of information technology in school. To ensure successful implementation, the decision makers must develop a plan for information technology staff development that assists teachers and administrators to gain knowledge and skills. One goal is to reduce their fear of using

information technology inside and outside of school. Indeed, staff development dissolves the psychological and skill barriers to utilizing information technology.

#### *Information Technology Plan (ITP).*

An information technology plan is the key to development and the implementation of information technology in schools. ITP works as a direction to develop a school's mission, goals, and objectives. These change from time to time to meet students', teachers' and administrators' needs in order to increase the schools' productivity. It is a road map that helps the school to perform its goals on time at low cost.

#### *Perceptions of teachers and administrators toward integrating information technology at school.*

It is important to discuss the view of teachers and administrators in the review of the literature. It is helpful for the researcher to know the other perspectives regarding using information technology in an educational institution.

#### *Definition of Terms*

Defining the terms that are used in the study is important in order to eliminate ambiguous meanings that could confuse the readers' understanding of the research. The definition of terms is divided into two types of definition. The first includes all the definitions that involve the dependent variables and the second includes all the definitions that are included in the research.

#### *Operational Definition*

*Collaborative learning:* "When students work together in a group in order to exchange information that helps them to solve a problem or develop a project. It gives them an opportunity to share their ideas and skills" (Pool, 1995, p. 440).



*Internet*: “An interconnection of thousands of separated networks worldwide originally developed by the U.S. federal government to link government agencies with colleges and universities. The Internet’s real expansion started recently with the addition of thousands of companies and millions of individuals who use graphical browsers to access information and exchange messages (Heide & Stilborne, 1999, p. 296).

*Information Technology (IT)*: Includes both computer and communication technology. The term is broadly applied to computer hardware, computer software, input and output devices, visual display devices, communication networks, and communication hardware and software (Davis & Naumann, 1997).

*Listserv*: An efficient tool that uses the Internet for discussion, where each participant sends email for all those who subscribe to the discussion (Keating & Hargitai, 1999).

*Local Area Network (LAN)*: Provides communication in a small area in order to help the users exchange information easily, such as connecting a group of computers inside a school (Stallings & Slyke, 1994, p. 635).

*Multimedia*: The system that has the ability to group together sound, video, and text. Users can develop their projects using these tools. The system needs to be integrated with a quick time player (Falk & Carlson, 1995).

*Network*: A group of computer devices connected by a data communication system (Picciano, 1998).

*Search Engine*: software that allows users to locate different forms of information in the Web (Anderson, 2001).

*Technology Plan*: “A blueprint, which guides the process of comprehensive technology integration in a school district or building” (Lumley & Bailey, 1997, p. 24).

*Wide Area Network (WAN)*: Integrating a group of computers together linked by the modem, such as high schools with the district schools (Roblyer & Edwards, 2000).

### *Other Related Definitions*

*Administrators*: Includes principals and assistant principals who are working in high schools (male and female) in Saudi Arabia.

*CD-ROM*: these letters stand for compact disc-read only memory. It has a high capacity that allows for the storing of various and enormous of forms information such as sound movies, and text that cannot be stored in floppy disk (Picciano, 2001).

*Constructivism*: “A school of psychology which holds that learning occurs because personal knowledge is constructed by an active and self-regulated learner who solves problems by deriving meaning from experience and the context in which that experience takes place” (Seels & Richey, 1994, p. 127).

*Computer-Assisted Instruction (CAI)*: Integrating computer technology in teaching and learning and increasing the interaction of the students with the teacher. (Ellington, Percival & Race, 1993).

*Computer-Based Technology*: “Ways to produce or deliver materials using microprocessor based resources” (Seels & Richey, 1994, p. 126).

*Courseware*: Materials that represent any subject such as, 8th grade Math, and include sound, animation and graphics, which are built into the software and use the computer to learn the subject matter (Kemp & Smellie, 1994).

*H*: It represents the word *Hijri*, which is the Islamic Calendar, followed in Saudi Arabia.

*Instructional Technology*: “Is the theory and practice of design, development, utilization, management and evaluation of processes and resources for learning” (Seels, & Richey, 1994, p. 9)

*Ministry of Education*: An organization that is responsible for the development and fulfillment of the strategy for K-12 (boys) education.

*Presidency of Girls’ Education*: An organization responsible for the development and fulfillment of the strategy for K-12 (girls) education.

*Technology Integration*: “Ways to produce and deliver materials which encompass several forms of media under the control of a computer” (Seels & Richey, 1994, p. 127).

*Technology Planning Committee*: “A group of key stakeholders in a school district who draft a long range plan” (Lumley & Bailey, 1997, p. 24).

#### *Organization of the Study*

This study is organized into five chapters.

1. Chapter one provides an introduction, background of the study, problem statement, research questions, null hypotheses, delimitations and limitations of the study, definition of terms, assumptions, and organization of the study.
2. Chapter two provides a review of the literature which includes:
  - a. Education in Saudi Arabia.
  - b. Teachers’ and Principals’ Perceptions.

- c. Constructivism and Information Technology.
  - d. The Humanistic Model.
  - e. The Innovation of Change.
  - f. Staff Development.
  - g. Information Technology Plan
3. Chapter three provides the methodology of the study.
  4. Chapter four includes the findings and the results of the study.
  5. Chapter five includes conclusions and recommendations for further studies.