

## 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 eight percent of all USA business. It is successful and growing.</li></ul>	<ul style="list-style-type: none"><li>• Many students are successfully learning about IT. State and national standards and goals are being developed.</li></ul>
<ul style="list-style-type: none"><li>• Computer-assisted learning and distance learning are successfully used in staff and customer learning.</li></ul>	<ul style="list-style-type: none"><li>• Computer-assisted learning and distance learning are successfully used with students and for staff development.</li></ul>
<ul style="list-style-type: none"><li>• IT tools that support the individual worker are relatively well-integrated in the workplace. Business has invested heavily in this area.</li></ul>	<ul style="list-style-type: none"><li>• Progress is occurring on integrating IT tools with curriculum, instruction, and assessment, but educational investment levels lag significantly behind business.</li></ul>

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,^^ξ 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 ١٠,١١٤, the number of students was ١,٨٨٨,٩٧٥, 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 Vygotsky. 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.

## CHAPTER TWO

### Review of the Literature

#### *Introduction*

Education provides society with a great opportunity for people to learn. People are encouraged to construct their knowledge and have their skills through the exploration and development of solutions for the problems they face. The National School Board Association (NSBA, 2000) points to education as the key sector of our society that can prepare us and ensure our success. The North Regional Educational Laboratory (NREL, 2000) states that a comprehensive school reform is a means to improve student achievement through reorganizing and revitalizing entire schools, rather than implementing isolated programs. Additionally, the primary purpose of education reform is students learning and developing their experiences in order to assist them to obtain the fullness of their potential (U.S. Department of Education, 1995). Education influences students' thinking by making them knowledgeable, wise, and creative. Indeed, education constructs and develops healthy intellectuals.

Teachers need knowledge and skills that will enable them to improve their teaching, such as integrating information technology (IT) with the curriculum in order to enhance learning and allow students to learn from different resources. When teachers use IT in teaching their classroom role will be reduced while the students' role increases by their becoming more independent and responsible for acquiring skills and knowledge.

Saudi Arabia reforms its educational policies from time to time in order to develop new educational environments depending upon the demands of the society. Presently, the decision makers need 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.

### *Education in Saudi Arabia*

#### *Background of Saudi Arabian Education*

K-12 education in Saudi Arabia is managed by two government organizations. The first is the Ministry of Education, which was established in 1953 for the purpose of developing a plan for boys' education. The second is the Presidency of Girls Education founded in 1960. The Ministry of Education develops educational policy for the entire country. Saudi Arabian decision-makers recognized the importance of integrating educational technology into the curriculum during the Second Educational Development Plan (1975-1980), the Third Development Plan (1980-1985) and in the Fourth Development Plan (1985-1990). However, the major changes took place during the Fourth Development Plan when the Ministry of Education established a new department called the General Administration for Educational Technology in order to develop and improve the quality of education through the use of technology (Moshaikeh, 1991). The integration of computer literacy in the boys' high schools was implemented in three main stages. The first stage began in 1985 with the establishment of new high schools that were called "Developed High Schools." In this new experiment, every student in these schools was to complete 168 credit hours (Ahamed, 1990). The study plan included two types of computer curricula. The initial course of study required all of the students to complete five credit hours. The program was divided into two courses which included Computer Introduction for two credit hours and Basic Programming Language for three credit hours. The second type was taught by the Management of Science Program. Each

student who decided to be in this program had to study Computer and Information Systems, which was three credit hours (Ministry of Education, 1995). After implementing the computer literacy curriculum in the schools, there were some barriers that were encountered in the teaching of these curricula. The primary problem was that there were no computer labs in the schools.

In 1985 the Ministry of Education stopped working on “Developed High Schools” and introduced a general computer curriculum for each of the high school grades. The third stage started in 1994 when the Ministry of Education developed another computer curriculum. This stage oversaw the implementation of computers in schools in order to motivate students and reduce the anxiety of students toward using computer technology (Ministry of Education, 1995).

The Ministry of Education began in 1994 to encourage teachers who taught science and math to enroll in a training program at the Public Management Institute. One hundred and twenty six teachers enrolled between 1994 and 1995. Those who were enrolled in these programs would help to teach computer literacy in high schools. The training programs included DOS, Windows, word processing, spreadsheet, database, and BASIC Language. The program did not include training on how to use computer technology as a tool for teaching and learning. They did not train the teachers and administrators in the use of computer technology, which was important for all the staff in the school (Ministry of Education, 1995).

The Presidency of Girls’ Education, in charge of girls’ education, developed its plan for improving the quality of the learners. The first college for girls was founded in 1970 in Riyadh, the second in Jeddah in 1974, and the third in Makkah in 1975. In 1979

there were many Junior Colleges for women founded to prepare teachers for intermediate and high schools (Ministry of Education, 1985 &1986). Ibin Dhaish et al., (1992) indicated that the girls' schools did not teach computer literacy. They used their curricula to enhance teaching and learning. The Presidency of Girls Education (1999) reported that they started to teach computer literacy in some high schools in the academic year of 1999. They established a committee to discuss and issue a curriculum of computer literacy (p. 141).

In 1978 the King Fahad University established the Department of Computer Science and Computer Engineering. The students in this program were awarded a bachelor's degree. In 1983 a masters program in Computer Science was implemented (King Fahad University, 1995). King Abdul-Aziz University was one of the first universities to use computer technology in its library and admission department.

In addition, it was the first university that developed and used computer technology in office work, such as admission, registration, course schedules and grade reports in the Arabic language. The university computer center was established in 1976 to provide many services, including computer hardware, software, and maintenance of colleges and the other branches (King Abdul-Aziz University, 1995).

Mandurah (1997) indicated that King Saud University started to teach computer literacy in 1982. There were two programs: Computer Science, which was taught in the College of Science, and Computer Engineering, which was taught in the College of Engineering. King Saud University established the College of Computer Science and Information System in 1984. The college consisted of four departments, which were

Computer Engineering, Information Systems, Computer Science, and Computer Technology.

Leaders of these universities are working to improve computer literacy to construct and improve the knowledge and skills of the learners. This impacts the environments of many sectors that use computer technology in their workplace, such as the public sector, business sector, and the education sector.

### *Information Technology in Educational Institutions in Saudi Arabia*

Information technology is fundamental for improved productivity of an organization. Saudi Arabia's economy has been influenced by the adoption of information technology in the workplace in order to save time and improve productivity. The Ministry of Education became aware of the development of information technology, especially among developed countries such as the USA. These countries placed a high importance on the integration of information technology in classroom teaching. Many scholarships have been granted by the Ministry of Education to Saudi Arabian students to enable them to study abroad in these developed countries. The goals are to improve the education system, reduce the shortage of skilled information technology personnel, and to improve the Saudi Arabian schools. These changes could improve the school system and develop the society as a whole. The school teachers and administrators need to acquire the skills and knowledge of information technology and its uses so as to function well in a school setting. This study seeks to determine the perceptions of administrators and teachers in both girls' and boys' high schools towards utilizing information technology in Riyadh, Saudi Arabia.

Education is the cornerstone of any society. It is an important tool to improve the society and to allow the citizens of that society to acquire new information, which is critical for creating and developing their knowledge and skills. Education is a means of classifying countries as being either developed or undeveloped. When King Abdul Aziz began to unite the biggest part of the Arab Peninsula, which is now called the Kingdom of Saudi Arabia, he realized the importance of education. The Ministry of Education in Saudi Arabia has been in the forefront of trying to improve the quality of learning through changes in the quality of the curriculum (Ministry of Education, 1998). There are two important periods in the history of education in the Kingdom of Saudi Arabia. These are:

1. Before the unification of the country (Saudi Arabia).
2. After the creation of the Kingdom of Saudi Arabia (Ministry of Education, 1998; Al-Hogail, 1998)

#### *Before the Kingdom*

There were many schools during this period that were not organized into a school system as we have in Saudi Arabia today.

#### *AlHashemaih Schools*

Hassain Bin Ali started a war against Empirical Othmany in 1916 (1335 H) and closed all their schools. He opened many schools in the western region, but the quality of these schools decreased because there were not enough resources, money, and quality of curriculum (Al-Hogail, 1998; Ministry of Education, 1998).

### *Private Schools*

There were numbers of private schools that were established before King Abdul-Azize controlled the most of Arab Peninsula, which are Alsoulataih in 1872A.D (1292 H); AlMaddrash Alfakhraih in 1878 A.D. (1298H); Alfalah in 1903 (1323H) and Alngah in 1930 (1350H). The main reasons for establishing these schools were, failure to control the system in that time, and that most of the people were illiterate. There were, however, many people who worked voluntarily to develop these schools and provide curricula. The people who graduated from these schools developed the education system in the modern country after it was established (Al-Hogail, 1998; Ministry of Education, 1998).

### *After the Creation of the Saudi Kingdom*

#### *Directorate of Education.*

The modern education system began when King Abdul-Aziz established the first educational department in 1925 (1344 H), which was called the Directorate of Education. This department was established in order to supervise and to spread education.

#### *Ministry of Education.*

The Ministry of Education was established in 1953 (1373 H). It replaced the Directorate of Education. The Ministry of Education was responsible for planning and developing education in the Kingdom.

The government split the Ministry of Education into several different ministries because of the pressure on the government to diversify its services. As a result a number of Ministries were created to cater to the other sectors in education. The Presidency of Girls Education was created in 1960 (1380 H), the Ministry of Higher Education in 1975, the Institute of Public Administration in 1960, and the General Organization for

Technical Education and Vocational Training in 1980. All of these ministries are independent of each other.

The new education system consisted of grade levels. These were six years of elementary school, three years of middle school, and four years of high school (Ministry of Education, 1998).

### *Curriculum*

The high school curriculum has been revised many times. The most recent update allows the students to acquire skills and knowledge in the areas of Islamic Science, Arabic Language, Social Science, Management Science, Science, Technical Science, Mathematics, Computer Literacy, Library Research, and Physical Science. The students can major in any of the following four subjects; Islam and the Arabic Language, Management and Social Studies Management, Sciences, and Technical Sciences (Ministry of Education, 1998).

### *Presidency of Girls Education*

The ministry that deals with matters related to girls' education is called the Presidency of Girls' Education. It was established in 1960 to develop educational planning for females and to improve the quality of women's education, thus assisting them to be active in the society within the boundary of Islamic law. The range of the girls' education is grades K-12. The education system has six years of elementary school, three of middle school and four years of high school. The first high school for girls was established in 1963 in Riyadh, the capital of Saudi Arabia. The first graduating class consisted of twenty-one students (Presidency of Girls Education, 1998).

### *Curriculum Development.*

The Presidency of Girls' Education has developed a new curriculum for girls that is in use to this day. Curriculum developers continuously design and improve the curriculum so that the learners can develop their skills and knowledge to face existing changes or new problems in the society. The girls' curriculum includes Islamic Science, Arabic Science, Social Studies, Science, English Language, Art, and Home Economics (Presidency of Girls Education, 1998)

### *Funding Support and Planning*

Budget and planning for the Presidency of Girls' Education has changed rapidly since its establishment in 1960, keeping updated and developing the education system to meet girls' needs in the society. The initial budget of the Presidency of Girls' Education was 2 million Saudi riyals (approximately 5 billion dollars) but no more than 15 billion Saudi riyals (approximately 4 billion dollars). The budget increased 254% during the decade from 1960 to 1970. This is a good indication of the annual improvement in girls' education, focusing on K-12 in Saudi Arabia (The Presidency of Girls' Education Report, 1999).

The budget hierarchy has changed since the Presidency of Girls' Education was established. Change and development in the society was reflected in the internal structure of the Presidency of Girls' Education organization. It adopted the following changes in the budget hierarchy:

1. It was the budget and organization;
2. It became part of the General Management for Planning and Budget;

3. The last change established was a high position called the Assistant of Planning and Budget (The Presidency of Girls' Education Report, 1999).

It was the responsibility of the Assistant to collect information from all the educational districts in Saudi Arabia in order to study their needs and monitor the spending.

In (1410 H) 1990, the main changes in the Presidency of Girls' Education hierarchy were:

1. General Management for Administrative Development that includes:
  - a. Management of Organization;
  - b. Management of Educational Training;
  - c. Management of Training and Scholarships.
2. Assistant for Planning and Budget (The Presidency of Girls' Education Report, 1999).

All the change that has happened has had a major effect on girls' education, such as staff development that allows teachers to improve and gain new knowledge and teaching skills.

#### *Ministry of Education*

The first organization to support education field was called the Directory of Education established in (1344 H) 1924 the budget was 56,650 Saudi riyals (approximately 16,000 dollars) the budget of the Directory of Education continuously increased from one year to another. The Directory of Education ended in (1372 H) 1952 and its budget had increased 226 times since its establishment in 1924. The Ministry of Education replaced the Directory of Education in 1953 (1373 H) (Ministry of Education,

1998). The change was not merely in its name but also in the duties. It was able to face the change in the society and improve quality of education during the stages of learning. In 1953 (1372/1373 H), the first budget of the Ministry of Education was roughly 13 million Saudi riyals (approximately 3 million dollars). In (1380 H) 1960, the budget increased annually until it reached 115 million Saudi riyals (approximately 35 million dollars). According to the Ministry of Education (2000, 1420/1421H), the current budget of the Ministry of Education is roughly 20 billion Saudi riyals (approximately 5 billion dollars).

In fact, the change included the internal organization of the Ministry of Education. It was the first hierarchy to represent the new positions of Minister of Education, the High Consult of Education, and Assistant to the Minister of Education. There were new responsibilities toward improving education in all fields that included K-12, vocational education and technical training (Ministry of Education, 1998).

#### *The Changing Environment in Education in Saudi Arabia*

Courseware Products. There are many aspects of change in the Saudi environment that impact educational institutions. There are some companies that produce courseware for K-12 in order to enhance their learning and help them to gain information that is illustrated in Table 2.

Table 2

*Courseware Production in Saudi Arabia*

Company	Grade Level	Subject Matter
Sakar Software	10-12	Science, English, Math Islamic Studies
Dowlog Technologies	1-12	General Science, Math Physics, Chemistry Geography, English, Language
Al-Mareefa	1-12	General Science, Math
Al-Saudi Co.	1-12	Physics, Chemistry Geography, Arabic Language
Sakar Software	10-12	Science, English, Math Islamic Studies
Obeikan Home Interactive	K-9	General Science, Math, Biology, Social Studies Geology, English Language Arabic Language

Note. From *Computer Based Instruction in Saudi Education: A Survey of Commercially Produced*, by B. A. Al-Saleh and S. M. Al-Debassi, (2000).

Al-Saleh and Al-Debassi (2000) provide strong indications in the previous table that there are courseware products that are locally available that can be used in education to enhance learning and teaching and be infused with the curricula. The technological environment has changed in order to be compatible with the advancement in information technology in order to reform schools.

The connection of the Kingdom of Saudi Arabia with the world is of vital importance for several reasons:

1. Increased access to research gives students, teachers, and researchers opportunities to develop their own research in different areas of study.
2. It gives increased interaction among students outside of the classroom with students world wide.
3. It enables all organizations (business, public, non profit, universities) to post their information on the Internet, which provides opportunities for learners to seek information.
4. It allows the schools to develop their own web sites, thereby increasing the communication within the community, as well as providing information for administrators and coordinators of schools to seek information related to information technology and its impact on education.
5. It links the Kingdom with the world over the Internet to maximize an exchange of information between educational institutions and other sectors.

### *Economics*

Approximately \$275 billion was spent on education in the fourth development plan. In the fifth development plan the government is targeting to spend revenues

generated from the oil industry to improve all the economic sectors in order to raise their productivity Oweiss (1998). According to Oweiss (1998) during the first three development plans from 1970 to 1985, Saudi Arabia spent roughly \$550 billion to develop and increase productivity in all sectors, education being one of the sectors.

### *Teachers' and Principals' Perceptions*

The review of literature is based on primarily studies that have been done in the United States' environment by different organizations and scholars that have strong relationships to the research.

Teacher and administrator perceptions toward utilizing information technology in school is essential to determining helpful techniques for implanting information technology methods that support and enhance learning, teaching, and management work. The literature indicates that there is a positive attitude toward using and implementing information technology in the school environment.

Rowand (2000) conducted a study that focused on using computers and the Internet in school. The survey indicated that teachers who work full-time had access to computer technology and the Internet, which represents 99% of full-time teachers, but their access to and utilization of them, was different. Rowand states that of those who used computer technology and the Internet "a lot" to develop course materials, as well as those who integrated computer technology "a lot" in order to keep effective administrative records, the percentage was thirty-four. Those who utilized the Internet for lesson plans and did their research represented less than ten percent.

Students were involved in using computer technology applications, such as word processing or spreadsheets. Thirty-one percent used them for drill and practice. In

addition, Rowand (2000) notes, “Secondary school teachers were more likely to assign research using the Internet” (p. 4). According to Rowand (2000), when the teachers were asked about the potential of their feelings toward using computers and the Internet in their classroom, 23% felt “well” and 10% felt “very well.”

Ertmer et al., (1999) studied teachers’ beliefs about the role of technology in the elementary classroom in regard to the effectiveness of information technology in teaching and student learning. The study focused on seven teachers with a variety of teaching experience, training programs and the use of software. They interviewed all the teachers and their questions focused on how information technology was used in the classroom to improve contents. Teachers were asked to provide examples that supported successful information technology implementation in the classroom. The results of their research were comprised of three parts.

*Using computer technology as a supplement.* Three of the interviewees used computer technology to motivate students to complete their assignments. They used computer technology as a reward in the classroom. One of them said, “I see the classroom computer not as a teaching tool but kind of as a reward kind of thing, like when kids are done with their work.” The other four teachers’ perceptions indicated that computer technology was essential for students to learn. Also, they believed that one of their duties was to be connecting technology with curricula in order for students to recognize its effectiveness (Ertmer, Addison, Lane, Ross, & Woods, 1999).

*Using computer technology to support the existing curriculum.* Teachers’ perceptions indicated that information technology enhances and enriches curricula. Ertmer, et al., (1999) provided examples that represented teachers’ opinions toward the role of

information technology in curricula. One of the interviewees responded, “I select a variety of CDs that they put in and use depending on the skills I want them to work on that day” (Ertmer, Addison, Lane, Ross, & Woods, 1999, p. 63). Another reportedly did not use computer technology to teach skills, but as she stated, “More to reinforce what I have taught” (Ertmer, Addison, Lane, Ross, & Woods, 1999, p. 63). Besides, another one asserted, “I use it more to just reinforce what I am doing, kind of like a drill and practice session” (Ertmer, Addison, Lane, Ross, & Woods, 1999, p. 63).

*Using computer technology to facilitate an emerging curriculum.* Ertmer, et al., (1999) found during their study that teachers who used computer technology encouraged students to work together to solve problems. Computer technology helps students to gain new concepts that assist them in building their knowledge. Lola was one of those interviewed in the study. She asserted that computer technology should be fully integrated into curricula and “be a key part of the instruction in the classroom” (p. 64).

Ertmer, et al., (1999) point out that they found many reasons to incorporate computer technology in the classroom:

1. To increase students’ motivation.
2. To make content interesting.
3. To prepare for using information technology in the future.
4. To increase students’ attention to learning in the classroom to help solve problems.

Chiero (1999) conducted a study that investigated teachers’ perceptions of the use of computer technology and its role at their work place. Participants were 142 secondary teachers. The interview was conducted with fifteen of them by phone, of whom 58.5% were female and 41.5% male. The subjects ranged in age from twenty-five to seventy-

two years of age. Moreover, their experience ranged from one year to forty-six years. Their experience at utilizing computer technology ranged from zero to twenty-nine years and the average was 7.3 years. Most of the respondents used a computer both at home and at school; however, their access to the Internet was limited. They used computer technology in a variety of tasks, such as developing instructional materials and administrative work that assessed the performance of their assignments properly. Computer technology made them more creative, improved their proficiency, maximized their accessibility, and enhanced their experience as educators.

Chiero (1999) noted that 23.2% of the respondents were beginners, 40.8% had moderate experience, and 35.9% described themselves as experienced. As well as in this study, Chiero found that 52.9% of the respondents used computer technology to develop and create instructional materials.

When Chiero (1999) asked about using computer technology in their work, 48.6% responded that computer technology was important to accomplish their activities. Also, of the respondents who answered that computer technology was essential to gather information, 22.8% believed it was somewhat important, 35.8% believed it was important, and 25.2% believed it was essential. Most of them viewed the use of computer technology to gain information to support their work as important. Chiero (1999) declared that the majority of subjects (92.9%) reported that computer technology was essential for saving teachers time. In addition, the majority of respondents stressed that use of computer technology positively affected their productivity (76.7%), made them more professional (72.3%), made them more creative (66%), and generally better educators (60.6%).

Body (1998) conducted a study that focused on computers in the classrooms and analyzed their effectiveness on students' learning. Teachers and principals cited other benefits of using computer technology:

1. Concentration and motivation
2. Social and group work skills
3. General computer operation skills
4. Communication skills.

The Wiesenmayer and Koul (1998) studied the integration of the Internet into the classroom to increase the value of teaching. The first of twenty-five studies was in the fall of 1996 and the second in the spring of 1997. They found student's use of collaborative learning in the fall 1996 was 30% and in the spring of 1997 was 43%; communication between teachers and students in the fall 1996 was 22% and in the spring of 1997 was 39%; and the other communication in the fall of 1996 was 34% and in the spring of 1997 was 56%. From the previous ratios, there is an indication that teachers increased their utilization of information technology in their tasks. Likewise, teachers use of the Internet to enhance curricular content in the fall of 1996 was 71% and in the spring of 1997 was 87%. Wiesenmayer and Koul conclude in their study that "Teachers from all over West Virginia perceive the Internet as a major tool for teaching collaborative and investigative practices of science and scientists" (p.227). The increasing use of the Internet during 1996 and 1997 by teachers, indeed, reflected the teachers' implicit perceived willingness to adopt information technology in their classroom and out of school.

MacNeil, et al., (1998) investigated administrators' perceptions of the implementation of information technology in restructuring schools. The study included principals and assistant principals who represented 112 school districts in southeast Texas. Only sixty-four responses were returned, or 57.14%. MacNeil, et al., (1998) found in their study that those administrators supported infusing information technology in schools. They asked how important technology was in the school. The result was 67.2% who reported that technology was very important and 90.6% responded that infused technology in school was important. This indicated that administrators asserted that implementing information technology in school is very important, and that it would have a significant impact on its outcomes. That makes its implementation an imperative matter.

Consequently, Sharp and Walter (1997) sent surveys to three states (Illinois, Massachusetts, and Texas) and 325 administrators and they received a 71% return. This study examined many different issues, one of them computer technology. They asked the subjects to rank them based on their importance. When they asked the administrators which issues were more important than in 1995, the respondents ranked the issues for these questions as followed:

1. Technology/computers 63.9%
2. School finance in general 61.3%
3. State testing programs 54.8%
4. School finance equity 50.9%

The majority of the respondents ranked computer technology as the most important issue.

Furthermore, Chiero (1997) carried out a study that related to computers present in K-12 teachers' use of computer technology and their perspectives. Additionally, Chiero (1997) indicated that respondents were 77% female, and 23% male. Their ages ranged from twenty-three to forty-nine years. Their years of experience in teaching ranged from one to twenty-five years. In addition, their experience using computer technology in the classroom ranged from zero to twenty-five years. In fact, the respondents were from different skill levels. The majority of teachers were from elementary schools (70.6%), with middle school teachers representing 11.8%, and 17.6% representing high school teachers. When they were asked about their experience with computer technology, 2.9% ranked themselves as computer experts, 73.6% as having moderate computer experience, and 23.5% had difficulty with computer literacy. Moreover, Chiero indicates that most of the respondents used information technology that included computer technology for creating instructional materials, tests, and work sheets, excluding 5.6% of the subjects. There were 58.3% that used computer technology for seeking information about specific subjects. In addition, there were those who used computer technology to develop their lesson plans, 47.2%.

Chiero asserts from this study, "Responses to the items measuring attitudes toward computers were overwhelmingly positive with little variation" (1997, p. 117). The Office of Technology Assessment (1995) (as cited in Faison, 1996) reportedly found the numbers of teachers using information technology over what was expected in the U.S.A. The study included 1,000 teachers from K-12. They found during the period of 1994-1995 school year that of the 85% subjects who used information technology, 58% used CD-ROM, 16% used the Internet and 12% used other on-line services that were

provided by using computer technology. In addition, they estimated that of the computers in schools at that time, approximately 5.8 million computers were utilized for instruction. In the past two years, there had been rapid growth in many aspects of information technology, such as modems, CD-ROM, and local area networking.

Stellwagen (1999) conducted a study that focused on the implementation of information technology in the school. Her study was implemented in Hinsdale South High School in Darien, Illinois. The project provided by Stellwagen was helpful in motivating ten teachers to infuse computer technology in their classroom in order to enhance cooperative learning among students.

Stegal (1998) studied principals' viewpoints. The study included 54 principals of elementary schools in south Texas and 54 schools. Stegal found in this study that 31% of the schools had access to the internet, 85% supported curricula with computer technology, 81% of schools had computer teachers, and 59% integrated computer technology into the school budget. Stegal asserts that 74% of all participants strongly agreed that information technology was essential for schools, whereas 26% of the principals agreed that information technology was important. In general, all principals agreed on the importance of information technology for their schools. Also, 96% of the participants agreed or strongly agreed that they had a strong interest in computer technology.

Lewis (1997) focused on teachers' perceptions toward utilizing information technology in schools. The study included elementary, middle and secondary schools in Tennessee. Lewis reported teachers in high school and middle school had positive perceptions and agreed or strongly agreed in their responses that included nine items that

represented features of information technology in the 21<sup>st</sup> Century. The items included accomplishing tasks fast, improving quality of the productivity, job execution, and its effectiveness, making jobs easier, controlling the work, increasing productivity and providing more features for the classroom rather than its disadvantages. Indeed, that all the previous studies give testimonies that information technology is important enough to be integrated into schools. Both teachers and administrators asserted that information technology is the baseline for school environments, which work to supplement classroom and administrative jobs.

### *Constructivism and Information Technology*

Parkay and Glen (2000) provide a clear definition of a constructivist model: “views of learning; therefore, focus on how learners make sense of new information—how they construct meaning based on what they already know” (p.168). In fact, learners who utilize a constructivist approach in their learning should be able to develop new knowledge based on analyses and synthesis of information. They can link prior knowledge with the new knowledge to develop optimizing knowledge that enables learners to create new ideas, processes or models. (Parkay & Glen, 2000; Roblyer & Edwards, 2000) point out that the constructivist theory focuses on students capabilities that should enable them to deal with real problems and bring up reasonable methods to manipulate problems.

De Caprariis (2000) commented that the notion of “constructivism” emphasizes how learners construct the meaning of learning or how they process information to solve their problems, as well as the need to gain information and explore solutions.

Constructivism is a learning theory that is based on the cognitive root and is derived from Piaget, Bruner and Vygotsky's work. Piaget and Bruner support the cognitive theory, whereas Vygotsky concentrates on the social cognitive theory (Maddux, et al., 2001). Constructivism as a learning theory focuses on the knowledge of the person and how the learner constructs knowledge. Based on this learning theory knowledge is not transferred from teachers, but constructed by the learners. Students can construct their own knowledge based on the experiences they have had and the current skills that they add to their knowledge. The learners have to organize, manage, and develop their experiences and understanding in the shaping of knowledge that can be interpreted by finding out a realistic solution for it. (Fosnot, 1996; Jonassen, 1996).

Teachers do not deliver knowledge to students. In fact, according to the contemporary theory of constructivism, teachers have to use an appropriate approach that encourages students to learn and seek information that helps them to develop the meaning of learning that constructs their knowledge and view of the real world. This suggests that students are active learners. They have to develop different knowledge and link the prior knowledge with the new knowledge in order to create advanced knowledge. This makes them thinking people with the ability to solve their problems or develop new concepts. According to Jonassen, et al., (1999); Fosnot (1996), "...a constructivist view of learning suggests an approach to teaching that gives learners the opportunity for concrete, contextually meaningful experience through which they can search for patterns, raise their own questions, and construct their own models, concepts, and strategies" (p. ix). In fact constructivism is completely opposed to the behaviorist theory because it views students as active learners not passive learners.

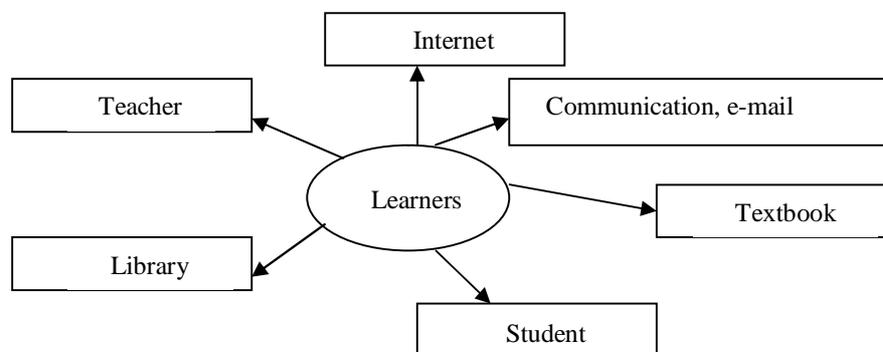
Knapp and Glenn (1996) point out,

Our emphasis on student inquiry is based on growing research, which asserts that learners “construct” their own understandings/ knowledge from the information they acquire. This is referred to as the constructivist approach to learning, and it differs from the traditional approach, which assumes a teacher can “deliver” knowledge to a learner. (p. 112)

The constructivist approach emphasizes the importance of the learners. Driscoll (1994) indicates, “... constructivist theory rests on the assumption that knowledge is constructed by learners as they attempt to make sense of their experiences” (p.360). According to this theory, learners have to seek information in order to construct their knowledge and develop their decisions. Students are the center of learning. They may use computer technology to gain their information and use the technology communication tools that support collaboration and interaction among students. In fact the constructivist theory describes the learner as able to active and acquire information from different resources to develop his or her knowledge as shown in Figure 1.

Figure 1

*Learning Based on the Constructivist Theory*



Morrison et al., 1999; Ryba and Anderson, 1993; Knapp and Glenn, 1996; Jonassen et al., 1999; Dwyer, 1996; Leflore, 2000 all mention that it is the power and role of students in the constructivist theory that make students able to work as if they are in the real world. The characteristics of the students are:

1. Students are active and able to develop relationships between variables and test hypotheses instead of merely listening to the teacher or simple learning (Schunk, 1991).
2. Students work as a group, cooperatively and collaboratively, because students possess different knowledge, skills, and experience. They can exchange information with each other to enhance their learning. This model emphasizes cooperative and collaborative learning instead of working alone.
3. Students seek information from various resources, not only the textbook, in order to acquire information and discover their learning.
4. Students use communication tools such as e-mail, chatrooms, and listserv in order to increase their interaction and participate outside of the classroom. This provides vast information.
5. Students are active learners and have the capabilities to develop their own knowledge.

According to Fosnot (1996) “ Teachers who base their practice on constructivism reject the notion that meaning can be passed on to learners via symbols or transmission, that learners can incorporate exact copies of teachers’ understanding for their own use.” (p. ix). The researchers agree that with this approach the knowledge is not “Cut and Paste.”

Morrison et al. (1999), Ryba & Anderson (1993), Knapp & Glenn (1996), Jonassen et al. (1999), Dwyer (1996), and Leflore (2000) all indicate that the roles of teachers are:

1. Teachers have to give students a chance to become learners themselves because the students are not containers that are to be filled by the teachers.
2. Teachers must create course activities that encourage students to seek and manipulate their information and create their own abilities to choose an appropriate solution for their projects.
3. According to this theory, teachers work as facilitators in the classroom to give students suggestions when they are stuck in order to refresh their intellects. Roblyer, Edwards & Havriluk (1997) point out "... teachers act as a guide to students while they set their own goals and "teach themselves" (p. 70)
4. Teachers must divide the students in the classroom into groups in order to set their goals and objectives.
5. Teachers must choose appropriate resources for students.

Computer technology plays a critical role for implementing constructivist strategies because student learning is not only based on the textbook. They may use computer technology, which makes the information available anytime and anywhere, making the topic dynamic.

Maddux & Cummings (1999) view the constructivist model as a popular notion in the field of information technology and education that gives students new authority with which to learn the use of information technology to support content.

The web allows learners to learn from different perspectives and to gather information from various locations in the world. In addition, students learning from one article on the web are able to move to another link that provides more information related to the topic. The web provides students with vast information that is needed for developing solutions to the problems they face. The web permits learners to interact with the society and contact knowledgeable people and obtain additional information through different kinds of communication, which are both asynchronous and synchronous tools. Learners can use the web to refresh their intellectual ability and reconstruct understanding. In fact, the web structure encourages learners to locate more than one resource (Smith-Gratto, 2000).

Leflore (2000) points out that the web in the classroom is a significant axis to assist students to develop their models. This includes various information forms, different layouts, both linear and non-linear, that can help students to understand the meaning of learning. Their models begin to reflect their internal thinking and how they process information.

Moreover when teachers use information technology, such as a web-based course, teachers develop course materials and objectives that include different resources that encourage students to synthesize and organize information that works as a baseline for producing new knowledge. (Bannan & Milheim, 1997; McCraw et al., 1995) indicate that information technology plays an important role in increasing the effectiveness of the classroom and creating the student centered learning processes, which changes the role of the students from passive to active learners. Wiburg, et al., (1999) suggests that “Teachers, through the constructivist use of technology, were able to provide multiple

ways for students to learn and to demonstrate their knowledge. The visual, sound, and kinesthetic capabilities of the computer proved especially helpful for students who were learning English while also learning content” (p. 209). Beal (2000) indicates that a constructivist approach gives students the chance to discover learning and develop meaning when they are able to use tools such as email, listserv, and the web to increase their communication and to gain additional information. Finally, Beal (2000) states that the skills the students have learned appear to be very transferable to the workplace. According to Roblyer & Edwards (2000) computer technology based on CD-ROMs is another means of supplying a vast amount of information based on multimedia concepts.

#### *The Humanistic Model*

According to (Sowell, 2000; Lefrancois, 2000; Schunk, 1991; Elliott et al., 2000) Maslow developed a pyramid that consists of five levels. It begins with basic needs such as food and continues on to the highest level, which is self-actualization. Maslow’s theory focused on individual growth. Each person must complete the previous level before moving on to the next level. In addition, he or she cannot skip a level to go to another level. These levels are:

1. Physiological needs such as food, air, and water, which are necessary for each person.
2. Safety needs, such as freedom from anxiety. Students need protection from fear and a secure school environment.
3. Belongingness needs, such as receiving love from other people, working with them as a group, making friends.

4. Self-esteem that reflects others' judgments. According to Elliott et al., (2000) this level represents "the reaction of others to us as individuals and our opinion of ourselves" (p. 336).
5. Self-actualization needs. In this level a person is creative, self-fulfilled, able to lead people and be respectful toward them.

In fact, Maslow's theory is vital in learning because each person needs to acquire information that enhances their thinking and problem solving. The constructivist theory supports student learning that encourages learning from diverse perspectives. Without acquiring information, the teacher, administrator and/or the student cannot grow.

Additionally, teachers and administrators should work together in order to develop and assist their schools in advance. Moreover, students need to work as a group to exchange information that assists them to grow their classroom and meet their acceptance needs level. In this research, is essential to combine humanism and constructivism together and used them as the structure of the research because the humanistic theory is based on individual needs. This, in turn must be supported by the decision makers. Teachers need to acquire information technology in order to be able to integrate it with curricula. Students need to develop their knowledge in the information age to face and solve problems. Administrators need to acquire information that enables them to lead and restructure the school. Finally, teachers, administrators and students need to learn information technology so that they can enhance their knowledge. It is important for administrators and teachers to up-date their schools to meet students' needs, such as information technology, which increases their effectiveness in their society.

## *The Innovation of Change*

### *Innovation and School*

Kozlowski (2000) affirms that change is not merely integrating information technology into school environments. Change should increase students' learning and achievement. Change must be planned to include all the elements that have an impact on the students' learning and achievement. The teachers' attitudes toward infusing information technology into curricula, and selecting appropriate courseware and how to choose suitable resources from the web that enhance the content are also important elements. A change in the administrator's attitude to become more aware of how technology can enhance learning and teaching in order to infuse technology into the curriculum is necessary. Kozlowski states, "Technology is being infused to nurture innovative efforts and prepare learners to live and work in a rapidly changing global community" (p.35).

Eden et al., (1996) assert that we live in a global world where information technology plays a significant role in providing pressure to change. Leaders of organizations have to plan expectations for the future in order to update the internal environment. Eden et al., (1996) state that it is important for leaders to prepare for this change, "The world is constantly evolving, creating the challenge for individuals and organizations to deal with change and for schools and universities to prepare people for change" (Eden, Eisenberg, Fischer & Repenning, p. 40). Moursund and Bielefeldt (1999) indicate that to develop a reasonable change model schools must focus on the adoption of information technology in a school environment, and implementing the change requires that teachers become agents of change. Change in the school environment is an

imperative matter that directs schools to apply all the features of information technology for their needs, so that schools can perform missions in the society well (Bielefeldt, 1997). Hallinger, et al., (1999) point out employing information technology in the real world requires teachers and administrators to recognize their involvement in the field of information technology and engage them in its use for communication, management and instruction. Students, teachers, and administrators must realize that information technology is an essential part of their future jobs.

Hall and Hord (2001) claim that the charge of change based on “everyone, teachers and principals in a school and personnel in the district office, must consider and view how a school advances as the change process unfolds” (p. 14). Kershaw (1996) declares that educational institutions started to apply information technology as a new innovation to improve their environments, but placing information technology is not enough to implement change. Information technology must involve staff development that will assist the staff in the operation and integration of information technology into the curriculum. Cosx (1996) indicates that information technology must be infused into the entire curriculum; therefore teachers who do not have skills should change their behaviors to attain skills that enable them to use information technology in their classroom.

It is necessary to reconstruct schools in all aspects so that each member performs his or her duties effectively, including teachers, administrators, students, and parents. Change requires that all those who represent the stakeholders attend meetings to develop the future of the school. It requires developing a vision and a mission statement that will meet the school’s needs now and in the long term (Knapp and Glenn, 1996).

Change in an organization is based on the ideas and concepts that reflect all of the members of the organization at all levels. As a result the leadership is able to implement the change and make it happen (Troy, 1996). Chopra (1999) asserts that new innovation or change must have value, which starts from raw materials by thinking and gaining more data in order to develop powerful information that can be used as new ideas to start to transfer the innovation. Juechter (1996) sustains that the leadership of change is accountable for the outcome of the organization based on stakeholders that represent all the levels of management.

### *Innovation in Schools*

Rogers (1995) states that innovation “is an idea, practice, or object that is perceived as new by an individual or other unit of adoption.” (p. 11). Chopra (1999) cites that innovation “is about doing something in a new or better way.” (p. 17).

Based on this definition, diffusion of information technology in school demands the development a of technology plan that starts from the leadership or innovator’s idea that has significant positive effect on the school environment, including teaching, learning, and administration. The implantation of innovation based on Mouraund’s notion of school (1997) includes:

- a. Hardware, which is important for education, computers, and printers.
- b. Communication tools, such as e-mail, and chat rooms.
- c. Web search information, to provide information for teachers and students to support their teaching and learning.
- d. Software, such as CD-ROM, that includes enormous amounts of information.

- e. Connectivity, that allows the connection of all the activities such as library and administration.
- f. Curriculum, with integrated information technology so that it can enhance the topics and research.

Staff development programs, that enhance the knowledge and skills of information technology to adopt the new types of information technology in school activities. Leadership, or the innovators, should present features of information technology in how increase teachers and administrators productivity and students achievement to persuade them (Kershaw, 1996). Based on Mouraund and Kershaw, teachers and administrators, realize the new ideas, should visit organizations that have adopted such ideas. This will show how information technology works as a vital piece in an organization that makes the staff enthusiastic for involving and adopting change. They can then recognize its impact in school. Then the school will start to assess the budget to ensure implementation of the new innovation.

### *Resistance to Change*

Members of organizations might resist change for various reasons. Deetz, Tracy, & Simpson (2000) defined resistance as “misunderstood or simply written off as antiprogressive or technophobia” (p. 147). Tozer (1997) provides reasons as prevent implementation of change that are shown in Figure 2.

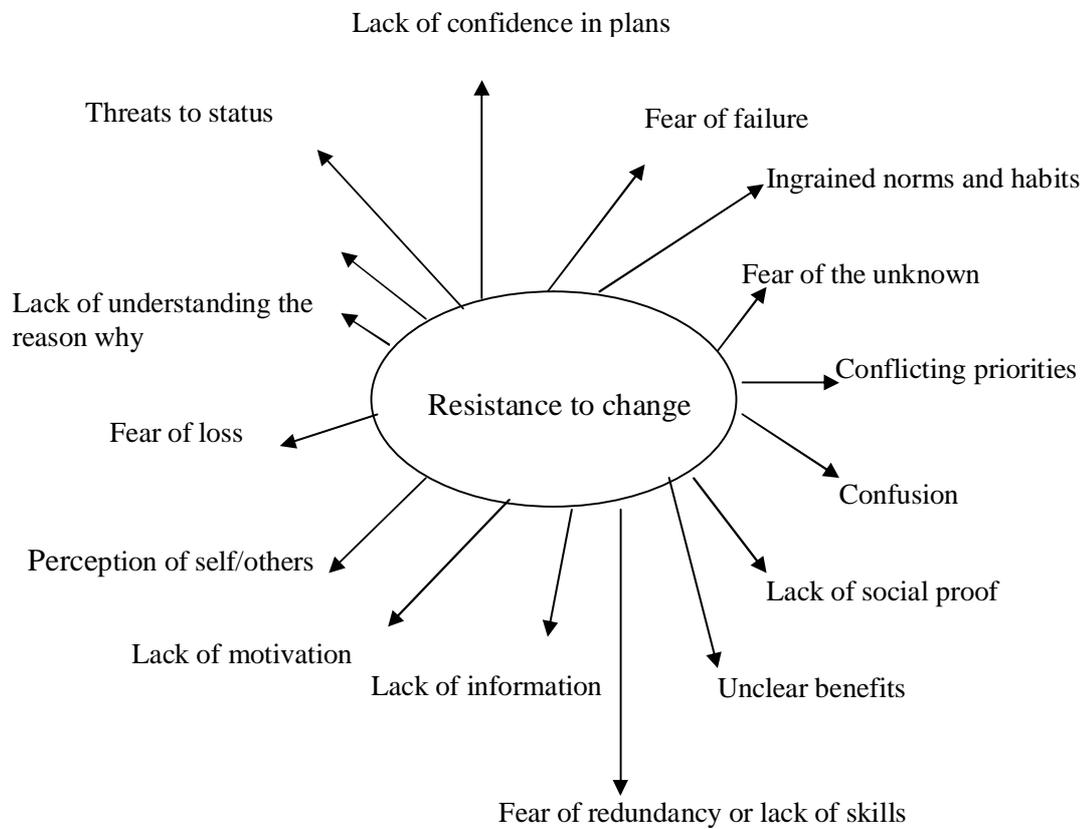


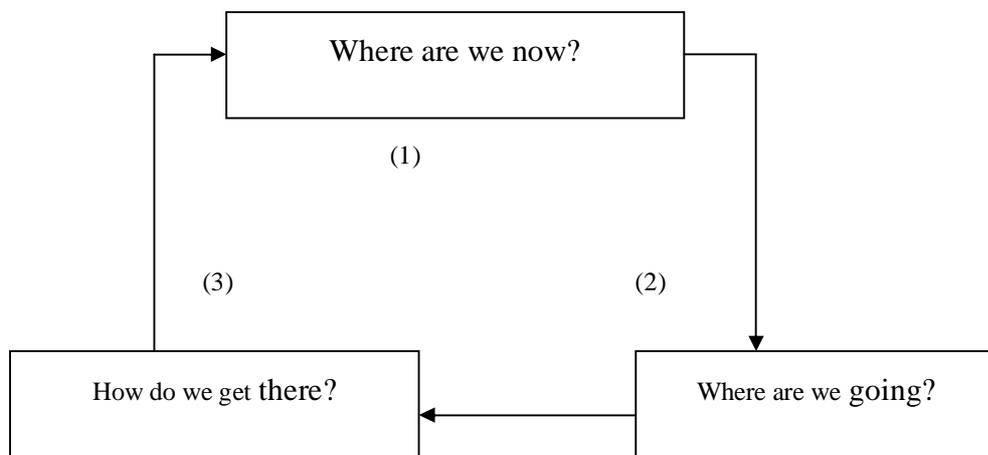
Figure 2. Resistance to Change

Note. From *Leading Initiatives*, by J. Tozer, (1997), p. 256.

Tozer (1997) proposed three questions which are essential for creating the rationale for a change plan that works as a vehicle to develop comprehensive change programs. These questions are presented in Figure 4.

Figure 3

*Initial of Starting the Change Plan*



Note. From, *Leading Initiatives* (p. 262), by J. Tozer, (1997), p. 262.

The previous questions are significant and act as baselines for implementing the comprehensive change plan. Change must be planned because it cannot happen overnight.

To implement successful change demands specific stages that work as a road map. The stages direct the decision makers to reach their goals and tackle the plan deviation on time. This prevents serious problems from occurring. The Technology Education Index (1996 & 1997) proposed six steps that assist planners in developing a technology change plan, which is illustrated in Figure 4.

Figure 4

*The Process of Change*

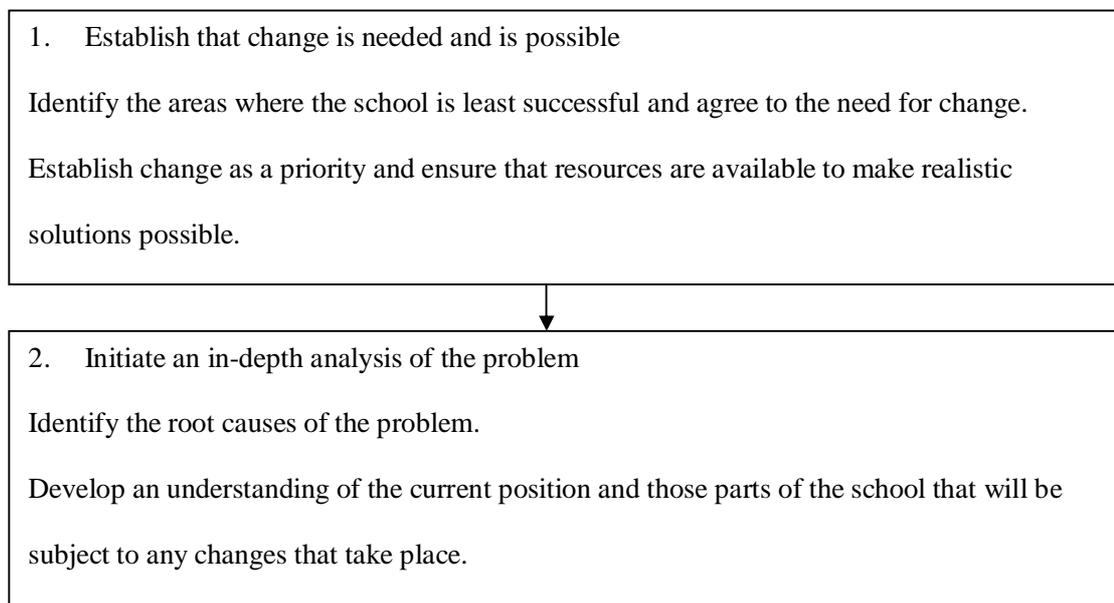
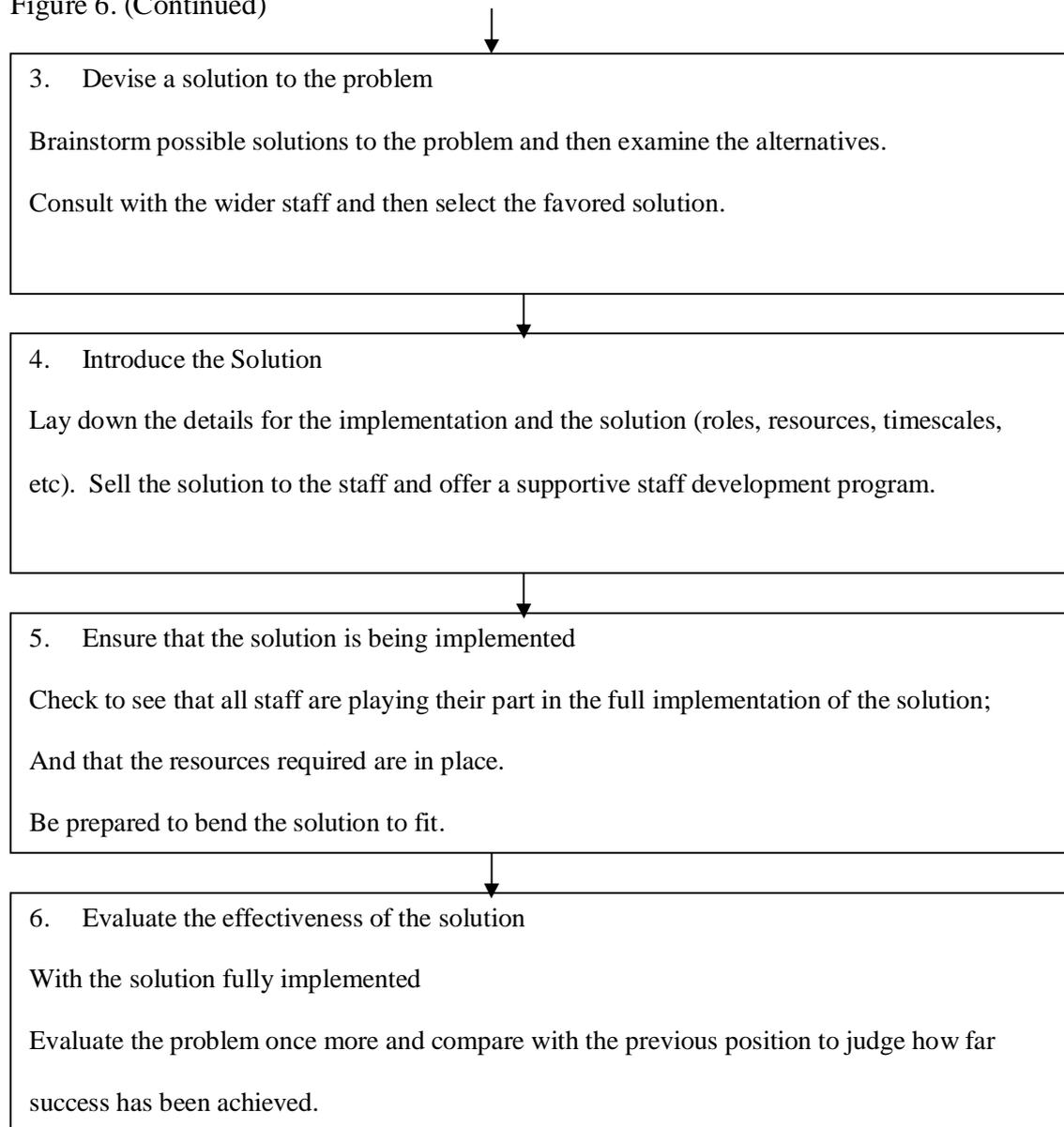


Figure 6. (Continued)



*Note.* From *Technology Education Index* [Online]. Available:

<http://www.technologyindex.com/education/handbook/change.html>

### *Restructuring Schools Through Change*

Knapp & Glenn (1996) note that school reform should include a change in curriculum, instruction and school structure. This will assist to build a coherent school environment. Restructuring a school covers the roles of the teachers, students, parents, and administrators. In addition, creating stakeholders is essential in developing an effective long term school plan. They indicate integrating technology into a school can enhance activities of learning that encourage students to seek information to enrich course topics. The learning meets the students' needs and is able to be implemented in the real world. Whitaker & Moses (1994) point out "Educational restructuring is a fundamental change of assumptions and practices about what schools are for, how they are organized, and how they operate." (p. 2).

Friedman, Director at the Center for Improved Engineering and Science Education, and Professor of Management, Stevens Institute of Technology, Hoboken, NJ, (Cited in Charp, 1997, p. 6) emphasized that technology must be involved in the educational reform process as an essential part in each stage to guarantee that information technology is implemented in revising curricula, establishing new buildings, new computer labs, and in-service training programs.

### *Leadership*

The administrators of schools must understand the importance of implementing information technology in order to make changes in the school environment to convince and encourage teachers to enroll in staff development for acquiring information technology knowledge and concepts (Clark and Denton, 1998). Donova (1999) asserts that successful innovation and implementation of information technology in teaching and

learning depends on the administrators' discussion with the teachers. Slowinski (2000) points out "Administrators who implement technology effectively in their schools and communities will contribute greatly to both education and the economy in the twenty-first century." (p. 1) Foley (1997) notes the role that principals play is the keystone to reform in the school. They can be leaders of change for bringing new innovations and managing their powerful processes for reconstructing schools and in motivating teachers to improve their capabilities through staff development. Kaufman (1997) indicated, "The role of the school principal is increasingly cited as the keystone of educational reform" (p. 100). Hall & Hord (1987) assert that principals are the pivot of the process of change in their schools. This starts with the planning of the change to its implementation. The leaders of schools draw the strategies that are expected to develop technology in schools, both at the current time and in the future to develop effective efficient school environments that increase student success (Johnson & Bartleson, 1999; Weidner, 1999).

#### *Staff Development*

Staff development is the tactical approach to providing the wide range of information technology that is needed by administrators. It assists them to acquire power to support its implementation in the classroom and administration. Investment in staff development programs must be continuous in order for them to follow up the rapid changes that occur in information technology, to encourage them to gain new ideas, to improve their efficiency, and to meet their needs that are critical in improving and increasing student achievement (Carter, 2000 & Schmeltzer, 2001). Schoeny et al., (1999) and the Massachusetts Software & Internet Council (2000) cited staff

development as the most effective method in helping teachers and administrators grow and feel confident, and to fully enhance school performance.

The previous researchers asserted that professional development is the gateway to change for teachers' and administrators' behaviors toward putting technology into real use for school activities. Staff development is a value matter that should be discussed when integrating information technology in various schools activities.

Pan (1999) pointed out that,

Infusing technology in teaching and learning has become a national norm. Presently, most classrooms have some computers, and in some schools, computers have become a required component in the curriculum. Computers are generally deemed to have potential for enhancing teaching, learning, and teachers' productivity. Teachers generally are expected to have good computer skills and know to integrate [information] technology effectively into the curriculum. However, in reality, after advocating computer technology for over two decades, only a few schools have effectively integrated technology into their curricula, and still many teachers do not feel comfortable about using computers and even hold resistance or skepticism toward the usefulness of technological development (p. 81).

Additionally, Pan (1999) finds the best solution for solving and eliminating resistance to infusion of information technology is to incorporate the staff development programs into the teachers' training to assist them to acquire new skills and knowledge. Staff development should support them in integrating the new technology into the

curricula. Hardy (1998) asserted that preparing teachers is necessary for proficiency in utilizing and infusing information technology within the curricula.

### *Information Technology Staff Development and Human Needs*

Information technology is needed by all school staff, including teachers and administrators, to develop different levels of information technology that enable them to recognize its integration in the school. Bailey and Pownell (1998) created a hierarchy compatible with Abraham Maslow's that represents the teachers' needs to be able to diffuse information technology in the classroom and to be a leader in information technology in the future that are implemented in Figure 5. Each level required specific needs that should meet before moving to the second level. The leaders of staff development programs must understand teachers' needs in order to develop technology programs that are compatible with their needs. Bailey and Pownell (1998) suggest specific needs for each level, these are:

#### *Level One: Physiological Needs*

The leaders have to ask this question, what do teachers need to create basic needs of technology integration before they move to the highest level? (Bailey & Pownell, 1998)

Teachers need several basic needs for enhancing their technological foundation, these are:

- a. Time. Teachers need time to be involved in new sessions and practice using technology, so that they can develop their skills and infuse information technology into the classroom. If they don't have enough time they cannot learn and gain new skills (Bailey & Pownell, 1998).

- b. Technology plan. The purpose of a technology plan is to improve school outcomes. It should include what teachers need so that they can implement it into their activities sufficiently. Bailey and Pownell (1998) suggest questions which are necessary in this level, such as “Where do I fit in the over all technology plan?” (Bailey & Pownell, 1998, p. 49). “How am I expected to use the equipment?” (Bailey & Pownell, 1998, p. 49).
- c. Technology Staff Development. Teachers must enroll in staff development in order to support their skills of using and diffusing information technology in their teaching (Bailey & Pownell, 1998).
- d. Hardware and software. Equipment should be available in school that allows teachers to use computers and various of software and access the internet. Availability of information equipment increases teachers’ use of its benefits (Bailey & Pownell, 1998).
- e. Technology support. It is important for schools there be an information technology coordinator that supports computer use in schools (Bailey & Pownell, 1998).

*Level Two: Safety and Security Needs*

Teachers need to be safe and secure. Bailey and Pownell (1998) suggest a question which is, “What kind of basic safety and security needs do people have before they can move to higher levels of self actualization?” (Bailey & Pownell, 1998, p. 40).

This level is composed of:

- f. Congeniality. Teachers must feel comfortable that there is a way to access their information, such e-mail and students records (Bailey & Pownell, 1998).

- g. Technophobia. Teachers should not fear utilizing information technology in schools. Staff development must encourage them in the use of information technology (Bailey & Pownell, 1998).
- h. Administrative Support. Teachers are very worried about the continuing support of using information technology annually. Bailey & Pownell (1998) report a question that is asked by teachers which is, “How do we know the board will support us a year from now if we make this effort to integrate technology into our teaching?” (Bailey & Pownell, 1998, p. 50).
- i. Confidence in Infrastructure. The information technology system in a school must be highly configured and maintained to protect the loss of information. Thus, teachers will feel confidence in the system (Bailey & Pownell, 1998).

*Level Three: Belonging Needs*

Bailey and Pownell (1998) provide a question that support this level which is “How do we get teachers to feel a sense of belonging as they gain greater confidence and skill using the technology?” (p. 5) In order for teachers to meet this level of need during staff development they should perform these things.

- j. Peer Interaction. The leaders and stakeholders have to discuss how teachers using technology in their classroom will know what they can do and what they cannot do with the students and which is the appropriate technology for students. The interaction among teachers and stakeholders gives them confidence that allows them to express their opinions about using technology in the classroom (Bailey & Pownell, 1998).

- k. Technology Committees. Teachers must be involved in information technology planning.
- l. Teaming. Teachers have to work with the other teachers in one team to develop a project that can be used in teaching and learning. Bailey and Pownell (1998) provide a question that supports teaming which is, “Can we plan a unit together that we could use to teach the steps of information literacy using the Internet?” (Bailey & Pownell, 1998, p. 50)
- m. Community Belonging. Teachers should feel positively that all the stakeholder support using technology in school. There is a question that supports the idea which is, “Does the board of education know what the technology needs of the schools are?” (Bailey & Pownell, 1998, p. 50)

*Level Four: Esteem Needs*

This is one of the highest levels in the hierarchy of what feeling the other people have toward using information technology in school.

Peer Recognition. When teachers are observed by others how they are using technology they try to develop more advanced skills.

- n. Team Leadership. Teachers who lead in integrating technology are encouraged to improve themselves because the other people trust them.
- o. Teaching Competence. When the students learn more how to use technology in learning that reflects well on teachers’ skills and their desire to improve student learning. Bailey & Pownell (1998) provide a question that focuses on this point, “Are students learning more with technology because of my skills with technology?” (Bailey & Pownell, 1998, p. 50)

- p. Technology Innovation. Teachers have to develop new knowledge of how to innovate new methods to enhance teaching and learning.
- q. Extrinsic Rewards. Whether or not teachers successful are realized in internal and external schools. Bailey and Pownell (1998) provide a question that focuses on this point, “Have my efforts been recognized and rewarded by others?” (Bailey & Pownell, 1998, p. 50).

*Level Five: Self-Actualization Needs*

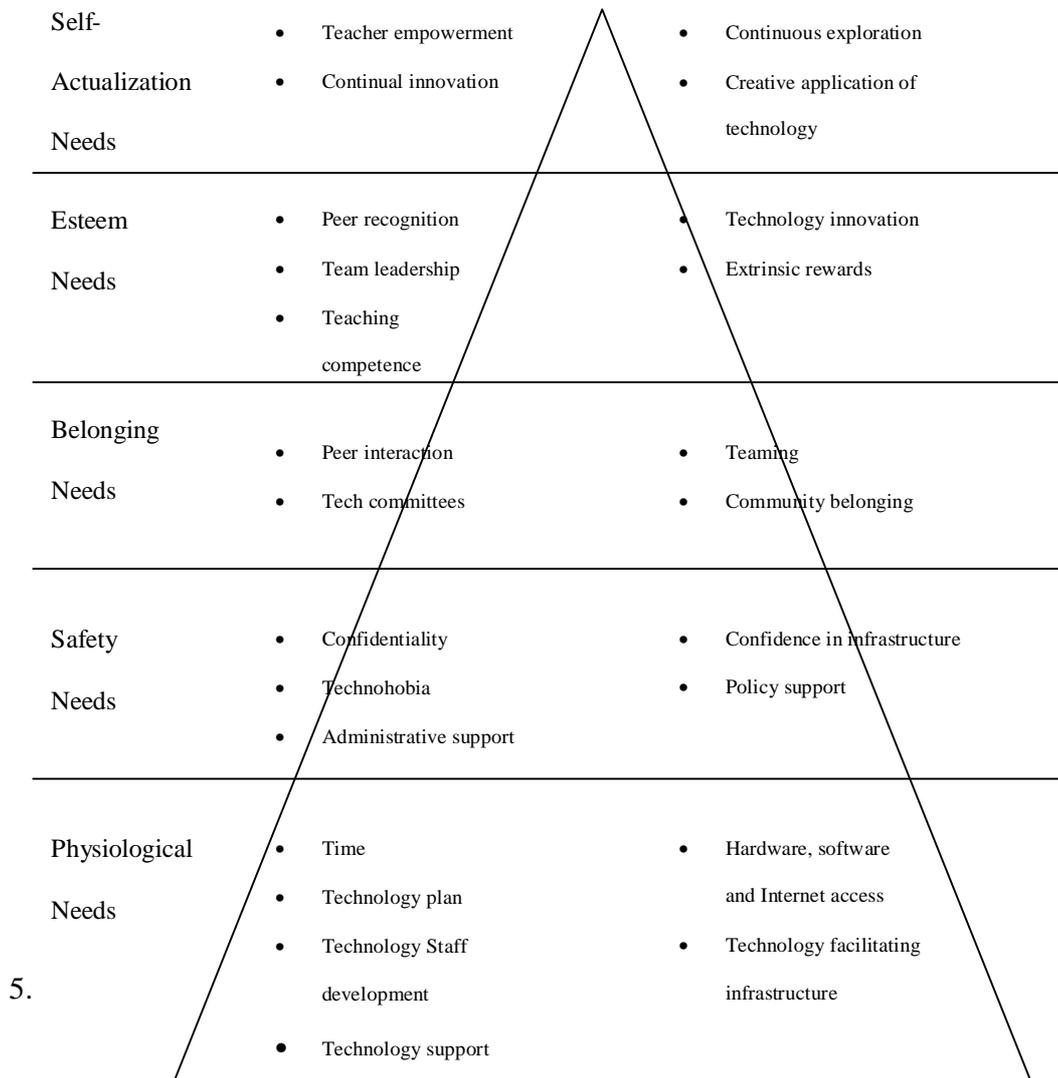
This is the highest level in the hierarchy. Teachers at this level will have the characteristics of creativity and respect from others.

- a. Teacher Empowerment with Technology. Teachers responsible for making a decision to choose technology to support student learning. Bailey and Pownell (1998) provide a question that focus on this point, “How can I take advantage of all these technologies to improve student performance?” (Bailey & Pownell, 1998, p. 51).
- b. Creative Application of Technology. Teachers are able to use information technology in difference ways to support teaching and learning.

Finally, developing staff development must be planned on assessment that helps to improve information technology staff development that will become compatible with teachers’ needs, because they have different knowledge and skills. When this is the case, the programs are successful.

Figure 5

*Maslow's Adapted Hierarchy Shows Priorities in Technology Staff Development and Support Programs*



Note. From Technology Staff-Development and Support Programs, by Bailey & Pownell, (1998 & 1999), *Learning & Leading with Technology*, 26(3), 64.

### *Magnitude of Staff Development*

Staff development must consider the teachers' and administrators' needs. As a result, teachers and administrators will be able to improve and renew the school environment in various directions. These include curriculum and instructional plans, which will ensure development of an effective learning environment (Nelson, 1998). In fact, both teachers and administrators should be involved in staff development program sessions.

Fruitfully implementing an information technology plan relies on meeting all of the needs of teachers, administrators and the students (Benson, 1997; cited in Brennan, 1997). Benson argues that "for any technology implementation plan to be successful, it must allocate sufficient time and resources for a focused staff development program." Costall (1997) indicates that staff development is the main method for implementation and diffusion of information technology in schools.

The equation provided by the Massachusetts Software Council (1994) (Cited in Whitfield and Templeton, 2000), asserts the relationship between the information technology plan and staff development. The equation is:

$$\textit{Technology} - \textit{Training} = \textit{Junk}.$$

The preceding equation has an implicit meaning, which is:

$$\textit{Technology} + \textit{Staff Development} = \textit{Effective Implementation of an Information Technology Plan in School}.$$

Information technology planners must discuss the needs of teachers and administrators that are significant for assuring implementation of the information technology plan successfully.

Levin et al., (2000) indicates that replacement hardware and software in schools does not guarantee its integration in tasks. When teachers and administrators develop new knowledge and intense skills of information technology, they are able to use computer technology (CT) in instruction and administrative work. The teacher's responsibility in the classroom is to use new technology in teaching and learning by utilizing the current technology, such as computer technology. They aid learners in acquiring information from different resources that assists them to improve and construct their knowledge. Teachers must acquire new skills and knowledge that develops new structures of thinking. Sharp & Walter (1997) state that "the importance of technology and computers has increased tremendously in the last few years as superintendents are pressured to purchase the latest equipment, hire computer coordinators, train teachers to use the equipment, and connect everything to the network" (p. 8).

Staff development is imperative for teachers and administrators in order to update their skills and knowledge. This has a positive impact on increasing their capabilities to implement information technology effectively in their classroom and for administrative work. Indeed, in order to perform their activities successfully they must "become an integral part of the curriculum of universities and other institutions preparing school administrators" (Telem, 1991, p. 605).

Beaver (1991) notes that administrators have a significant function in implementing computer technology in the schools. They "need to develop the understanding necessary to guide their instructional technology programs and to have the hands on experiences that training on administrative uses of technology provides."

Administrators needed to maximize their computer proficiency to increase their insight so that they can assist their schools to identify their needs for computer technology in instruction and administration (Beaver, 1991).

Yaghi (1996) conducted a study that focused on three groups, school administrators, computer teachers and supervisors, and subject matter teachers, in order to determine the importance of training teachers to acquire skills in computer education. The outcome of the study showed there was no significant difference among the three groups, indicating the value of training teachers to gain advanced skills in computer technology. They were assisted in performing computer education programs (CE).

Yaghi found “The three groups clearly believe that training in the use of computers should involve all teachers, and not be limited to computer teachers” (1996, p. 145).

Yaghi (1996) indicates that once teachers know how to operate a computer, and they will be motivated to use it and be able to integrate it into the curricula. Teachers are the key to successful implementation of computer technology in the classroom. It is required that all teachers receive staff development to gain enough skills to motivate them to make the new technology easy to implement. Meyer, et al., (1999) stated, “Teachers need not only understand instructional software from a user’s point of view, but also how to teach with it” (p. 4).

Jameson (1999) stated, “Teacher training in technology is no longer optional. Every educator must become proficient in technology” (p. 31). Jameson primarily focused on teacher training in the use of technology. He believes the technology is essential for teaching, implementing curriculum and increasing student learning. He also adamantly recommends that technology should be part of teacher evaluation.

Staff development plays a critical role in enhancing the use of information technology (IT) in schools, maximizing confident use and reducing teachers' and administrators' awareness. Using staff development is an appropriate way to become skillful in the use of technology (Hope, 1997; Bishop-Clark & Grant 1991). Hall (1999) indicates that there were many studies that suggest the support of training programs in utilizing information technology and the allotment of at least 30 percent of the budget for technology. Hall said, "The president's Committee of Advisors on Science and Technology recommends that at least five percent of a district's budget be allocated to technology" (1999, p. 30).

According to Whitefield and Templeton (2000), importing computer technology into the classroom is not enough to gain its fruit; teachers are the main element in incorporating computer technology into instruction. In this case, the necessity of training programs takes place to enthuse teachers about its implementation. Frelberger (1996) confirms this with a strong statement related to the importance of staff development: "A commitment to technology integration also includes a commitment to teacher training" (Cited in Whitefield & Templeton, p. 72)

Thuriow (1999) cites successful staff development that provides various and in-depth knowledge of computer technology that allows teachers to acquire new experiences that include the technical skills and management by which to integrate them in the curriculum. Administrators need to gain computer technology skills in management and instruction in order to develop the vision required to increase innovation in the schools. A well-designed staff development model depends on the needs of the teachers and

administrators to reach the appropriate level of technology that will increase their confidence in performing their tasks.

Bray (1999) states conclusively that implementation of information technology in the classroom is not useful without staff development. Bray reports that “simply placing technology in classrooms or computer labs does not mean that teachers will know how to use it or that the curriculum will be better for its presence.” (p. 15)

The National School Boards Association (1995) points out that “a major barrier in the path of bringing schools into the Information Age is the lack of visionary leadership on the part of school leaders.” Brooks (1997) reports that administrators did not have enough competence regarding how computer technology is used or configured in order to draw their own recommendations regarding computer equipment. They depended on others’ recommendations.

Staff Development Programs (SDP) are valuable for teachers and administrators in schools in that they play a great role in improving their knowledge and skills. Knowledge is not static but dynamic. This impels teachers and administrators to increase and develop their own knowledge and skills to match with different levels of information technology so they can fulfill their tasks properly and adopt change (Guskey, 2000).

Bray (1999) indicates that staff development seeks to provide assistance and support for those who are:

1. The aggressive (gung ho) teachers.
2. Teachers who are more resistant to utilizing information technology in the classroom.

Bray indicates that considering the needs of teachers is fundamental to the successful implementation of information technology in the classroom. However, if the administrators or planners of staff development do not discuss their needs and involve them in the planning, they will be an obstacle to implementing information technology in the classroom. She noted an interesting stance that was repeated by teachers who were not part of the planning. “You technology people think you know so much, but you do not understand what we have to teach” (Bray, 1999, p. 15).

Hardy (1998) reports that the main barrier to implementing computer technology in school was a lack of staff development, which was a core part of integrating computer technology in school. This means establishing staff development will eliminate the shortage of computer technology use in the schools.

Guskey (2000) pointed out “... Many modern educational reforms require teachers and school administrators to transform their roles and take on new responsibilities” (p. 3). School leaders must realize the main advantage of technology and utilize it in their schools. We are currently in an information age, and leaders should have the foresight to follow up on that and update the schools’ environments in order to correspond with their external environments. Weidner (1999) indicates, “School leaders today must use technology to improve the efficiency and effectiveness of their work... Information technology provides options for school leaders to become better at what they do” (p. 28).

MacNeil, et al. (1998), studied administrators’ perceptions on the use of information technology as curriculum to enhance and increase teachers’ knowledge and experiences by integrating it into the curriculum. Their response is eighty percent who

asserts that it is necessary for teachers to learn information technology as a subject matter during staff development programs.

### *Models of Staff Development*

Sherry, et al., (2000) assert that teachers should acquire computer technology skills that enable them to enrich the environment of teaching and learning. Such skills require teachers to become involved in staff development in order to build their knowledge and integrate the new technology into their classroom. Sherry, et al., (2000) developed a model composed of four stages. These stages are: teacher as learner, adoption, teacher as co-learner, and rejection. Adoption of this model by the school assisted not only the teachers, but also the administrators to acquire the new information technology. It is a mature model of professional development that ran from the lowest level (the teacher as a learner) to the highest level (the teacher as a leader).

### *The First Model*

Sherry, et al., (2000), have a model that includes two main parts:

1. The development stages.
2. Strategies for its implementation at each stage.

The model discussed here is composed of five stages that include development and implementation for each stage that ensure its work. These are:

1. Teacher as learner
2. Adoption
3. Teacher as co-learner
4. Reaffirmation or rejection
5. Teacher as Leader

*Stage one: Teacher as Learner*

In this stage, teachers started to:

- a. Seek information from diverse resources, and
- b. Construct their knowledge and skills by learning new information and skills.

In order to implement this step, the planner should provide appropriate strategies:

- a. Trainees should have enough time to enroll in staff development programs.
- b. Support peer training rather than one-shot classes in order that teachers may demonstrate and practice on the contents of the programs.
- c. Use in-service training that includes how to integrate information technology with the curriculum and standards.

*Stage two: Teacher as Adopter.*

In this phase, teachers began to take a positive approach toward computer technology:

- a. To use it in classroom in order to know how it works.
- b. To exchange their experiences with each other.

To implement this stage, the teacher should follow these strategies:

- a. Use online resources that provide technical support any time for technical problems.
- b. Obtain technical experience in order to deal with the technical problems that appear.
- c. Use the computer lab in school to solve technical problems that provides them real practice.
- d. Mentor new users of information technology and facilitate, as well as provide, information that assists them.

*Stage three: Teacher as Co-learner.*

In this phase, teachers have the abilities to realize and create relationships between:

- a. Computer technology and,
- b. Curriculum that helps them to integrate information technology within curricula.

To ensure its implementation teachers should:

- a. Get involved in workshops.
- b. Use Internet resources that build up their knowledge in order to support instruction and infuse information technology with the curriculum.

*Stage four: Teacher Reaffirms or Rejects.*

In this stage, teachers are mature because:

- a. Teachers have abilities to develop learning outcomes.
- b. They are able to assess students' performances.
- c. Teachers have optimizing thinking that assists them to develop rational decisions.

To implement this stage teachers should:

- a. Be supported by administration.
- b. Increase the use of the cognitive approach, which should impact student performance and their models.

*Stage five: Teacher as Leader.*

In this case, teachers have capabilities that allow them to increase their productivity:

- a. To be active members in their school to collect data and share their experience with other peers.

- b. To train the new teachers.
- c. To transition their skills and knowledge to assist those who need improvement.

To implement strategies at each stage.

- a. To discuss each strategy that supports the performance of each previous step.

For implementation at this stage teachers should:

- a. Motivate teachers to work as a co-teacher on site.
- b. Allow them to have enough time to work with the other teachers one-on-one (mentor).
- c. Support teachers and administrators by providing in-house training and support other schools.

### *The Second Model*

In addition, Kozlowaki (2000) built up a coherent model that included five levels that give direction and leading, and connect staff development with the specific level of their needs. These levels depict courses that serve as a road map and baseline for trainees.

#### *Level One.*

Basic computer skills: which includes the beginner skills and knowledge that are necessary for those who want to learn about information technology. This serves as an introduction to computer technology that includes basic operating systems, such as Windows and Macintosh, and basic word processing, as well as employing it to manage instruction tasks, such as students' attendance and grades.

*Level Two.*

Mastery of an application package: where they are able to master software packages such as Microsoft Office and introduce it in the classroom, enabling students to use it as part of their course activities.

*Level Three.*

Mastery of using the Internet: teachers and administrators have to acquire an advanced level of the use the web, for instance, skills with search engines and an ability to evaluate information and communicate by email. They must recognize their infusion in the classroom and school activities.

*Level Four*

Multimedia acquisitions: at this level, teachers have to learn and acquire knowledge and skills of multimedia and which software packages have features to develop courseware with multimedia features such as text, hyperlink, animation, movies and so on.

*Level Five*

De-emphasis of skills training: focuses on how teachers and administrators impact on student achievement and diffuse all the features of information technology into teaching and learning that enable students to be creative and knowledgeable.

*Effective Information Technology Staff Development*

The effectiveness of staff development programs depends on many different elements that have direct impact on developing and increasing teachers' and administrators' knowledge, skills, experience and attitude toward information technology. The literature suggests:

1. Staff development programs should be sequential to ensure trainees start from their level and gain new experience that supports them as either teachers or administrators.
2. The programs should help them to acquire new skills and help them to learn the basic computer technology in administrative work and within the curriculum.
3. Information technology is not timeless. It changes periodically and requires the continuing participation of administrators and teachers in professional development in order to improve their skills. (Kemp, 2000)
4. Staff development encourages all trainees to share experiences in order to augment their own new experiences.
5. Teachers who enroll in staff development should start to train the new teachers or administrators (Cort & Disario, 1996; Ferraro, 1999).
6. Teachers needed to learn the new information technology, such as the internet and computer technology. For instance, they should be developing courseware, presenting course materials using available software, such as PowerPoint and HyperStudio, and improving their abilities to access the new systems and equipment in order to increase their willingness to implement it in teaching and learning (Brace & Roberts, 1996).
7. Teachers and administrators should have enough time to enroll in technology staff development to discover and gain new information technology (Brace & Roberts, 1996).
8. Teachers need to be encouraged to adopt information technology and administrators should prompt them to provide opportunities to go through technology staff

development programs by identifying its features and its impact on their futures (Brace & Roberts, 1996; Brooks, 1997; Marsh, 1997).

9. Hardware and software must be appropriate to the classroom, labs, or in the staff development sites (Marsh, 1997).
10. Teachers must be involved and share in developing the activities of staff development, either in pre-service or in-service, which ensures their confidence in helping students to learn and participate in using information technology effectively, in the classroom and in the real world or at the work place (Luke, Moore & Sawyer, 1998). Additionally, the preceding authors linked the effectiveness of students' learning with information technology in classroom to the teachers' knowledge and preparation of information technology. They reported, "Teachers need to be better prepared to teach with technology"(Luke, Moore & Sawyer, 1998, p. 3). Moreover, schools must develop their environments to support students technologically and "become information literate and skilled in using computer based tools" (Rakes, 1996).
11. Create prior materials for each part of training programs and choose appropriate approaches to present the contents of courseware (Garcia, 1998).
12. Staff development programs must be continual so that trainees, either teachers or administrators, are linked with the progress of information technology. In fact, with information technology influx, one shot is not enough to gain the new knowledge and skills of information technology (Garcia, 1998; Shelton & Jones, 1996).
13. Staff development recognizes the level of each person in order to make the session compatible (Shelton & Jones 1996).

14. Effective staff developing for administrators and teachers relies on adequate timelines (Lan, He, Ouyang, Zhonghai, & Bao, 2000).
15. The teacher is the main element in the school that must be involved in the committee that has undertaken the decision to develop schools, either in curricula, organization, or planning for the future (Nelson, 1998).
16. “Hands-on” is an effective approach to ensure the acquisition of skills and to experience computer technology (Shelton & Jones, 1996; Boyd, 1998).
17. Staff development needs time to learn about hardware and software (Boyd, 1998).
18. Provide continuous staff developments that give teachers and administrators opportunities to follow up on modern computer technology (Boyd, 1998). The administrators should be enrolled in the technology staff development so that they can develop their vision and become whole information technology leaders who assist in the application of information technology in school.
19. Staff development should encourage cooperative and collaborative training among administrators and teachers, such as one teacher training another teacher (Shelton & Jones, 1996).
20. The teacher needs time to attend training programs (Meyer, Steuck, Miller, Pesthy, & Redmon, 1999).

### *Information Technology Plan*

Information technology plays a critical function in improving and increasing the productivity of all realms of society (Provenzo, 1996). Additionally, (Olds 1998; Stanton 1998; Zilonis 1998; Zimmerman, 1998) indicate the advantages of using an information technology plan are to:

1. Enable students to access different learning environments.
2. Enable teachers and administrators to access staff development to improve their capability.
3. Prove and enhance cooperative and collaborative learning for students, teachers, and administrators through networking.
4. Be the key to change student and teacher roles.
5. Enhance the connection between schools and the community.
6. Provide powerful tools that enhance communication among students, teachers, and administrators.
7. Enable students to develop an optimal level of thinking to create new processes, models, and solutions.

Charp (1997) detects that the use of information technology in education is gaining irreversible momentum as it cuts across disciplines and enhances learning opportunities for all ages. Hallinger, et al., (1999) report we are living in the era of deluge of information technology. Rapid change demands evolving a flexible information technology plan that would motivate teachers and administrators to adopt the new revolutions of the information technology age. An information technology plan encourages students to increase and develop their experience by adapting to the information age that is required in the work place.

Foster & Hollowell (1999) stress that,

Effective information technology planning does not take place in a vacuum. It must be integrated into instructional planning, mission, and goals. At the physical level it must be an integral part of every

construction and renovation endeavor of the learning institutions. At the operational level it must meet the demand for access to information technology resources. At the functional level it must serve the institution's community, i.e. students, faculty, researchers and administrators (pp. 9-10).

Parentech (1999) notes that the Bureau of Labor Statistics pointed out that the United States of America will need from 1996 to 2006, more than 1.3 million workers to occupy the new jobs that include programming, system analysis, and computer scientists, in order to develop a new generation that meets the demands of information technology. Friedman, Director of the Center for Improved Engineering and Science Education, and Professor of Management, Stevens Institute of Technology, Hoboken, N.J., (as cited in Chapp, 1997, p. 6) emphasized that technology must be involved in the educational reform process as an essential part of each stage. This will guarantee that information technology is implemented in revising curricula, establishing new buildings, new computer labs, and in-service training programs. Haycock & Jopson (1999) report that the West Vancouver School Board started to create school goals in 1995. In 1997 the new board asserted they would continue to infuse technology into the areas of subject matter and student achievement. The new board indicated that there was a clear vision of integrating information technology into instruction that allowed them to create an information technology plan to enhance student achievement and utilize it in the management of school activities. They noticed that "the Board's concern was that there was no common vision for the use of information technology to enhance students'

learning...Overarching these issues was the broader concern that the district needed a plan” (Haycock & Jopson, 1999, p.15).

Based on the former authors’ research the information technology plan is considered significant for schools, and provides connectivity of schools with the new technology in order to improve their environment. Information technology includes hardware, software, communication tools, Internet, and network. Schools need to develop a reasonable plan that would assist them to use wide range of information technology effectively in teaching, learning, and administrative work.

Brush & Bitter (2000) stated that the workforce needs to attain information technology, not only for improving the current needs of the organizations, such as business and governments, but must go widely to impact on the change of an organization’s environment in order to be ready to meet the needs of the society. The Gartner Group (1999) cites that all organizations must be able to deal with new information technology, because by the year 2003 schools will increase its use by 300%. (As cited in Brush & Bitter, 2000, p. 23). All organizations are looking to the high schools and universities to close the gap in the shortage of professional information technology. Educational institutions and high schools have to prepare students for proficiency and to perform in modern jobs (Gartner Group, 1999). Meyer et al., (1999) declared that it is not merely the purchasing of computers and placing them in the classroom and the labs in order to ingrate and modernize school with the current technology that can be used in teaching and learning and the other activities. Without a doubt, school administrators and teachers must strike up a plan information technology system in schools.

In the period of 1994-95 the New Hampshire State Department of Education investigated the implementation of an information technology plan in the New Hampshire Public Schools and they received 447 surveys out of 459. They found that 38% of schools established their plan as part of a district plan. Whereas, 50% of the schools pointed out their technology plan was in process. In fact there was a good indication toward fostering information technology plans in their schools. Moursunda & Bielefeldt (1999) state that information technology is composed of

Computer hardware and software, the networks that tie computers together, and a host of devices that convert information (text, images, sounds, motion) into common digital formats. However, information technology is not just hardware, wires and binary code, but also the effective use of digital information to extend human capabilities. (p. 5)

#### *Development of an Information Technology Plan*

There are many different questions that work as an umbrella for creating an information technology plan which are helpful to direct the planners to gather information related to each step of developing a planning strategy. These cover its mission statement, goals, and objectives.

West, 1994; Baule, 1997; Oliver, 1997; Barker and Hall, 1998; McNabb, McNabb, Valdez, and Mark, 1999; Looekard and Abrams, 2001; Bucher, 1998; Breithaupt, 2000; Lumley and Bailey, 1997 clarify the important questions that should be asked during developing ITP, these are:

1. Is there a leader who is able to connect all the stakeholders in order to gain information that supports information development?

2. Do the stakeholders support change in the school environment and does the leader have abilities to convince them?
3. What kind of support do schools need to enhance using information technology?
4. Is the coordinator important for maintaining the information technology system in the schools?
5. What is the mission statement of the use of information technology?
6. Does the mission statement support students' needs?
7. Is courseware used for enhancing curricular topics?
8. Does the school use the LAN and WAN networks?
9. Are the teachers involved in the decision of developing the plan?
10. Are all the goals and objectives very clear and able to be preformed?
11. When will the plan be implemented?
12. What kind of information technologies do administrators need?
13. What kind of software will be used to enhance the curriculum?
14. Does the library use an automated system and connect with the Internet?
15. What is the information technology plan feature for students, teachers, and administrators?
16. How much does the school spend to integrate information technology into its environment?
17. What kind of information technology do schools utilize to support and enrich curricula?

The purpose of the previous seventeen questions is to create a coherent and reasonable information technology plan that must be valuable for students to improve

their achievement in the different curricular areas that assist students to develop ultimate goals. It is essential for teachers and administrators to improve their capabilities. According to Carter (1997), in the past, information technology plans focused on placing computer technology in the classroom, but now the decision makers bring up a new imperative change in its purpose that emphasizes the individual needs and how to integrate computer technology into learning, teaching and curricula in order to increase teachers effectiveness toward meeting the students' needs and increasing traditional classroom productivity.

#### *Characteristics of the Information Technology Plan*

Jukes, 1996; Reksten, 2000 and Ward, 1999 indicate that there are properties of an information technology plan that should be recognized by the stakeholders through its development which ensure its implementation and its remaining in the long run. These are:

1. The plan must be documented to ensure its review and update.
2. The plan must be flexible enough to make it easy to adjust part of its goals or objectives that ensure its life, because technology is not timeless.
3. The plan must address student needs and enhance their experiences.

Each part of the information technology plan (ITP) work is integral with each other, therefore, students, teachers, and administrators will gain from its fruitfulness. Unless the characteristics of technology are known, its modification and improvement during the stage of implantation would be difficult.

### *Coordinator of Information Technology*

Meyer et al., (1999) noticed that schools or groups of schools should establish a coordinator job to support technical service and manipulate any problem or troubleshoot any problem that threatens the system during the day by enabling teachers, administrators and the other staff to work with confidence. In addition, Carter (1997) indicates that there is a main reason that pressed schools to initiate a new occupation for coordinator, which is, as Carter (1997) stated, “ The computer coordinator position was established in response to the growing numbers of computers in schools and the increasingly widespread establishment of computer labs” (p. 31). According to (Boyd, 1998; Carter, 1997; Lumley & Bailey, 1997; Ager, 1998; Clark & Denton, 1998; Zilonis, 1998; Meyer, et al., 1999; Lookard & Abrams, 2001) the coordinator has critical functions that include groups of responsibilities that ensure information system effectiveness in school. These are:

1. The making of decisions to purchase equipment that include software and hardware.
2. Updating the information technology system.
3. The ability to fix and maintain the system. (Boyd, 1998)
4. Provide teacher training and support to use information technology. (Boyd, 1998)
5. They assist in decreasing the anxiety of the users of information technology in the school environment, because they feel comfortable when they utilize it because there is a coordinator who is capable of maintaining technical problems.
6. Maintain the security system of school that saves the information and gives each employee access to the system up to his or her authority.
7. Technical problems that teachers and administrators face.

### *Information Technology Supports Administration*

Picciano, 1994; Kearsley, 1990; Picciano, 1998 assert that information technology is a potential steppingstone for schools. The lack of integration has negative effects on its activities. Information technology is an effective system that focuses on solving school problems and enhancing its activities.

Hsu, 1995; Forcier, 1996 state that information technology must be part of a school management system, which is called management information system (MIS). This makes the information flow from one department to another and ensures a high quality of information ready any time for decision makers, such as school committees, administrators and teachers. Implementing management information system (MIS) in school management enhances its functions. These include improved quality of reports that are comprised of analyzing information into different formats, such as figures and ratio and provide a real picture about the data. Information technology supports the decisions and makes better and more efficient staff productivity. In addition, the system assists them in retrieving information that they need immediately that saves their time and makes it easy to adjust their information records. Management information system enables staff to record data that include students' and staff names, grades, attendance, final reports, budgets, inventory, library, payroll, course schedule, and communication.

An organization utilizes technology to improve and increase their daily operations daily, so that they are able to provide high quality products that meet clients' desires. Thus schools are the same, as these organizations need to make their operations better by using technology in administrative work in the way that Johnson & Bartleson (1999) mention, "Like any large organization, schools can use technology to improve daily

operations” (p. 22). Leach & Smallen (1998) say that information technology supports administration, registration, and analysis data that assist decision makers.

The authors indicated the use of software that supports administrative daily work, such as students’ attendance, payroll, teachers’ reports, and course schedules. Moreover, using e-mail provides powerful communication with different communicators, such as parents, teachers, administrators, and providers. Pea (2000) cites that an information technology system in school “can and should be shared, following decisions regarding security and confidentiality, with teachers, parents, and community members.” (p. 45)

Information technology provides significant tools to improve schools in many ways that are based on information technology planning toward using it to enhance administrative work. Integrated IT in instruction allows the outcomes to be effective through its tools. These include such communication features as the web (Johnson & Bartleson, 1999; Weidner, 1999).

#### *Inventory*

There are many items in schools that should track all the items in the inventory. These include books, instructional materials, and other items that need to be updated. This is information that assists the employee to prepare new orders. Without information technology there are difficulties in updating information daily because it takes time (Kearsly, 1990; Forcier, 1996)

#### *Student records*

Schools must have records for each student that includes all her or his information, grades, attendance, monthly report, and the final report. Using information

technology enables schools to develop a management information system that makes certain student information is available any time, which saves time and cost (Kearsly, 1990; Forcier, 1996; Snider, 1998; Kosakowski, 1998)

#### *Budget*

With implementing information technology in schools it makes it easy to know their expenses, income, and staff payroll. It provides reports that enable schools to control their expenses and prepare their needs for the next academic year (Forcier, 1996).

#### *Information and Communication Technology (ICT)*

Information technology increases interaction between school and district. It provides information for school staff on time; therefore, it makes communication among staff more effective. Communication tools provide immediate response and assist staff to save their time (Forcier, 1996; Pea, 2000). Herschel and Andrews (1997) indicated that new communication technology, such as e-mail, has a positive effect on organizational structure and changes its process, so that information technology makes the interaction among employees effective and helpful for making their decisions. Kosakowski (1998) described the communication tools is “Decreasing isolation by using e-mail and the Internet to communicate with colleagues, parents, and the outside world” (p. 2)

There are two kinds of communication which enhance communication among students, teachers and students, and teachers. The first is synchronous which allows students to communicate in the real world, such as chatrooms. The second is asynchronous, in which communication happens at different times such as e-mail and listserv. Both of them play essential roles in enhancing learning (Belanger & Jordan, 2000; Baker & Gifford, 1997).

### *Stakeholders of Information Technology Plan*

Bucher (1998) defines an information technology plan as created by a team representing all individuals who have an interest in the outcomes. According to Bucher, planning includes different members' insights that will be suitable to develop an accurate plan that ensures the execution of its goals properly without main obstacles. Those members are: administrators, students, teachers, librarians, parents, and business members, members from college.

Ensuring the development and implementation of a practical information technology plan requires the creation of a committee composed of various members: teachers, administrators, parents, and business people, in order to bring up different ideas and concepts that draw the future of district schools that are accountable to construct their internal environments. As a result, students develop needs that are compatible with their environment and ensure their success in life (McNabb, McNabb, Valdez, & Mark, 1999; Moffitt, 2000)

Irwin & Robinson (2000) in their research paper reported that the committee makes a final decision in representing their vision by asserting that infusing information technology into various aspects of schools includes infusion of computer technology into curriculum. These include schools with networks that connect computers in classrooms, establishing computer labs, and utilizing an automated library system that provide useful service. The committee should recommend staff development and set the vision of the stakeholders. Jukes, 1996; Reksten, 2000) assert that an information technology plan must be recognized and understood by three categories: the community and their desire to enhance education through the society that helps the growth of people; the school that

must be supported by administrators initially that ensures its continuation; and the district's people, who must recognize its benefits for students and the society. As a result of their dialogue the information technology plan is capable of being implemented fruitfully.

### *Mission Statement*

The mission statement is the first coherent part of an information technology plan that works as bedrock for the next steps that the school districts intend to perform in the current time and future (McNabb, Valdez, Nowakowski & Hawkes, 1999). Pan (2000) states vision statements "To develop a consensus of the directions in which we should move and to provide a clear picture of what goals we want to be at the end of restructuring effort" (p. 4). According to Reksten (2000) district schools, or whoever undertakes to develop an information technology plan, must have answered this question, which is, how will information technology provide for students and improve their achievement? Reksten (2000) asserted that the planners should have started with that question. The author reported that schools who consider buying equipment, such as software and hardware, before identifying the purpose for it have no vision toward integrating information technology in their schools. The information technology statements are based on the committee discussions of their tendency to use information technology in the schools. The result of their debate must be expected to answer, "How will information technology be used now or in the future?" The mission statement should be flexible and able to change depending on the external and internal school environments in order to be continuous to meet students' needs.

The mission statement not only focuses on the students' needs, but should support teachers' and administrators' needs in order to perform the school goals (Baker and Hall, 1998). Chrisman (1998) pointed out that the Dallas Independent School District developed a mission statement that covered any one, any place, and any time. Information technology is available for students, teachers, and administrators. Also, it can be accessed at any place to explore and gain information in different formats. Also, it must be available for them any time so they can use communication tools, and the WWW. Chrisman provided a comprehensive mission statement with a tendency to improve all the aspect of school environments.

#### *Goals and Objectives of an Information Technology Plan*

All the studies that focus on creating an information technology plan (ITP) emphasize redeveloping their goals and objectives that are necessary for the purpose of its developing. Goals are the targets that the schools should implement in the long or short run, based on the mission statement. The objectives are more specific statements based on the goals in order to fulfill the goals. When the mission statement changes, therefore, goals and objectives imperatively are changed so that they become congruent with the new mission statement (Picciano, 1998; North Carolina Community College, 1998; Baule, 1997 ).

#### *Goals*

Goals represent what should be done in the future; goals must be attainable in order to perform the plan, which derived from the mission statement but more specific. Lumley & Bailey (1997) reported that "Technology goal statements are statements of focus, direction, and projected outcomes for the schools district." (p. 64)

The goal statement of utilizing information technology is to provide the quality of administrative work, staff development that enhances administrators and teachers' knowledge and skills that allow them to use in the school effectively, and enhance students learning.

An example of possible goals for a school district might include:

1. Provide a network that includes Wide Area Network (WA) and Local Area Network (LAN) that make effective communication among teachers, administrators and students to exchange information (Brennan, 1997; West, 1994).
2. Provide staff development programs for teachers and administrators to utilize information technology that enhances teaching, learning, and administrative work (Virginia State Department, 1996; Baule, 1997; West, 1994; North Carolina Community College, 1998).
3. The Internet will be connected to all classrooms to provide information resources that enhance teaching and learning (Mountain Brook City School, 1999).
4. Information technology enhances all school activities that include instruction, and administrative work (San Jose & Evergreen Community College District, 1997).
5. Develop an electronic database that enhance the traditional library and make it sufficient to provide information resources anytime, anywhere for students, and teachers (Baule, 1997).
6. Integrate information technology into entire curriculum areas in order to support student learning (Anchorage School District, 1997).

### *Objectives*

Objectives are more details than goals and mission statements, objectives should be implemented by students, teachers, and administrators to improve teaching and learning within an organization based on the former goals.

An example of possible objectives for a school district might include

1. Students will:
  - a. Be able to use the Internet to seek information from different locations locally and across the world.
  - b. Be able to use computer hardware and software.
  - c. Be able to use courseware that enhances their learning.
  - d. Be able to use communication tools, e-mail, listserv, bulletin boards, and electronic blackboard.
  - e. Be able to know how to seek information by using search methodology.
  - f. Be able to develop models by using software such as, PowerPoint, HyperStudio, and Authorware.
  - g. Be able to design their web page by using different web design tools.
  - h. Be able to discover learning by using different resources of information in order to synthesize and develop optimizing solutions.
2. Teachers will:
  - a. Be able to develop courseware.
  - b. Be able to develop their web page that supports instruction.
  - c. Be able to integrate information technology with the curriculum.
  - d. Use web resources to enhance curriculum content.

- e. Be able to use communication tools to exchange information among themselves in different schools that increase collaborative learning and improve their knowledge related to new technology.

*Strategies of Implementing Goals*

Baker & Hall (1998) identify many strategies that are essential for performing goals of an information technology plan. These are:

- a. Be integrated with the Internet in order to support teaching, learning, and administrative work.
- b. Provide a computer for each teacher in his or her office.
- c. Provide appropriate computer labs that include computers (hardware and software) that are suitable for each grade.
- d. Provide courseware that enhances each subject matter.
- e. Provide communication tools such as e-mail, listserv, and bulletin boards for each student and teacher.
- f. Support administrative management by using computers for grades, attendance, budget, and inventory.
- g. Provide computers that make the library accessible with the world and students able to locate books and information.
- h. Develop a web page for each school that represents its mission.
- i. Provide staff various sessions of training programs to enhance using information technology such as the Internet, and integrating technology into curriculum.
- j. Estimate an appropriate budget that supports the implementation of each type of information technology.

### *Information Technology Infrastructure as Part of the Technology Plan*

#### *Security System*

A security system is required that gives different privileges of accessibility for each program, that prevent users to access any database that is not part of their needs, as well as making a filter of web sites that inhibits the viewing of them as well as protecting the system from hackers. Gollmann (1999) states computer security “deals with the prevention and detection of unauthorized actions by users of a computer system.” (p.9). McNabb, McNabb, Valdez, & Mark (1999) point out that a security system is imperative to keep the system effective and protected against any peril of the contents, software, information, and functions.

Thus, it protects the system from internal staff and external people who do not have authorization. It does this by using a special mechanism, such as a firewall, or by procedures, for instance log names and passwords (Laudon & Laudon, 2001; Hallberg, 2001). Forsyth (1998) points out that information through the information system in educational institutions must be secure and allow the authorized users, such as teachers, students, and administrators, to access information. Foster (1998) indicates that the security allows:

- a. Teachers and students to access course materials.
- b. Students to access test materials at a specific time.
- c. Teachers to access and update students’ records.

#### *Integrated Library with the Information Technology System*

Hudson County Community College in Jersey City (1998) reported that learners and teachers needed to be able to access and connect all the resources of information, not

only that available at their libraries, that assists them academically to support their learning and research. The libraries are the great entrance to the information that must be supported by the information technology system that gives them abilities to seek information across the world in remote areas. Linking the libraries through the wide area network and updating their system enhanced their growth, because information grows daily.

Based on the preceding information, in order for school libraries to be more effective for students, instructors, and other members, they must adopt these imperative points as follows:

1. Develop a database that includes all books, periodicals, and other publications.
2. Link libraries with the Internet that enables users to seek information.
3. Develop a web page for each library that includes accurate resources that assist the searchers to find their needs.
4. Link the libraries with the local libraries.

### *Networking*

The Network system is the heart of an information technology plan that makes all of its elements connect together and work as one coherent system. The networking systems play a critical occupation in connecting local systems and making it one unit, as well as linking schools with the external environment and remote areas. It makes activities in all organization more at sections in any organization composed that increase the effectiveness of employee's productivity (Cox, 1999). West (1994) reports that networks bring up the core benefits of configuring all the components, and affirmed "Without wide distribution, your students, faculty, and staff cannot access information

when they need it. Without full integration, your hardware and software components will not be able to share information across the network, thus limiting access” (p. 27).

Mingle and Ruppert (1999) assert that networking systems allow information to gush in various formats from different departments and users in and outside schools that give the participants opportunity to utilize each other’s information. Baule (1997) points out that networking is the great pathway to exchange information and make it available on time for the users. Vietzke (1997) reports that networking is necessary for teachers, students, and administrators that provide powerful accessibility at any time from school and home that permit them to access their information and allow parents to connect with the school by sending e-mail. Cummins and Sayers (1995) provide a message that discovered the essentials of the network, which is “In the world of the 21<sup>st</sup> Century, decision- making and problem solving in virtually all spheres business, science, community development, government, politics will depend on electronic networks that span diverse national and cultural boundaries” (p. 12). Hamilton (1998) believes that networking LAN and WAN make the effectiveness of the connection between schools and districts so that they can update information and exchange ideas and concepts that support developing school environments.

#### *Wide Area Network (WAN)*

WAN provides connectivity for schools with the remote areas in one state and links them with the world. Thus students, teachers, and administrators are able to seek vast information that they need. It is also called the Internet and connects millions of computers around the world and helps the users to exchange information among them.

Winship & McNab (2000) provided a specific definition for the Internet that described its entity, which is “ an international network of computer network” (p. 1).

#### *Local Area Network (LAN)*

According to Bucher (1998) Local Area Network (LAN) connects more than one computer or several computers in one room, one building, more than one building or link locations for several miles. It is essential to use tools such as Novell, and Windows NT, which enhance the local network among workstations.

(Vietzke, 1997; Bucher, 1998) indicate that there are benefits of adopting a LAN.

1. Provide connectivity for all the workstations with printers.
2. Allow them to share software instead of installing it in each computer. In this case the coordinator will save a lot of time.
3. Manage the system and not allow the users to enter other files.
4. Allow users to connect with information, such as a library.

#### *Internet*

The Internet was invented during the cold war in 1969 by the Department of Defense (DoD) in order to connect many places together and exchange information. At the time was known as ARPANET, which means Advanced Research Projects Agency. In 1990 the Internet replaced ARPANET after the end of the cold war, which was called the information superhighway (Gunderson and Anderson, 1999; McArthur and Lewis, 1998).

According to Maddux (1999) Internet has grown very fast in the last ten years in all organizations. Jonassen, et al., 1999; Reksten, 2000) define the Internet as the connection of millions of computers around the world and exchanging of the

information supported by protocols. Gunderson & Anderson (1999) state the Internet is "an international network of computer networks that allows its users to share information and to communicate interactively" (p. 5) In addition, the Internet is the network of the networks. That means an organization has a network, and a country has different networks that connect with the world networking. It permits information to transmit through any location that is connected with the Internet. Hutchinson and Sawyer, 2000; Lockard and Abrams, 2001) point out that the Internet includes:

*The World Wide Web (WWW) or the Web.*

The web is the fastest growing of the Internet categories, which is increasing by 4% monthly in the number of users (Hutchinson & Sawyer, 2000).

*Communication Tools.*

Which are composed of e-mail, listserv, bulletin boards, chats, and newsgroups, which focus on the discussion of specific topics for all the subscribers (Hutchinson & Sawyer, 2000).

*Telnet.*

It provides primary service that allows users to log into their account from a remote area that gives them the opportunity to view their information from anywhere and whenever they need it (Hutchinson & Sawyer, 2000).

*File Transfer Protocol (FTP).*

It allows the users to connect remote computers and transmit information. According to Lockard and Abrams (2001) users are able to upload and download information.

### *Hardware and Software*

Part of the information technology plan is to identify appropriate hardware and software that works effectively to perform its goals. They have to write their specifications that lead schools to accurately purchase what they need accurately. Both hardware and software have strong relationships that cannot allow us to disconnect each of them from the other, and must be compatible. Consequently, the plan makes certain they work together properly.

Merrill et al. (1996), Picciano (1998) points out that hardware is the tangible part of the computer that includes corporeal parts such as hard drive, motherboard, drive A, and monitor, as well as all of the parts that must be configured together that give users the ability to interact with it effectively.

Merrill et al. (1996), Picciano (1998) Software is the intangible part of the computer that has instructions. It is the vital parts that are deemed the soul of computer technology such as, C++, Word Processing, Database, Authorware, and so on, that allow users a fruitful computer environment.

## Summary

The review of the literature focused on many aspects that must be discussed in order to make the study more coherent for the readers and to allow them to understand the major valuable elements that should be discussed through educational reform. The literature review provided information about educational organizations in Saudi Arabia that include the Ministry of Education and Presidency of Girls' Education, how these organizations were established, and what their functions are now. The discussion also covered information technology in higher education in different educational institutions.

Discussion of the Saudi educational environment was vital to give an indication of the growth of various aspects of that environment. Information technology is growing rapidly, including the Internet, the World Wide Web, and communication tools such as e-mail. Computer technology is also replacing manual work. In fact, the business and public environments are growing, acquiring more information technology, which will influence the school environment in its use of information technology to increase and improve students' learning and to meet their needs.

The second part of the study included the perceptions of teachers and principals toward utilizing information technology in various school activities. They confirm the significance of using information technology in teaching, learning, and administration.

The third part encouraged the discussion of change and how leaders must work to develop new ideas and processes to improve learning and teaching, as well as how to convince teachers to support the change. Constructivism is important for use in Saudi schools in order to encourage students to learn and acquire information that helps them to develop their optimal knowledge. Staff development must be discussed in order to

provide rational information that assists teachers and administrators to acquire the knowledge and skills of powerful models to develop teaching and administration concepts. An Information Technology Plan (ITP) is important to develop students' needs based on the mission statement, goals, and objectives of the plan. It was discussed intensively that administrators are able to develop their vision toward the future through planning.

## CHAPTER THREE

### Methodology

#### *Introduction*

The quantitative method was used to design research and analyze the outcome of the study. Quantitative research is composed of two main sub-methods, descriptive and inferential statistics. It also represents the results by numbers (Schumacher & McMillan, 1993). Both are utilized in order to derive appropriate conclusions and recommendations.

#### *Descriptive Statistics*

These describe the output from data analysis in order to give a clear view of the situation, allowing the researcher to draw ideal conclusions and give decision makers a way to base their decisions on rational study. Descriptive statistics involve various forms of information in terms of the mean, standard deviation, histogram, bar graph, whisker plot and scatter plot (McMillan & Schumacher, 2001).

#### *Inferential Statistics*

These were used for the testing of hypotheses to test the dependent variable(s) with independent variable(s) in order to know the relationship between them (Wiersma, 2000). Wiersma indicated, "Inferential statistics, ...measures of the sample and parameters are measures of the population. Inferences are made about the parameters from the statistics" (p. 345). Aron and Aron (1997) pointed out "Inferential statistics are to be used for drawing conclusion and inferences, which are based on the numbers from research study, but go beyond the numbers" (p. 2).

The qualitative method was used for analyzing question 11, which is open-ended question and the participants' comments. Analyzing of the qualitative data based on these steps:

1. Preparing and organizing the data for analysis.
2. Exploring the data.
3. Describing and developing themes from the data.
4. Representing and reporting the findings
5. Interpreting the findings. (Creswell, P. 257, 2002)

The study attempted to find answers to the research questions, which are:

*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?

### *Population*

The population of the study included administrators (principals and *assistants'* principal) and teachers male and female in Saudi high schools in Riyadh city. All the population information about high schools that are under the Ministry of Education is based on the Ministry of Education Statistical Report issued in the year 2000. The information about the Presidency of Girls' Education is based on a call with the Presidency of Girls' Education.

McMillan and Schumacher (2001) defined the population as,

A group of elements or cases, whether individuals, objects, or events, that conform to specific criteria and to which we intend to generalize the results of the research. This group is also referred to as the target population or universe (p. 169).

Table 3

*Distribution Number of Administrators and Teachers (male and female)  
in High Schools of Ministry of the Education and the Presidency of Girls Education in  
Riyadh*

	Administrators	Teachers
6. Male	7. 206	8. 2433
Female	224	4152
Total	430	6585

Table 4

Distribution Percentage of the Population

	Administrators	Teachers
Male	48%	37%
Female	52%	63%

#### *Sample Description*

Wiersma (2000) defined sample as “A subset of the population to which the researcher intends to generalize the results.” (p. 269). Besides, McMillan and Schumacher (2001) stated sample size as “The number of subjects in a study...represented by the letter n.” (p. 177). Gay (1981) suggests that sampling is the appropriate approach to collecting data that represents the population.

Generalizations of the results that are derived from the study require that the sample should be representative of the population of the study (McMillan & Schumacher, 2001).

McMillan and Schumacher point out that there are important components that should determine in the sample size,

The determination of sample size should take into consideration several factors—the type of research, research hypotheses, financial constraints, the importance of the results, the number of variables studies, the methods of data collection, and the degree of accuracy needed (2001, p. 177).

Choosing the samples from the population depended on many factors that must be determined to figure out the sample size. These elements are:

1. The statistical procedure, which is a two-way MANOVA.
2. The desired power is (.80)
3. The effect size is moderate.
4. Number of groups are two
5. The level of significant is .05.
6. Numbers of independent variables are two, which are gender and position (Stevens, 2002; Aron & Aron, 1997)

There is not a special method to be used in multivariate analysis (MANOVA) to consider the sample size. In the study, it was used analysis of variance (ANOVA) and one way multivariate analysis to derive how many subjects could be involved in the study (Stevens, 2002). The sample size was 180 participants. Ninety of the participants were administrators and the ninety were teachers, which represent the population. Table 5,

identifies the number of administrators and teachers from both boys' and girls' high schools based on the percentage each of them has from the entire population.

#### *Multivariate Assumption*

There are three assumptions for multivariate analysis of variance (MANOVA). These are:

1. Independence of observation.
2. Homogeneity of covariance.
3. Normality of the distribution (Stevens, 2002, p. 257)

Table 5

#### *Distribution Sample Numbers among Administrators and Teachers in Both Girls' and Boys' High Schools*

	Administrators	Number of Administrators	Teachers	Number of Teachers
Male	48%	43	37%	33
Female	52%	47	63%	57
Total	100%	90	100%	90

#### *Instrumentation*

##### *Selection and Development of the Instrument*

The instrument was constructed and was based on the literature review. There was not an appropriate instrument found to fit the study and enable to deal with the research components under study. The instrument was divided into four main parts, which are illustrated in Appendix A. These parts are:

Section I: Demographic information, which includes 11 items.

Section II: Information technology, which includes 44 items.

Section III: Staff Development, which includes 4 items.

Section IV: Teaching method and philosophy, which includes 16 items.

The second part that is information technology is divided into five categories which are: information technology and instruction (which includes items 12, 13, 20, 21, 22, 29, 36, 37, 40, 43, 44, 49, 51, 55); knowledge and skills of information technology (which is composed of items 15, 16, 27, 28, 33, 38, 41, 45, 47, 50, 53, and 54); information technology and administrative work (which includes items 18, 19, 25, 26, 31, 32, 39, 42, 46, 48, 52); and information technology plan (which includes item numbers 14, 17, 23, 24, 30, 34, 35). The third part is information technology and staff development, which includes item numbers 56, 57, 58, 59. The fourth part is the teaching philosophy and method that includes sixteen check statements that represent element of constructivism and behaviorism theories.

The dependent variables include information technology in instruction, and information technology plan. These dependent variables were tested in order to learn whether or not there were differences among perceptions based on gender and position.

The independent variables are gender (male and female) and position, which includes administrators (principal and assistant principal) and teachers.

Wiersma (2000) discussed different types of Likert Scales that measure participants' responses and these were used in the study. The scale consists of five degrees, which are:

SA= Strongly Agree; A= Agree; U= Uncertain; D= Disagree; SD= Strongly Disagree.

The degree for each part of scale in the study is measured as:

SA= 1, which is Strongly Agree; A= 2, which is Agree; U= 3, which is Uncertain; D= 4 which is Disagree; SD= 5, which is Strongly Disagree.

The first part is information technology that includes information technology in instruction, information technology planning, information technology skills, and information technology in administrative work are measured based on the Likert Scale. There is an open-ended question, which is number eleven, after the demography section and before the participants start choosing the appropriate answer on the Likert Scale, so that the researcher can determine their knowledge in employing information technology in school.

Staff development is composed of four questions, three of which have yes or no answers. If the first answer is yes the participant(s) should write down the course title of the computer and the Internet class that they have taken and the time. The second question is about staff development plans whether or not school has a staff development plan. If the response is yes, the participant(s) should explain their plan. The third question measures the degree of need for staff development. The last question measures multiples of information technology needs, and participants have the freedom to choose what they need, from “a” to “k”. The fourth part, which is teaching philosophy and method, includes seventeen check statements that teacher and administrators mark the points that they used in school

The instrument was written in the English Language. The study was conducted in Saudi Arabia. This demanded the quality to be translated into Arabic. There were two main points to be considered:

1. The instrument was to be compatible with the meaning in English.
2. It was to be understood by the participants in order for them to answer the questions properly.

To implement the previous components, it requires a person to translate the original from English to Arabic and vice versa. Two Ph.D. students of Arab origin and fluent in Arabic Language skills translated the survey. One of them was from Instructional Technology Department and the other was Supervision and earned bachelor in English as a second Language. During the pilot study, they also suggested a change in some items in order to make it clearer. The feedback from both improved the Arabic version content. One of them suggested a terminology in Arabic language that could be used for multimedia, instead of translating it as it is. Behling and Law (2000) asserted that "...the translation must be done correctly, not only from the language perspective, but that we pick up the nuances, etc. that would allow our instrument to achieve validity, reliability, and possess the appropriate psychometric properties" (p. 1)

#### *Item Analysis*

Developing coherent items for research depends on the quality of the instrument questions. The outcome of item analysis is critical for redeveloping and revising the questions that are given to the participants in the pilot study. The discrimination index is an appropriate method that ranges from -1 to +1, where a negative correlation indicates that the item(s) is poor and needs to be deleted, zero correlation that means the item(s) needs to be deleted or revised, and a positive correlation means that item(s) is appropriate. When the item has a high discrimination factor, it becomes a good item. Item analysis allows the researcher to learn the quality of each item to be deleted or

revised in the instrument (Wiersma & Jurs, 1990). The discrimination index is part of the reliability result after running the Statistical Package of Social Studies (SPSS) which is the corrected item total correlation. Ebel and Frisbie (1991) suggested a range of degree for index of discrimination to evaluate the items. Their suggestions are shown in Table 6.

Table 6

*Item Evaluation*

Index of Discrimination	Item Evaluation
0.40 and up	Very good items.
0.30 to 0.39	Reasonably good but possibly subject to improve.
0.20 to 0.29	Marginal items, usually needing and being subject to improvement.
Below 0.19	Poor items, to be rejected or improved by revision.

Note: From *Essentials of Educational Measurement*, Ebel & Frisbie, 1991, p. 232.

*Pilot Study*

It is imperative to conduct a pilot study in order to identify the reliability of the survey items. Indeed, the pilot study is the lens that enables the researcher to know the effectiveness of all items that represent each dependent variable. According to Wiersma (2000),

Before preparing the final form of the questionnaire, the items should be tried out with a small group in a pilot run. This is a pretesting of the questionnaire, and deficiencies may be uncovered that were not apparent by simply reviewing the items. (p. 171)

Based on the result of the pilot study, weak items can be removed or revised to enhance the construction of the instrument and make it ready to be utilized without major problems. The pilot study gives enriched feedback that is very useful to adjust the instrument. Tuckman (1999) identified that “Most studies benefit substantially from the precaution of running pilot tests on their questionnaires, leading to revisions based on the results of the test” (p. 256).

The pilot study was conducted in city of Athens, Ohio in the United States that included 21 male participants. It provided information that helped in revising some items. There were items numbers 18, 19, 21, 25, 30, 31, 40, 44, 56, 57, and 58. All of these items were adjusted based on the participants’ feedback in the pilot study. All of the previous items were revised in order to be comprehensible. Additionally, 57, which had a degree measure of merely yes or no, was adjusted to three degrees: yes, no, and I don’t know. In addition, item 58 was adjusted from four degree to three degrees, which are presently no need, somewhat need and strong need. Additionally, some of the participants in the pilot study reported there is a similarity between items 19 and 25 and they suggest removing them. Then they were revised in order to remove the ambiguity.

#### *Validity*

The data that were collected from the participants during the pilot study indicated that the content of the survey was valid for the study. McMillan and Schumacher (2001) declared validity is “a judgment of the appropriateness of a measure for specific inferences, decisions, consequences or uses that result from the scores that are generated” (p.181). Gay (1981) defined validity by stating that it should measure all items of the instrument that the researcher needs to measure.

The validity of the instrument used in the study was confirmed by two experts in the College of Education at Ohio University. One of the experts, Dr. Teresa Franklin, was from the Instructional Technology Department and the other, Dr. George Johanson, was from the Research and Evaluation Department.

All the items used in the survey are based on a review of the literature, so that the content of the survey is a valid representation of all the dependent variables and other categories in the study. There is additional information that supports the validity of the content.

#### *Information Technology Plan*

Bucher (1998) pointed out “ideally, a technology plan is created by a team representing all individuals who have an interest in outcomes” (p. 5)

#### *Information Technology and Instruction*

Leu and Leu (1999) indicated, “Communicating with others around the world on a common classroom project provides opportunities for your students, opportunities they will not experience without the Internet. You should seek out these opportunities for your students and integrate them into your curriculum” (p. 128)

Hoffman and Scheidenhelm (2000) noted that “...the Web provides teachers and students unique opportunities to learn and teach in ways that would have been impossible even a few short years ago” (p.86). Najjar (1996) pointed out that

Computer-based multimedia instruction allows the learner to personally set the pace of learning. Traditional classroom instruction does not. Self-paced learning is probably a more effective way to learn because the learner can move on to new material when the learner is ready.

Rada (2000) noted, “In a successful virtual organization, the technology fits into the workflow of the people. To place a school onto the information superhighway, one needs a model of the school. The model must accommodate students, teachers, administrators, marketers, and more” (p. 150). Moreover, from Oswego City School District (1997), “New information and communication technologies continually appear to enable individuals to access the best information in the shortest time to identify and solve the most important problems and then communicate those solutions to others.”

*Information Technology and Administrative Work*

Fulmer (1995) cited that “in the automated mode, computers calculated daily average attendance data by class, building, and district at a much faster rate. However, in spite of the speed and accuracy in calculations, the intent of the system to manage the information remained the same” (p. 4). Visscher (1995) said,

As modern tools such as relational database management system (RDBMS) and query languages become available, high levels of management support become possible; the query language in combination with a RDBMS enables the definition of, and response to, questions in which school managers are interested (p. 18).

Hsu (1995) said, “To cope with such changes, Information Technology has been in some schools and the Education Department (ED) to support their routine operational, administrative and management processes” (p. 50).

Appendix C was created in order to enhance the content validity.

### *Reliability*

McMillan and Schumacher (2001) declared reliability is “the consistency of measurement” (p. 181). The purpose of the reliability gives indications that inform the researcher as to which items work better than the others to measure what is supposed to be measured. That enables the items to be revised or omitted from the instrument to make the survey consistent. Likewise, they mentioned that reliability has a foremost goal that made them to confirm, “The goal of developing reliable measures is to minimize the influence on the scores of chance or other variables unrelated to the intent of the measure.” (McMillan & Schumacher, 2001, p. 181). When the instrument is reliable that means it has minimal errors. In this case, when the result of the reliability is close to one, it indicates that the instrument is more reliable (Gay, 1981).

There were twenty-one participants in the pilot study (N=21). The reliability determined for two categories that represents dependent variables. The first is information technology in instruction, the second is information technology plan. The analyses of the data that was collected by the pilot study indicated that the Cronbach Alpha degree for the first dependent variable is .88. The Cronbach Alpha degree for the second dependent variable is .78. The corrected correlation of information technology in instruction and information technology plan items, whose represented item analyses were above 0.26, indicated that all items had good quality and distinguished among the participants, based on the suggestions of Ebel & Frisbie (1991).

### *Data Collection Procedure*

The survey was used to collect data of the study. It is based on the sample that is composed of teachers and administrators (principals and assistant principal) that includes

both males and females. In this research, random sample that represent participants will be used to collect the data from the population. Tukman (1999) said that

The researcher selects a sample or representative group from this population to serve as respondents. As one way to ensure that this sample is representative of the larger population, a researcher might draw a random sample, because random selection limits the probability of choosing a biased sample (pp. 258-259).

As a precaution, Gay (1981) pointed out that those who are doing research should ensure that all of the participants in the study have a willingness to participate voluntarily and that they are available in their school. This researcher sent the instrument to his friends and brothers in Riyadh, Saudi Arabia, in order for the data to be collected.

#### *Data Analysis Procedures*

The researcher plans to test three null hypotheses, and answer six descriptive questions. These are:

##### *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. Null hypothesis is

H<sub>01</sub>. There is no significant interaction between position levels and the level of genders on a combination of information technology in instruction and information technology plan?

This hypothesis tests against the alternative hypothesis.

H<sub>A1</sub>. There is significant interaction between position levels and the level of genders on a combination of information technology in instruction and information technology plan?

7b. Null hypothesis is

H<sub>02</sub>. There is no significant differences between teachers and administrators on a combination of information technology in instruction and information technology plan?

This hypothesis tests against the alternative hypothesis.

H<sub>A2</sub>. There is significant differences between teachers and administrators on a combination of information technology in instruction and information technology plan?

7c. Null hypothesis is

H<sub>03</sub>. There are no significant differences between male and female on a combination of

information technology in instruction and information technology plan?

This hypothesis tests against the alternative hypothesis.

$H_{A3}$ . There are significant differences between male and female on a combination of information technology in instruction and information technology plan?

In analyzing the data, there were three null hypotheses, which are 1a, 1b, and 1c.

Multivariate Analysis of Variance (MANOVA) method was used to test them.

Descriptive method was used to analyze all the six questions descriptive. Crosstabs, percentages, frequencies, standard deviation, mean, and bar charts were used to analyzed the data.

The Statistical Package of Social Studies (SPSS V. 10.1, 2001) was used to test the null hypotheses and descriptive analysis in the study which is available at Alden Library in Ohio University.

## CHAPTER FOUR

### Data Analysis

#### *Introduction*

The information derived from the data analyzed is presented in this section of the research. The data that has been collected is based on the survey questionnaire, which consisted of four parts:

1. Demographics
2. Information Technology (IT), including:
  - 2.1 Information Technology in Instruction,
  - 2.2 Knowledge and Skill of Teachers and Administrators of information technology,
  - 2.3 Information Technology Plan, and
  - 2.4 Information Technology in Administrative work.
3. Staff Development
4. Method of Teaching and Learning

There is an open-ended question that follows the demographic part that asked the participants about the importance of information technology in education.

The Office of Institutional Research at Ohio University approved the study on December 6, 2001. The data collection started on December 30, 2001 for two months, after the Ministry of Education and Presidency of Girls' Education communicated its approval to the schools to encourage them to participate in the study.

The sample was composed of male and female (teachers and administrators). The surveys were given to each principal in girls' and boys' high schools and they distributed

the surveys to those who had a desire to voluntarily participate in answering the questionnaire. The participants were teachers and administrators in Boys' and Girls' schools in Riyadh City. They were given the date that the survey was to be returned. The data was collected from 31 male administrators, 47 female administrators, 43 male teachers, and 57 female teachers. Two surveys were eliminated because they were not completed. The sample was 180 participants with 178 valid responses. Crosstab was an appropriate method used to analyze the data and break it into frequencies and percentages. A multivariate analysis of variance (MANOVA) was used to test the hypotheses of the study.

### *Demographic Analysis*

#### *Participants' Age*

The first question focused on the age of the participants. Table 6 provides information that includes the overall mean age of the participants (33.38 years old), with a standard deviation of 5.347. In general, the participants were young.

Table 7

#### *Overall Mean and Standard Deviation of the Participants' Age (N=141)*

N	Missing	Mean	Std. Deviation
141	37	33.38	5.347

### *Participants' Degrees*

The participants were asked what level of educational degree they hold in their field. Table 2 organized all the information into three categories – community college, bachelor's degree, and master's degree – with each category's percentage. Table 8 shows that most of the participants (89.89%) have obtained a bachelor's degree. Likewise, Figure 6 indicates that the majority of the respondents hold a bachelor's degree. A dash (-) indicates that the cells are empty.

Table 8

### *Distribution of the Participants' Degrees (N=178)*

		Position				
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	Total
Degree	Community college	-	2	3	-	5
		-	40.0%	60.0%	-	100.0%
Bachelor's		30	34	42	54	160
		18.8%	21.3%	26.3%	33.8%	100.0%
Master's		3	5	2	3	13
		23.1%	38.5%	15.4%	23.1%	100.0%

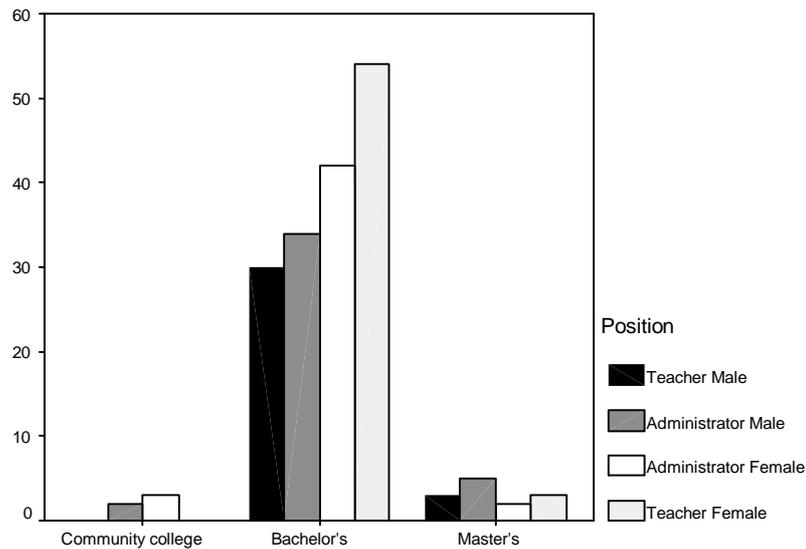


Figure 6. Distribution of the Participants' Degrees.

*Overall Mean and Standard Deviation of the Participants' Major*

The teachers and administrators were asked about the degree that they possessed. Table 9 breaks down the participants' information into various categories depending upon their majors. Thirty-two of the participants majored in Islamic Studies, which represents 18% of the subjects (13 male administrators, 9 female administrators, 7 male teachers and 3 female teachers.) Eleven respondents listed Mathematics as their major, representing 6.2% of the subjects. (1 male administrator, 4 male teachers, and 6 female teachers.) Forty-three of the participants major in Arabic Studies, which represents 24.2% of the subjects (12 male administrators, 10 female administrators, 10 male teachers, and 11 female teachers.) Eleven English as a Second Language had 11 respondents, or 6.2% of the subjects (2 female administrators 4, male teachers and 5 female teachers.) Thirty-three of the participants major in Science, which 18.5% of the

subjects, which included 6 male administrators, 5 female administrators, 7 male teachers, and 15 female teachers. Fourteen of the participants majored in Geography and History, which represents 7.9% of the participants, (4 male administrators, 7 female administrators and 3 female teachers.) Nine of the participants majored in Anthropology, which represents 5.1%, which included 3 male administrators, 4 female administrators and 2 female teachers. One of the participants majored in Psychology, which represents 0.6%, which included 1 female teacher. Five of the participants majored in Administration Science, which represents 2.8% including (1 male administrator and 4 female administrators.) The number of Home Economics participants was 6, or 3.4%, which were (3 female administrators and 3 female teachers.) The number of Laboratory Specialists was 3, or 1.7%, which included (2 female administrators and one female teacher.) Three of the participants majored in Computer Science respondents 1.7%, which included (1 female administrator and two female teachers.) Two of the participants majored in Libraries and Information Science which represents 1.1%, which included (2 female teachers.) Two of the participants majored in Nutrition Science which represents 1.1%, which included (2 female teachers). One of the participants majored in Art, which represents 0.6% which included (1 female teacher).

Table 9

*Distributions of the Participants' Majors (N=176)*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Islamic Studies	32	18.0	18.2	18.2
	Math	11	6.2	6.3	24.4
	Arabic	43	24.2	24.4	48.9
	English	11	6.2	6.3	55.1
	Natural Science	33	18.5	18.8	73.9
	Geography and History	14	7.9	8.0	81.8
	Anthropology	9	5.1	5.1	86.9
	Psychology	1	.6	.6	87.5
	Administrative Science	5	2.8	2.8	90.3
	Homely Economics	6	3.4	3.4	93.8
	Libratory Specialist	3	1.7	1.7	95.5
	Computer Science	3	1.7	1.7	97.2
	Libraries and Information	2	1.1	1.1	98.3
	Nutrition Science	2	1.1	1.1	99.4
	Art	1	.6	.6	100.0
	Total	176	98.9	100.0	
Missing	99	2	1.1		
Total		178	100.0		

*Participants' Experience*

The participants were asked to inform how many years experiences they worked in the school system. Table 10 illustrates the experience information into four categories. The number of responses was 169 with 9 non-responses. The mean is 10.02 years whereas the standard deviation was 5.619.

Table 10

*Overall Mean and Standard Deviation of the Participants' Experience (N=169)*

N	Missing	Mean	Std. Deviation
169	9	10.02	5.619

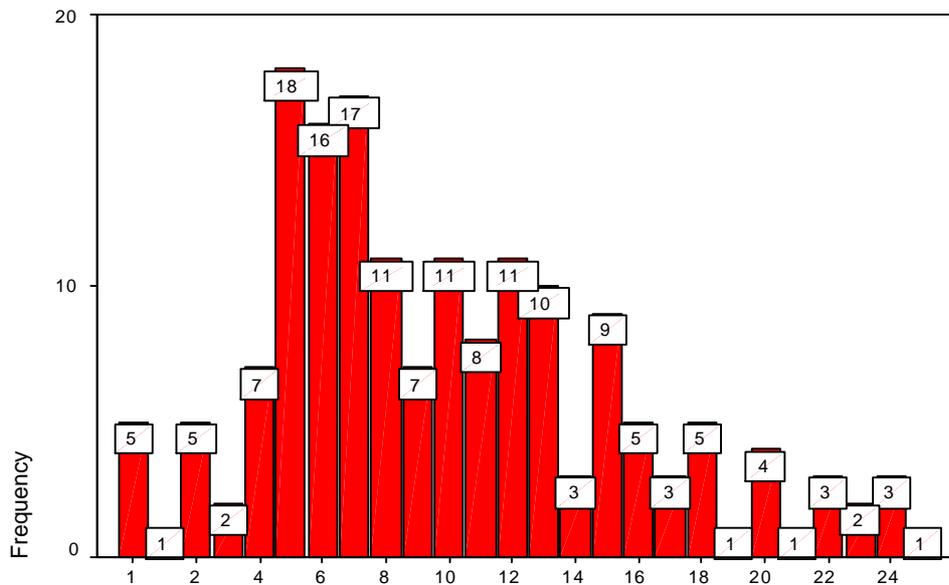


Figure 7. Frequencies of the Participants' Experience.

*Computer Ownership*

This question addressed whether the teachers and administrators possess computers in school, home or both. Table 11 shows the number of respondents of the question was 177 with only one non-response. The mean was 2.09 and the standard deviation was 1.09. Table 11 indicates that there were 11 male administrators, or 13.8%,

and 25 male teachers, or 31.3% who owned a computer at home. There were 11 female administrators, or 13.8%, and 35 female teachers, or 41.3%, who owned a computer at home. There was one male teacher, or 5.3%, and 4 female administrators, or 21%, who use a computer at school. Seven female teachers, or 36.8%, and 7 female administrators, or 36.8% who use a computer at school. Of those who use a computer both at home and school, there were 2 male teachers, or 3.3%, 22 male administrators, or 36.7%, 24 female administrators, or 40%, and 12 female teachers, or 20%. Those who did not have a computer in school or at home consisted of 5 male teachers, or 27.8%, 4 male administrators, or 22.2%, 5 female administrators, or 27.8%, and 4 female teachers, or 22.2%.

The data indicated a minority (10%) of teachers and administrators (male and female) have a computer in school. Figure 8 indicates that few teachers and administrators (female and male) have a computer at school.

Table 11

*Frequencies and percentages of the Participants Computer Ownership at Home and at School (N=177)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
Computer Ownership	Home	25 31.3%	11 13.8%	11 13.8%	33 41.3%	80 100.0%
	School	1 5.3%	4 21.1%	7 36.8%	7 36.8%	19 100.0%
	Both	2 3.3%	22 36.7%	24 40.0%	12 20.0%	60 100.0%
	I do not have	5 27.8%	4 22.2%	5 27.8%	4 22.2%	18 100.0%

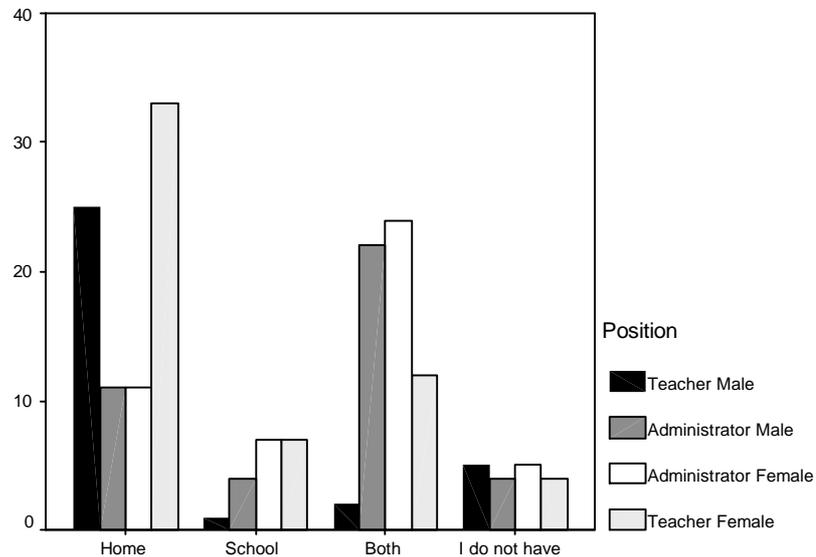


Figure 8. Computer Ownership at Home and at School.

### *Computer Usage*

The participants were asked whether or not they use a computer in school, at home, both or they do not use it. Table 12 gives the information pertaining to computer usage. Twenty-seven 27 male teachers, or 29%, 16 male administrators, or 17.2%, 15 female administrator, or 16.1%, 35 female teachers, or 37.6% reported that they used one at school. Those who used a computer at home were 1 administrator, or 4.5%, 5 male administrators, or 22.7%, 9 female administrators, or 40.9%, and 7 female teachers, or 31.8%. Those who said that they utilize it at both places included 16 male administrators, or 42.1%, 16 female administrators, or 42.1%, and 6 female teachers, or 15.8%. Those who indicated that they do not use it included 5 male teachers, or 20.8%, 4 male administrators, or 16.7%, 7 female administrators, or 29.2%, and 8 female teachers, or

33.3%. A majority of the participants (52.25%) used computers at school consisted primarily of female and male teachers, while 18.08% of male and female administrators and 3.39% of female teachers used it at both. Figure 9 indicates the use of computer technology. A dash (-) indicates that the cells are empty.

Table 12

*Frequencies and Percentage Scores Use of Computer (N=177)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
Computer Usage	School	27	16	15	35	93
		29.0%	17.2%	16.1%	37.6%	100.0%
	Home	1	5	9	7	22
		4.5%	22.7%	40.9%	31.8%	100.0%
	Both	-	16	16	6	38
		-	42.1%	42.1%	15.8%	100.0%
	I do not use it	5	4	7	8	24
		20.8%	16.7%	29.2%	33.3%	100.0%

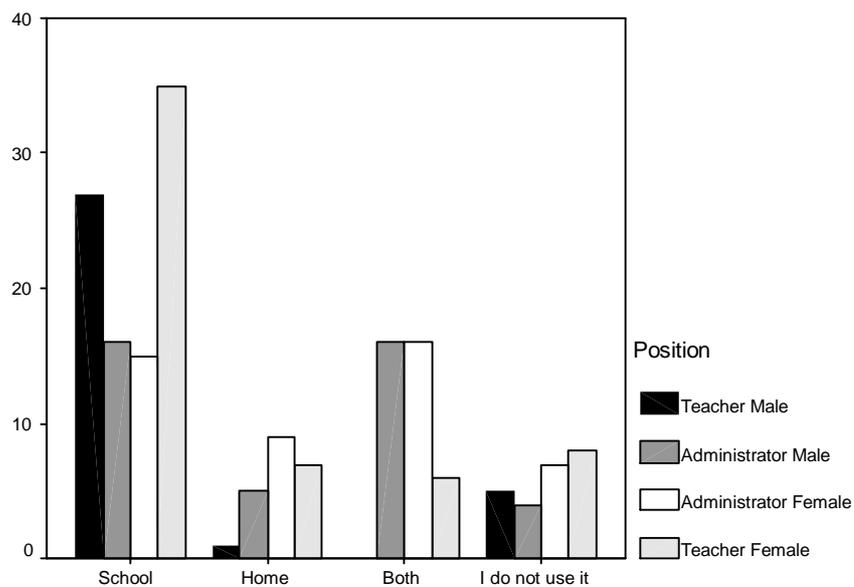


Figure 9. Use of Computer.

*Access to the Internet*

Teachers and administrators were asked whether or not they use the Internet. Table 13 indicates that those who reported a “yes” answer were 18 male teachers, or 19.8%, 21 male administrators, or 23.1%, 23 female administrators, or 25.3%, and 29 female teachers, or 31.9%. Those who replied “no” to this question were 15 male teachers, or 17.4%, 20 male administrators, or 23.3%, 24 female administrators, or 27.9%, and 27 female teachers, or 31.4%. This information indicated that female teachers and administrators were more likely than the male teachers and administrators to use the Internet. Figure 10 shows how the participants use the Internet.

Table 13

*Access to the Internet Based on the Position (N=177)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
Access the Internet	Yes	18 19.8%	21 23.1%	23 25.3%	29 31.9%	91 100.0%
	No	15 17.4%	20 23.3%	24 27.9%	27 31.4%	86 100.0%

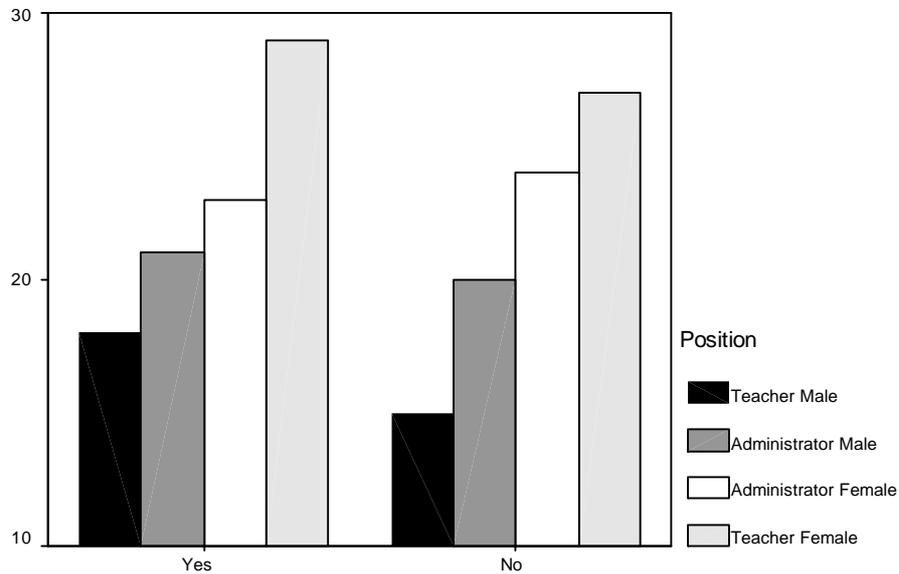


Figure 10. Distribution of Utilizing the Internet Based upon the Participant's Position.

### *Utilizing the Internet*

Utilization of the Internet was divided into four categories – at home, in school, both and not at all. Table 14 indicates that those who used the Internet at home were 17 male teachers, or 20%, 19 male administrators, or 22.4%, 23 female administrators, or 27.1%, and 26 female teachers, or 30.6%. Those who used it at school were 2 male administrators, or 100%. Those who reported that they did not use it were 16 male teachers, or 18%, 19 male administrators, or 21.3%, 24 female administrators, or 27%, and 30 female teachers, or 33.7%. As a result, the data indicates that the Internet was used at home rather than the school. Female teachers and administrators used the Internet more often than male teachers and administrators. Only 2 administrators used it at schools. Figure 11 indicates that most of the participants use it at home and, in general, do not use it at school. A dash (-) indicates that the cells are empty.

Table 14

*Frequencies and Percentage scores of Utilization the Internet Based upon the Participant's Position (N=177)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
Place of the usage of the Internet	Home	17 20.0%	19 22.4%	23 27.1%	26 30.6%	85 100.0%
	School	-	2 100.0%	-	-	2 100.0%
	Both	-	1 100.0%	-	-	1 100.0%
	I do not use it	16 18.0%	19 21.3%	24 27.0%	30 33.7%	89 100.0%

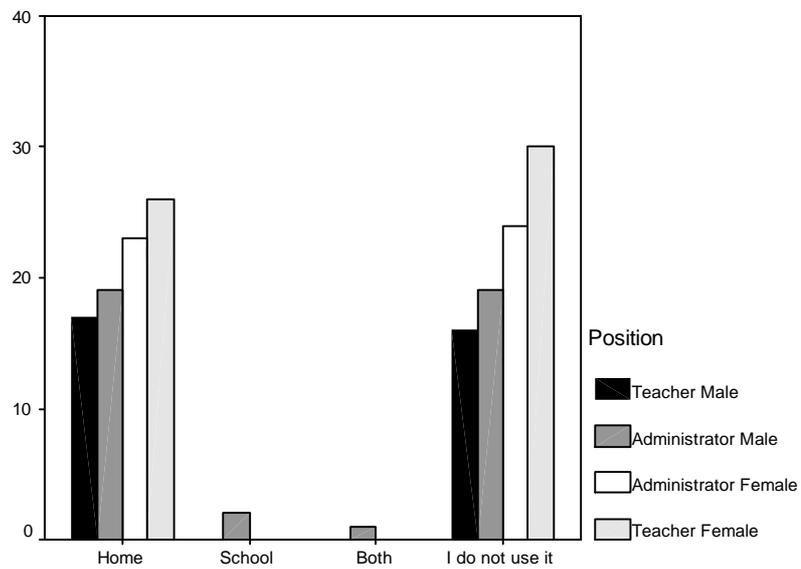


Figure 11. Frequencies and Percentage scores of Utilization of the Internet Based upon Position.

## *Information Technology in Instruction*

### *Students Should Use the Computer in All Curricula*

Teachers and administrators were asked whether or not students should use computer technology in all curricula. There were 176 who responded and only two non-responses. The mean was 2.36 with a standard deviation of 1.15 as shown in Appendix D. Table 15 breaks down the information based upon the scale that was used in the survey and provides the frequency and the percentage of responses. Table 15 shows that those participants who strongly agree with the statement, there were 8 male teachers, or 19.5%; 11 male administrators, or 26.8%; 12 female administrators, or 29.3%; and 10 female teachers, or 24.4%. Of those who agreed with the statement, there were: 16 male teachers, or 20.5%, 22 male administrators, or 28.5%; 16 female administrators, or 20.5%; and 24 female teachers, or 30.8%. Two male teachers, or 11.1%, 6 female administrator, or 33.3%, and 24 female teachers, or 55.6%, were uncertain of their agreement with the statement. The data indicated that 5 male teachers, or 16.1%, 6 male administrators, or 19.4, 10 female administrators, or 32.3%, and 10 female teachers, or 32.3% disagreed. Two male teachers, or 25%, 2 male administrators, or 25%, 2 female administrator, or 25%, and 2 female teachers, or 25% strongly disagreed with the statement that students should use computers in all curricula.

Figure 12 shows that a majority of the participants (66.85%) agree or strongly agree regarding the use of computer technology in all curricula. Male administrators and female administrators were more likely to strongly agree than female and male teachers. Some of the participants (33.15%) were uncertain, disagree and strongly disagree toward employing information technology in school. A dash (-) indicates that the cells are empty.

Table 15

*Frequencies and Percentage Scores of the Participants toward Students Should Use the Computer in All Curricula (N=176)*

		Position				
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	Total
Students should use the computer in all Curricula	SA	8 19.5%	11 26.8%	12 29.3%	10 24.4%	41 100.0%
	A	16 20.5%	22 28.2%	16 20.5%	24 30.8%	78 100.0%
	U	2 11.1%	-	6 33.3%	10 55.6%	18 100.0%
	D	5 16.1%	6 19.4%	10 32.3%	10 32.3%	31 100.0%
	SD	2 25.0%	2 25.0%	2 25.0%	2 25.0%	8 100.0%

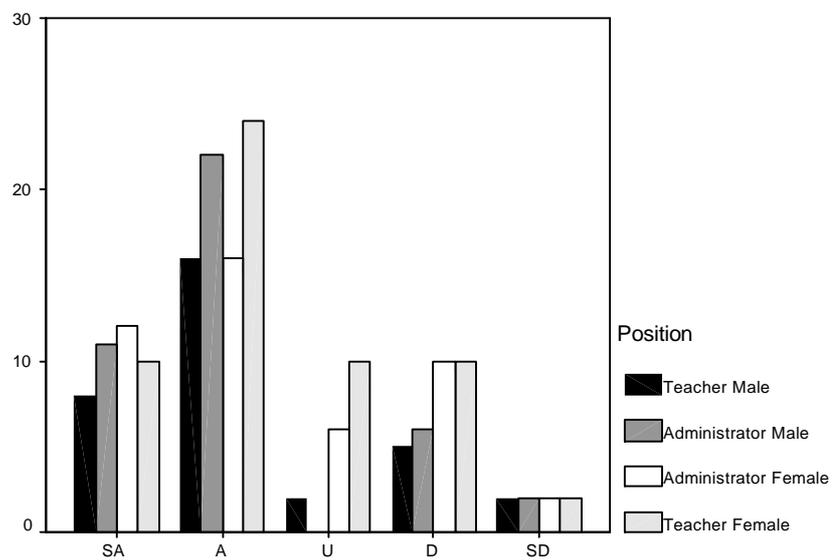


Figure 12. Distribution of the Responses to the statement, “Students Should Use the Computer in All Curricula.”

### *Computer Technologies Are Great Tools to Improve Learning*

This question examined the participants' vision of computer technologies as important tools to supplement learning. Appendix D. indicates that there were 175 who responded and only 3 non-responses. The overall mean was 1.67 with a standard deviation of 0.69 as shown in Appendix D. Table 16 breaks down the information based on the scale that the survey used and provided the frequency and percentage of responses for each part of the scale. According to Table 16, 15 male teachers, or 16%, 16 male administrators, or 21.3%, 20 female administrators, or 26.7%, and 27 female teachers, or 36%, responded that they strongly agreed with the statement, "Computer technologies are great tools to improve learning." Eighteen male teachers, or 20.7%, 22 male administrators, or 25.3%, 24 female administrators, or 27.6%, and 23 female teachers, or 26.4%, chose the answer, agree. Three male teachers, or 30%, 2 male administrators, or 20%, one female administrator, or 10%, and 4 female teachers, or 40%, were uncertain. Only two female teachers chose the response, disagree. One male administrator chose strongly disagree. In general, the most of the participants (90%) emphasized that computer technologies represent a great tool to improve learning. Female administrators and teachers most often asserted that computer technologies support learning. Those who thought that computer technologies did not support learning or were not certain was 9%. A dash (-) indicates that the cells are empty.

Table 16

*Frequencies and Percentage Scores of Participants' Perception that Computer Technologies Are Great Tools to Improve Learning (N=175)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
Computer technologies are great tools to improve learning	SA	12 16.0%	16 21.3%	20 26.7%	27 36.0%	75 100.0%
	A	18 20.7%	22 25.3%	24 27.6%	23 26.4%	87 100.0%
	U	3 30.0%	2 20.0%	1 10.0%	4 40.0%	10 100.0%
	D	-	-	-	2 100.0%	2 100.0%
	SD	-	1 100.0%	-	-	1 100.0%
		-		-	-	100.0%

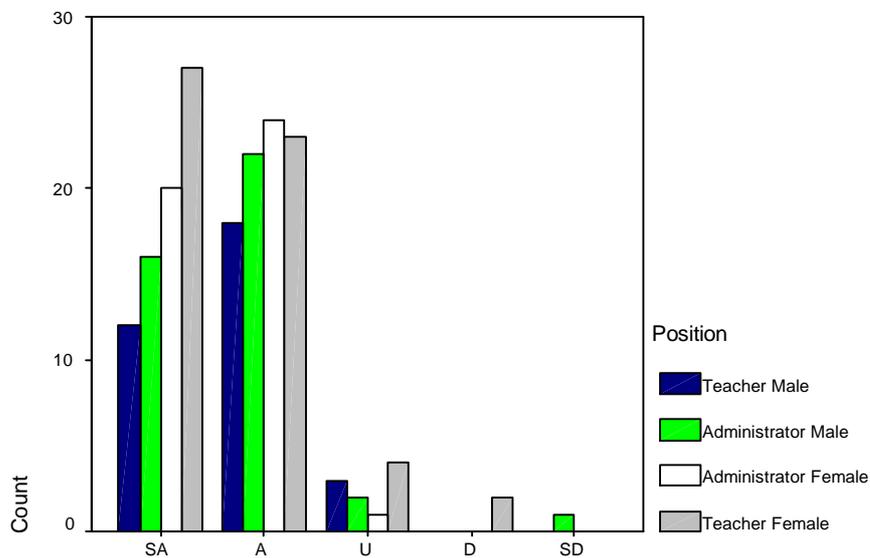


Figure 13. Distribution of the Responses to the statement, “Participants Perceptions that Computer Technologies Are Great Tool to Improve Learning.”

### *Using Drill and Practice Computer Applications Will Improve Learning*

This question provided information that indicates the administrators and teachers perceptions as to whether using drill and practice computer applications improves learning. Appendix D. indicates that there were 177 responses with one response missing. The overall mean was 1.58 with a standard deviation of 0.71 as shown in Appendix D. Table 17 illustrates the information based upon the scale used in the survey and provides the frequency and percentage of the responses. It shows that 18 male teachers, or 19.4%, 20 male administrators, or 21.5%, 26 female administrators, or 28%, and 29 female teachers, or 31.2% responded strongly agreed with the statement, "Using drill and practice computer applications will improve learning." Eleven male teachers, or 15.9%, 20 male administrators, or 29%, 16 female administrators, or 23.2%, and 22 female teachers, or 31.9%, chose the answer agree. Three male teachers, or 27.3%, one male administrator, or 9.1%, 4 female administrators, or 36.4%, and 3 female teachers, or 27.3%, chose the answer uncertain. On the other hand, there were one female administrator, or 25%, and three female teachers, or 75%, chose the response disagree. None of the respondents reported that they strongly disagreed with this statement. The majority of the participant, representing 90%, stated that utilizing drill and practice applications was appropriate to improve learning. Only 10 % of the participants were uncertain or disagree that employing computer technologies in the classroom enhanced learning. A dash (-) indicates that the cells are empty.

Table 17

*Frequencies and Percentage of Participants' Perceptions toward Using Drill and Practice Computer Applications Will Improve Learning (N=177)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
Using drill and practice computer applications will improve learning	SA	18	20	26	29	93
		19.4%	21.5%	28.0%	31.2%	100.0%
	A	11	20	16	22	69
		15.9%	29.0%	23.2%	31.9%	100.0%
	U	3	1	4	3	11
		27.3%	9.1%	36.4%	27.3%	100.0%
	D	-	-	1	3	4
		-	-	25.0%	75.0%	100.0%

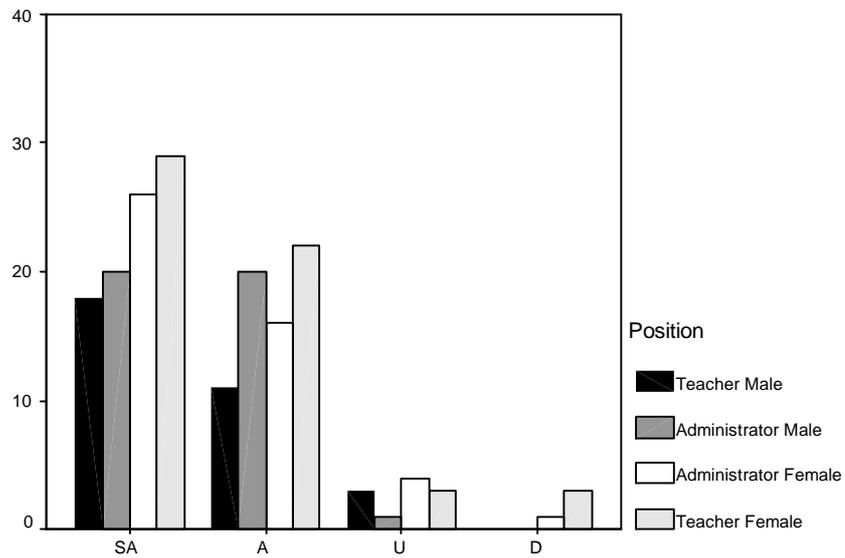


Figure 14. Distribution of the Responses to the statement, “Using Drill and Practice Computer Applications Will Improve Learning.”

*Using Computer Technology in the Classroom Makes Subject Matter Interesting*

This question asked if computer technology makes the subject matter interesting. Table 18 illustrates the information based upon the scale used in the survey and provides the frequency and percentage of responses. There were 178 responses. The overall mean was 1.61 with a standard deviation of 0.76 as shown in Appendix D. Table 18 shows the responses of the participants. Fifteen male teachers, or 15.8%, 22 male administrators, or 23.2%, 26 female administrators, or 27.4%, and 32 female teachers, or 33.7%, responded that they strongly agreed with the statement that “Using computer technology in the classroom makes subject matter more interesting.” Twelve male teachers, or 19.7%, 13 male administrators, or 21.3%, 17 female administrators, or 27.9%, and 19 female teachers, or 31.1%, chose the answer agree. Four male teachers, or 22.2%, 6 male administrators, or 33.3%, 3 female administrators, or 16.7%, and 5 female teachers, or 27.8%, chose the answer uncertain. There were two male teachers, one female administrator, and one female teacher who chose the response disagree, and no one chose the response strongly disagree. The majority of the participants, or 87.64%, asserted that computer technologies in classroom make subject matter interesting. Those who were uncertain or who disagree represented 12.36% of the respondents. Figure 15 shows that more female administrators and teachers strongly agreed and agreed than male administrators and male teachers. Only a few participants (22) were uncertain or disagreed. A dash (-) indicates that the cells are empty.

Table 18

*Frequencies and Percentage Scores of the Participants' Perception toward Using Computer Technology in the Classroom Makes Subject Matter Interesting (N=178)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
Using computer technology in the classroom makes subject matter interesting	SA	15 15.8%	22 23.2%	26 27.4%	32 33.7%	95 100.0%
	A	12 19.7%	13 21.3%	17 27.9%	19 31.1%	61 100.0%
	U	4 22.2%	6 33.3%	3 16.7%	5 27.8%	18 100.0%
	D	2 50.0%	- -	1 25.0%	1 25.0%	4 100.0%

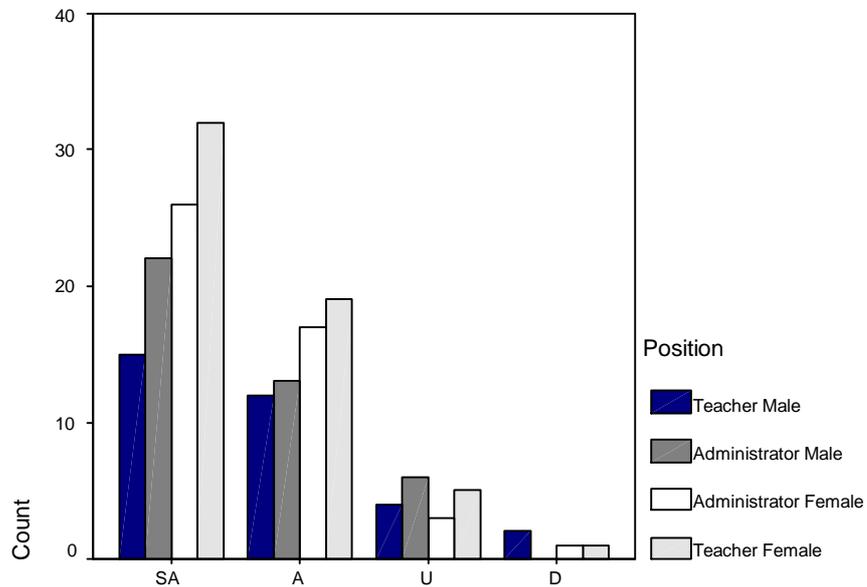


Figure 15. Distribution of the Responses to the statement “Using Computer Technology in the Classroom Makes Subject Matter Interesting.”

### *Information Technology Assists Students in Problem Solving*

This question was asked in order to provide information as to whether administrators and teachers perceive that information technology assists students in problem solving. Table 19 illustrates the information based on the scale used in the survey and provides the frequency and percentage of the responses. There were 178 who responded. The overall mean was 1.84 with a standard deviation of 0.78 as shown in Appendix D Table 19 shows the responses of the participants. Ten male teachers, or 15.4%, 16 male administrators, or 24%, 16 female administrators, or 24.6%, and 23 female teachers, or 35.4%, responded that they strongly agree with the statement that information technology assists students in problem solving. Sixteen male teachers, or 19.8%, 18 male administrators, or 22.2%, 24 female administrators, or 29.6%, and 23 female teachers, or 28.4%, chose the answer agree. Five male teachers, or 17.9%, 7 male administrators, or 25%, 6 female administrators, or 21.4%, and 10 female teachers, or 35.7%, chose the answer uncertain. Two male teachers and one female administrator chose the response disagree, while only one female administrator responded that she strongly disagreed with the statement. A majority of the participants, or 82%, affirmed that information technologies play important roles in problem solving. Figure 16 shows that more female teachers supported the information technologies impact in problem solving than male teachers whereas more of the female teachers reported that they were uncertain than any of the other groups. A dash (-) dash indicates that the cells are empty.

Table 19

*Frequencies and Percentage Scores of Participants' Perception toward that Information Technology Assists Students in Problem Solving (N=177)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
Information technology assists students in problem solving	SA	10	16	16	23	65
		15.4%	24.6%	24.6%	35.4%	100.0%
	A	16	18	24	23	81
		19.8%	22.2%	29.6%	28.4%	100.0%
	U	5	7	6	10	28
		17.9%	25.0%	21.4%	35.7%	100.0%
	D	2	-	-	1	3
		66.7%	-	-	33.3%	100.0%
	SD	-	-	1	-	1
		-	-	100.0%	-	100.0%

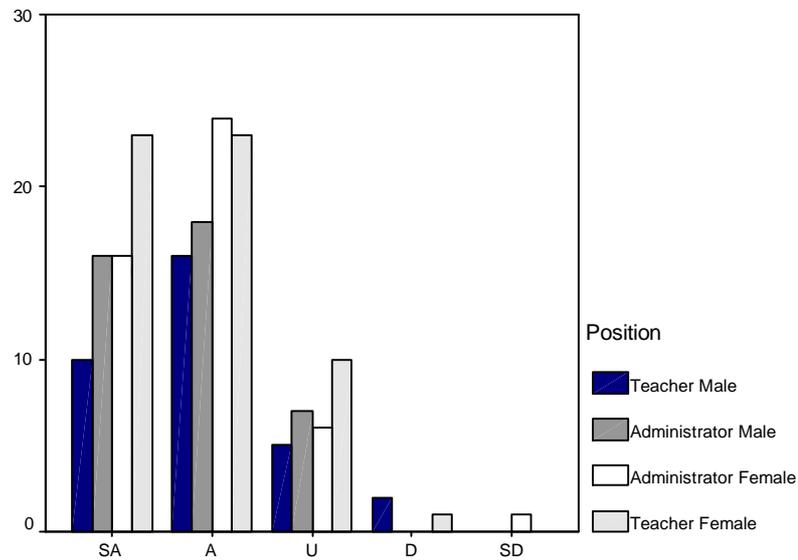


Figure 16. Distribution of the Responses to the statement, “Information Technology Assists Students in Problem Solving.”

*Using the World Wide Web (WWW) in Instruction Helps to Access Many Different Types of Information.*

This question discussed the importance of the World Wide Web for instruction that can supply various types of information to enhance instruction. Table 20 breaks down the information based on the scale used in the survey and provides the frequency and percentage of responses. Appendix D. indicated that there were 177 responses with only one non-response. The overall mean was 2.36 with a standard deviation of 1.15 as shown in Appendix D. Table 19 that 15 male teachers, or 18.5%, 20 male administrators, or 24.7%, 18 female administrators, or 22.2%, and 28 female teachers, or 34.6%, who responded that they strongly agree with the statement, "Information technology assists students in problem solving." Thirteen male teachers, or 20.6%, 11 male administrators, or 17.5%, 21 female administrators, or 33.3%, and 18 female teachers, or 28.6%, chose the answer agree whereas 2 male teachers, or 10%, 7 male administrators, or 35%, 4 female administrators, or 20%, and 7 female teachers, or 35%, chose the answer uncertain. There was one male teacher, or 10%, one male administrator, or 10%, 4 female administrators, or 40%, and 4 female teachers, or 40%, who chose the response disagree. Only one male teacher and one male administrator responded, strongly disagree. The majority of the participants (80.9%) maintained that use of the WWW enhanced instruction. Of the participants 11.24% were uncertain and 6.86% disagree or strongly disagree. Figure 17 shows that female administrators and teachers constituted the majority of those who support the use of the WWW in instruction. A dash (-) indicates that the cells are empty.

Table 20

*Frequencies and Percentage Scores of Participants' Perception toward Using the World Wide Web (WWW) in Instruction Helps to Access Many Different Types of Information (N=177)*

		position				
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	Total
Using the WWW in instruction helps to access many different types of information sources	SA	15	20	18	28	81
		18.5%	24.7%	22.2%	34.6%	100.0%
	A	13	11	21	18	63
		20.6%	17.5%	33.3%	28.6%	100.0%
	U	2	7	4	7	20
		10.0%	35.0%	20.0%	35.0%	100.0%
	D	1	1	4	4	10
		10.0%	10.0%	40.0%	40.0%	100.0%
	SD	1	2	-	-	3
		33.3%	66.7%	-	-	100.0%

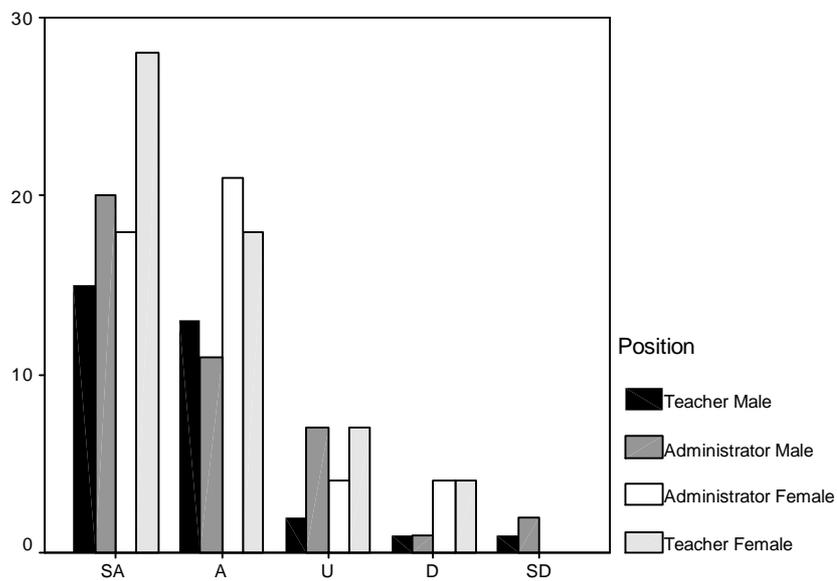


Figure 17. Distribution of the Responses to the statement, “Using the World Wide Web in Instruction Helps to Access Many Different Types of Information.”

### *Using Multimedia Is Important in Enhancing Learning and Teaching*

The use of multimedia in the classroom allows students to use various senses in teaching and learning. Table 21 breaks down information based on the scale that it was used in the survey and provides frequency and percentage of responses. There were 178 responses. The overall mean was 1.85 with a standard deviation of 0.77 as shown in Appendix D. The responses of the participants were provided in Table 21. There were 7 male teachers, or 11.3%, 15 male administrators, or 24.2%, 19 female administrators, or 30.6%, and 21 female teachers, or 33.9%, who responded that they strongly agreed with the statement that “using multimedia is important in enhancing learning and teaching.” Twenty male teachers, or 23.3%, 21 male administrators, or 24.4%, 18 female administrators, or 20.9%, and 27 female teachers, or 31.4%, chose the answer agree. Six male teachers, or 25%, 5 male administrators, or 20.8%, 6 female administrators, or 25.8%, and 7 female teachers, or 29.2%, chose the answer uncertain. Four female administrators and two female teachers chose the response disagree. No one strongly disagree. The majority of the participant, or 83.15%, asserted that multimedia influences learning. Whereas 13.48% reported that they were uncertain and 3.37% of the participants said they disagreed. Figure 17 showed that significantly more female teachers claimed that the employing multimedia enhances teaching and learning than male teachers did. A dash (-) indicates that the cells are empty.

Table 21

*Frequencies and Percentage Scores of the Participants toward Using Multimedia is Important in Enhancing Learning and Teaching (N=178)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
Using multimedia is important in enhancing learning and teaching	SA	7 11.3%	15 24.2%	19 30.6%	21 33.9%	62 100.0%
	A	20 23.3%	21 24.4%	18 20.9%	27 31.4%	86 100.0%
	U	6 25.0%	5 20.8%	6 25.0%	7 29.2%	24 100.0%
	D	- -	- -	4 66.7%	2 33.3%	6 100.0%

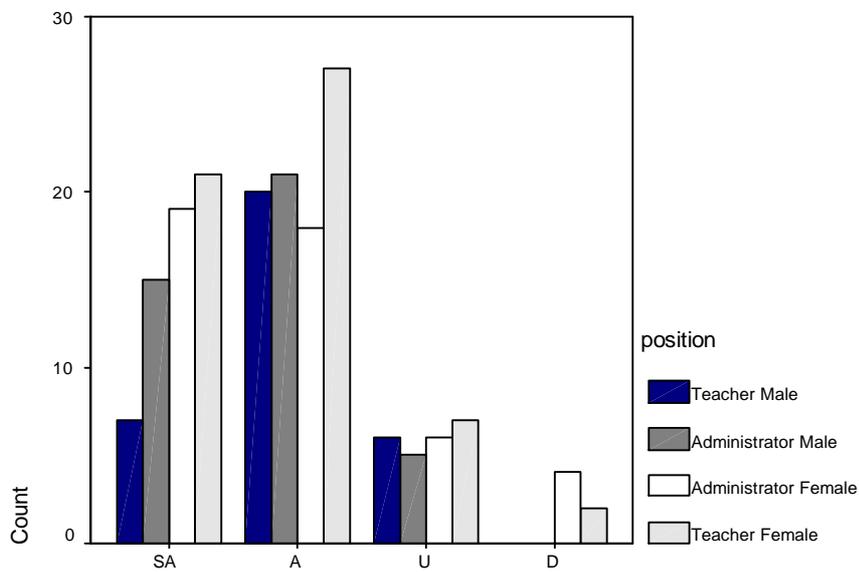


Figure 18. Distribution of the Responses to the statement, “Using Multimedia is Important in Enhancing Learning and Teaching.”

### *Using the Internet in the Classroom Enhances Teaching and Learning*

This question examined the participants' perceptions toward using the Internet in the classroom during teaching and learning and its impact. Table 22 illustrated the information based upon the scale used in the survey and provides the frequencies and percentages of the responses. There were 176 responses and two non-responses, the overall mean was 2.48 with a standard deviation of 1.09 as shown in Appendix D. Table 22 shows that the responses of the participants included 3 male teachers, or 8.8%, 11 male administrators, or 32.4%, 7 female administrators, or 20.6%, and 13 female teachers, or 38.2%, who responded that they strongly agree with the statement that using the Internet in the classroom enhances learning and teaching. Fifteen male teachers, or 23.4%, 9 male administrators, or 14.1%, 14 female administrators, or 21.9%, and 26 female teachers, or 40.6%, chose the answer agree. Whereas 8 male teachers, or 17.8%, 12 male administrators, or 26.7%, 16 female administrators, or 35.6%, and 9 female, or 20%, who chose the answer uncertain. There were 4 male teachers, or 16%, 5 male administrator, or 20%, 8 female administrator, or 32%, and 8 female teachers, or 32%, who chose the response disagree. 3 male teachers, or 37.5%, 3 male administrators, or 37.5%, one female administrator, or 12.5%, and one female teacher, or 12.5% responded that they strongly disagree with the statement. Overall, 55.68% of the participants stated that use of the Internet enhances learning and teaching. Of the remainder, 25.57% of the participants stated that they were uncertain, 14.20% of the participants stated that they disagree, and 4.56% strongly disagreed. Figure 19 shows that female teachers' assertion that the Internet has positive influences was significantly larger than that of the male

teachers. A large number of female and male administrators reported that they were uncertain whether the Internet enhances teaching and learning.

Table 22

*Frequencies and Percentage Scores of the Participants toward Using the Internet in the Classroom Enhances Teaching and Learning (N=176)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
Using the Internet in the classroom enhances teaching and learning	SA	3	11	7	13	34
		8.8%	32.4%	20.6%	38.2%	100.0%
	A	15	9	14	26	64
		23.4%	14.1%	21.9%	40.6%	100.0%
	U	8	12	16	9	45
		17.8%	26.7%	35.6%	20.0%	100.0%
	D	4	5	8	8	25
		16.0%	20.0%	32.0%	32.0%	100.0%
	SD	3	3	1	1	8
		37.5%	37.5%	12.5%	12.5%	100.0%

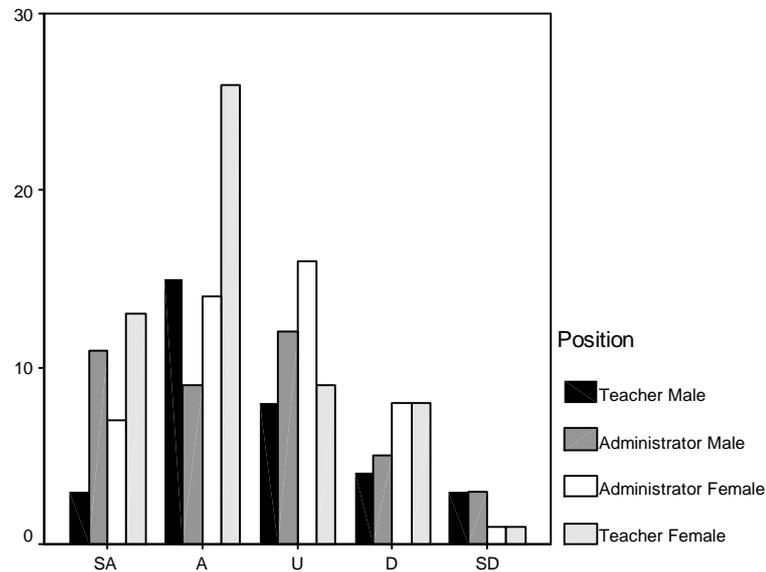


Figure 19. Distribution of the Responses to the statement, “Using the Internet in the Classroom Enhances Teaching and Learning.”

*Using Email and a Listserv Increases the Exchange of Information Between Teacher and Students.*

This question focused on how communication tools influence the distribution of information among teachers and students. There were 176 responses and two non-responses. The overall mean was 2.13 with a standard deviation of 0.93 as shown in Appendix D. Table 23 breaks down the information based upon the scale used in the survey and provides the frequencies and percentages of the responses. Of the participants, there were 8 male teachers, or 18.2%, 13 male administrators, or 29.5%, 10 female administrators, or 22.7%, and 13 female teachers, or 29.5%, who responded that they strongly agree with the statement that using email and a listserv increases the exchange of information between teacher and students. Fifteen male teachers, or 17.2%, 23 male

administrators, or 26.4%, 26 female administrators, or 29.9%, and 23 female teachers, or 26.4%, chose the answer agree whereas 5 male teachers, or 19.2%, 4 male administrators, or 15.4%, 6 female administrators, or 23.1%, and 11 female teachers, or 42.3%, chose the answer uncertain. Three male teachers, one male administrator, 5 female administrator, and 8 female teachers chose the response disagree, and only one male teacher chose strongly disagree. A total of 74.43% of the participants emphasized that communication tools increase the exchange of information between teachers and students. Only 14.77% of the participants reported that they were uncertain, 9.66% of the participants reported that they disagree, and 1.14% strongly disagree. Figure 20 shows that female administrators, male administrators, and female teachers asserted that communication tools are significant in teaching and learning more than the male teachers did. More female teachers reported that they were uncertain or disagree than the other participants. A dash (-) indicates that the cells are empty.

Table 23

*Frequencies and Percentage Scores of Participants toward Using Email and a Listserv Increases the Exchange of Information between Teacher and Students (N=176)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
Using email and a listserv increases the exchange of information between teachers and students	SA	8	13	10	13	44
		18.2%	29.5%	22.7%	29.5%	100.0%
	A	15	23	26	23	87
		17.2%	26.4%	29.9%	26.4%	100.0%
	U	5	4	6	11	26
		19.2%	15.4%	23.1%	42.3%	100.0%
	D	3	1	5	8	17
		17.6%	5.9%	29.4%	47.1%	100.0%
	SD	1	-	-	1	2
		50.0%	-	-	50.0%	100.0%

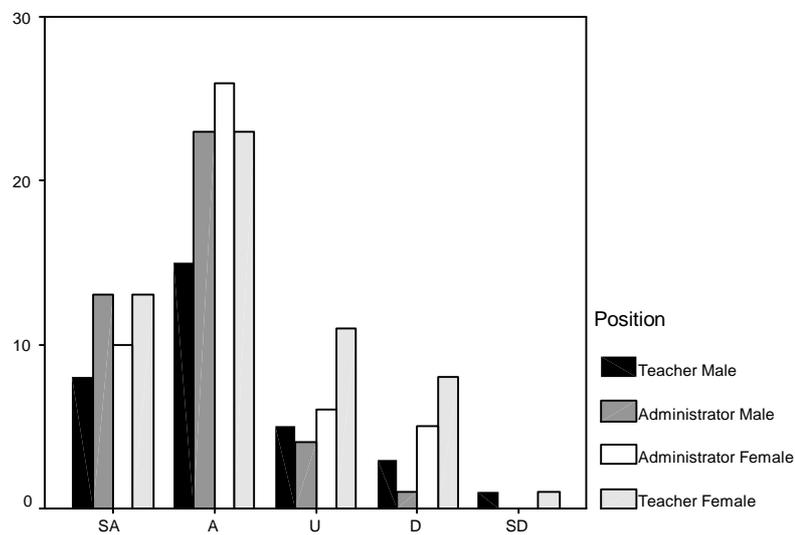


Figure 20. Distribution of the Responses to the statement, “Using Email and a Listserv Increases the Exchange of Information between Teacher and Students.”

### *Computer Technology in Education Motivates Students to Learn*

This question focused on whether computer technology motivates students to learn. Table 24 indicates that there were 177 responses and one non-response. The overall mean was 1.72 with a standard deviation of 0.69 as shown in Appendix D. Table 24 illustrates the information based upon the scale used in the survey and provides the frequencies and percentages of responses. Of the participants, 8 male teachers, or 11.3%, 20 male, or 28.2%, 21 female administrators, or 29.6%, and 22 female teachers, or 31%, responded that they strongly agree with the statement that computer technology in education motivates students to learn. Twenty male teachers, or 23%, 17 male administrators, or 19.5%, 23 female administrators, or 26.4%, and 27 female teachers, or 31%, agreed with the statement. Whereas 4 male teachers, or 25%, 2 male administrators, or 12.5%, 2 female administrators, or 12.5%, and 8 female teachers, or 50%, were uncertain. Two male administrators and one female administrator disagree, though no one strongly disagree. None of the participants reported strongly disagree. Overall, 89.27% of the participants believed that computer technology motivates students to learn, while 9.04% reported that they were uncertain and 1.69% disagree. In Figure 21, the majority of the participants agreed that the use of computer technologies has positive effects on students' motivation. The majority of the participants who said they were uncertain were female teachers. A dash (-) indicates that the cells are empty.

Table 24

*Frequencies and Percentage Scores of the Participants toward Computer Technology in Education to Motivates Students to Learn (N=177).*

		Position				
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	Total
Computer technology in education motivates students to learn	SA	8	20	21	22	71
		11.3%	28.2%	29.6%	31.0%	100.0%
	A	20	17	23	27	87
		23.0%	19.5%	26.4%	31.0%	100.0%
	U	4	2	2	8	16
		25.0%	12.5%	12.5%	50.0%	100.0%
	D	-	2	1	-	3
		-	66.7%	33.3%	-	100.0%

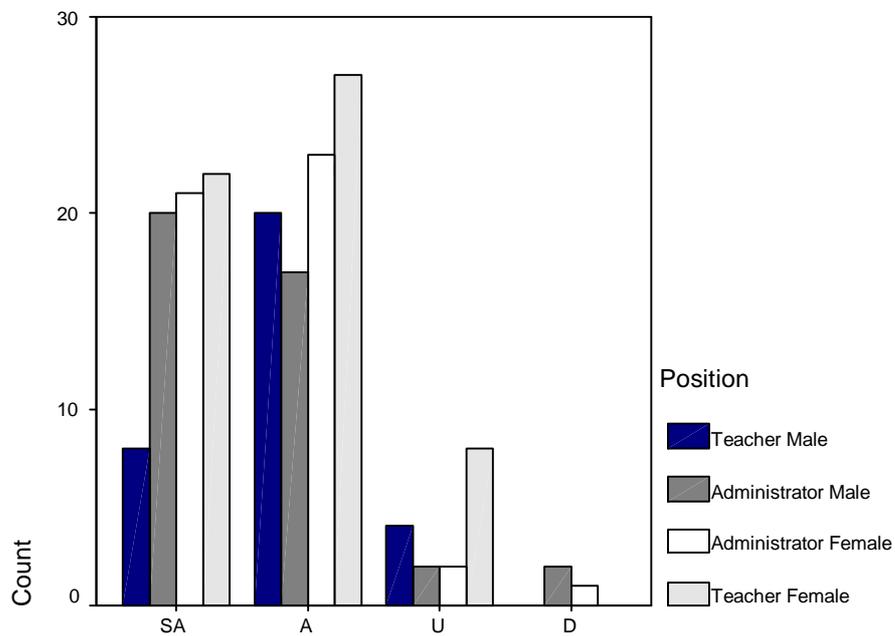


Figure 21. Distribution of the Responses to the statement that “Computer Technology in Education Motivates Students to Learn.”

### *The Web Enhances Content*

This question examined the perceptions of the administrators and teachers toward the statement that the web enhances content. There were 176 responses and two non-responses. The overall mean was 2.10 with a standard deviation of 1.00 as shown in Appendix D. Table 25 breaks down the information based upon the scale used in the survey and provides frequencies and percentages of responses. There were 7 male teachers, or 12.3%, 18 male administrators, or 31.6%, 11 female administrators, or 19.3%, and 21 female teachers, or 36.8%, who responded that they strongly agree with the statement that the Web enhances content. Twelve male teachers, or 18.5%, 13 male administrators, or 20%, 20 female administrators, or 30.8%, and 20 female teachers, or 30.8%, chose the answer agree, while 11 male teachers, or 28.9%, 5 male administrators, or 13.2%, 11 female administrators, or 28.9%, and 11 female teachers, or 28.9%, were uncertain. One male teacher, or 8.3%, 2 male administrators, or 16.7%, 5 female administrators, or 41.7%, and 4 female, or 33.3%, chose the response disagree, and only 2 male teachers and 2 male administrators chose strongly disagree. Overall, 69.32% of the participants reported that the Web enhances content, while 21.59% were uncertain, 6.82% disagree, and 2.27% strongly disagree. The distribution of the female and male respondents who reported that they disagree and strongly disagree was almost equal. Figure 22 provides information that most of the participants asserted that the Web enhances content. A dash (-) indicates that the cells are empty.

Table 25

*Frequencies and Percentage Scores of the Participants toward the Web Enhances Content (N=176)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
The Web enhances the content	SA	7 12.3%	18 31.6%	11 19.3%	21 36.8%	57 100.0%
	A	12 18.5%	13 20.0%	20 30.8%	20 30.8%	65 100.0%
	U	11 28.9%	5 13.2%	11 28.9%	11 28.9%	38 100.0%
	D	1 8.3%	2 16.7%	5 41.7%	4 33.3%	12 100.0%
	SD	2 50.0%	2 50.0%	-	-	4 100.0%

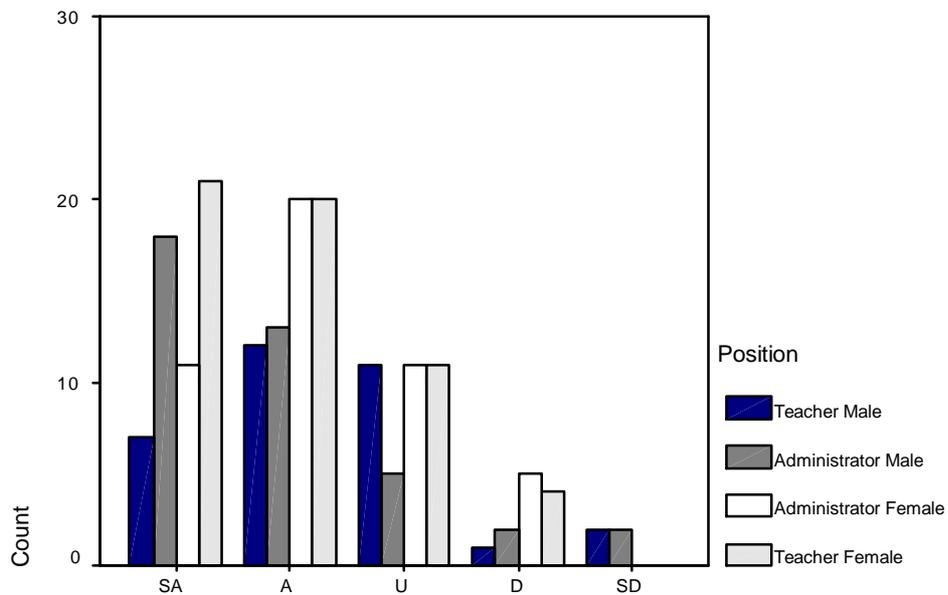


Figure 22. Distribution of the Responses to the statement, “The Web Enhances Content.”

### *Information Technology Supports Cooperative Learning*

This question examined the perceptions of the administrators and teachers as to whether information technology encourages students to work in cooperative learning situations. There were 178 responses. The overall mean was 1.90 with a standard deviation of 0.83 as shown in Appendix D. Table 26 illustrates the information based upon the scale used in the survey and provides the frequencies and percentages of the responses. Of the 178 respondents, 9 male teachers, or 15%, 18 male administrators, or 30%, 16 female administrators, or 26.7%, and 17 female teachers, or 28.3%, responded that they strongly agreed with the statement that information technology supports cooperative learning. Eighteen male teachers, or 21.4%, 19 male administrators, or 22.6%, 21 female administrators, or 25%, and 26 female teachers, or 31%, chose the answer agree. Whereas 4 male teachers, or 14.8%, 3 male administrators, or 11.1%, 7 female administrators, or 25.9%, and 13 female teachers, or 48.1%, chose the answer uncertain. One male teacher, or 20%, 3 female administrators, or 60%, and one female teacher, or 20%, chose the response disagree. Only one male teacher and one male administrator chose strongly disagree. Overall, 80.9% of the participants reported that information technology supplements cooperative learning, 15.17% of the participants reported that they were uncertain, and 3.92% disagree or strongly disagree. Figure 23 shows that the majority of the respondents asserted the importance of information technology in cooperative learning. It also shows that female teachers were substantially more uncertain than the other participants. A dash (-) indicates that the cells are empty.

Table 26

*Frequencies and Percentage Scores of Participants toward that Information Technology Supports Cooperative Learning (N=178)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
Information technology supports cooperative learning	SA	9	18	16	17	60
		15.0%	30.0%	26.7%	28.3%	100.0%
	A	18	19	21	26	84
		21.4%	22.6%	25.0%	31.0%	100.0%
	U	4	3	7	13	27
		14.8%	11.1%	25.9%	48.1%	100.0%
	D	1	-	3	1	5
		20.0%	-	60.0%	20.0%	100.0%
	SD	1	1	-	-	2
		50.0%	50.0%	-	-	100.0%

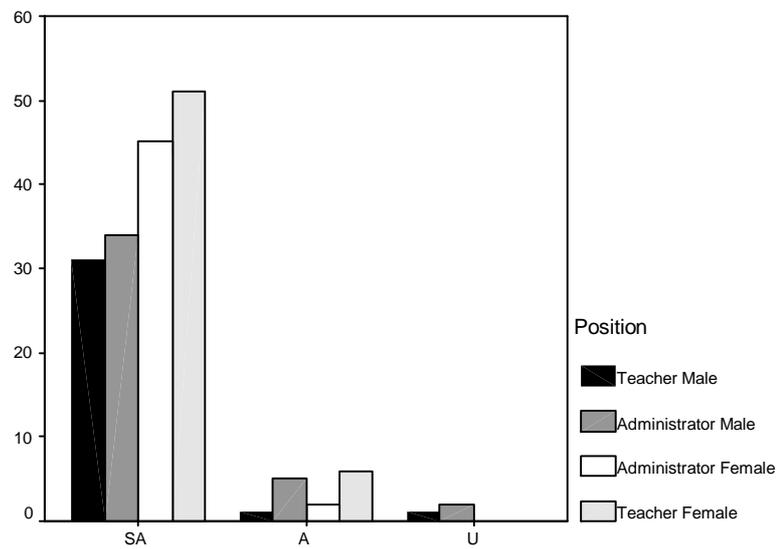


Figure 23. Distribution of the Responses to the statement, “Information Technology Supports Cooperative Learning.”

*Using Computers in the Classroom in Instruction Helps to Construct the Knowledge of the Students*

This question discussed the use of computer technologies in instruction to help students to construct new knowledge. There were 175 responses and 3 non-responses. The overall mean was 1.80 with a standard deviation of 0.71 as shown in Appendix D. Table 27 breaks down the information based upon the scale used in the survey and provides frequencies and percentages of the responses. Of the respondents, 9 male teachers, or 14.3%, 18 male administrators, or 28.6%, 19 female administrators, or 30.2%, and 17 female teachers, or 27%, who responded that they strongly agreed with the statement that using computers in the classroom in instruction helps to construct the knowledge of the students. Twenty male teachers, or 23.3%, 15 male administrators, or 17.4%, 19 female administrator, or 22.1%, and 32 female teachers, or 37.2%, chose agree. Whereas 3 male teachers, or 12.5%, 6 male administrators, or 25%, 7 female administrator, or 29.2%, and 8 female teachers, or 33.3%, chose uncertain. One male administrator and one female administrator disagreed with the statement. Overall, 85.14% of the participants indicated that using computer technology in instruction helps to construct the knowledge of the students. Whereas 13.71% of the participants were uncertain and 1.14% disagreed. Figure 24 shows female teachers overwhelmingly asserted that utilizing computer technology in the classroom helps construct the knowledge of the students. A dash (-) indicates that the cells are empty.

Table 27

*Frequencies and Percentage Scores of Participants' Perception toward Using Computers in the Classroom in Instruction Helps to Construct Knowledge of Students (N=175)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
Using computers in the classroom in instruction helps to construct knowledge of students	SA	9	18	19	17	63
		14.3%	28.6%	30.2%	27.0%	100.0%
	A	20	15	19	32	86
		23.3%	17.4%	22.1%	37.2%	100.0%
	U	3	6	7	8	24
		12.5%	25.0%	29.2%	33.3%	100.0%
	D	-	1	1	-	2
		-	50.0%	50.0%	-	100.0%

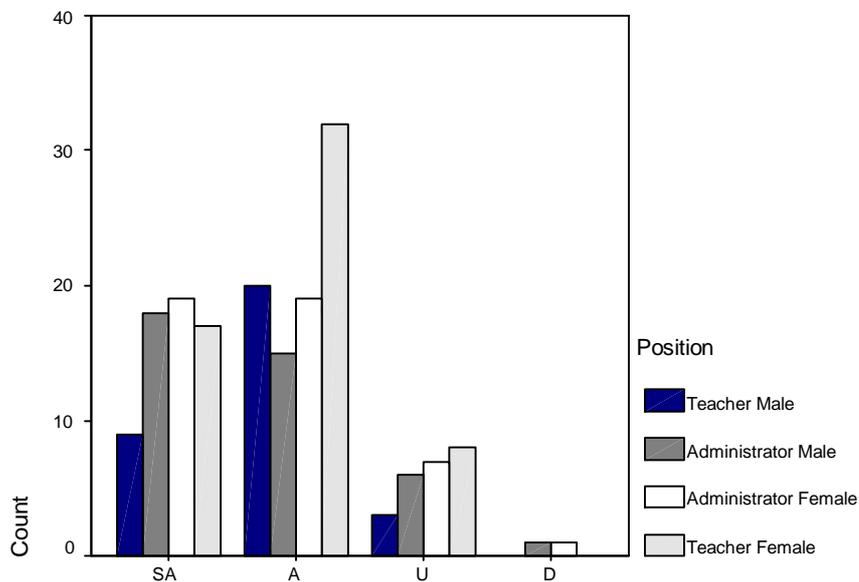


Figure 24. Distribution of the Responses to the statement, “Using Computers in the Classroom in Instruction Helps to Construct Knowledge of Students.”

### *All Teachers Should Use Information Technology in Instruction*

This question examined the perceptions of the administrators and teachers toward employing information technology in teaching activities in order to provide information that the students needed. There were 178 responses. The overall mean was 2.12 with a standard deviation of 0.94 as shown in Appendix D. Table 28 breaks down the information based upon the scale used in the survey and the frequencies and percentages of the responses. Of the participants, 7 male teachers, or 14.9%, 12 male administrators, or 25.5%, 12 female administrators, or 25.5%, and 16 female teachers, or 34% responded that they strongly agreed with the statement that all teachers should use information technology in instruction. Eighteen male teachers, or 21.4%, 23 male administrators, or 27.4%, 20 female administrators, or 23.8%, and 23 female teachers, or 27.4%, agree. Whereas 7 male teachers, or 25%, 3 male administrators, or 10.7%, 6 female administrators, or 21.4%, and 12 female teachers, or 42.9%, were uncertain. One male teacher, or 5.9%, 3 male administrators, or 17.6%, 8 female administrators, or 47.1%, and 5 female teachers, or 29.4%, disagree, while only one female administrator and one female teacher chose to strongly disagree. Overall, 73.6% of the participants asserted that all teachers should use information technology in instruction, 15.73% reported they were uncertain whether or not information technology could be used by all teachers in instruction, 9.55% reported they disagree with the statement and 1.12% strongly disagree that information technology should be used by all teachers in instruction. Figure 25 shows that more female teachers and male administrators supported using information technology in instruction than the other participants. A large number of female teachers

reported that they were uncertain whether all teachers should employ the use of information technology in instruction. A dash (-) indicates that the cells are empty.

Table 28

*Frequencies and Percentage Score of the Participants' Perception toward that All Teachers should Use Information Technology in Instruction (N=175)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
All teachers should use information technology in instruction	SA	7 14.9%	12 25.5%	12 25.5%	16 34.0%	47 100.0%
	A	18 21.4%	23 27.4%	20 23.8%	23 27.4%	84 100.0%
	U	7 25.0%	3 10.7%	6 21.4%	12 42.9%	28 100.0%
	D	1 5.9%	3 17.6%	8 47.1%	5 29.4%	17 100.0%
	SD	-	-	1 50.0%	1 50.0%	2 100.0%
		-	-			

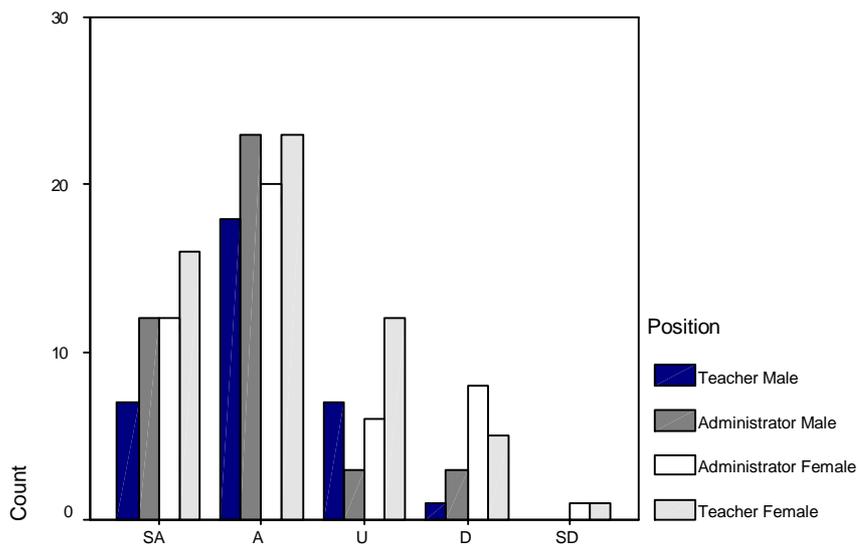


Figure 25. Distribution of the Responses to the statement, “All Teachers should Use Information Technology in Instruction.”

### *Information Technology Plan*

#### *Information Technology Plan Should Be Written for Schools.*

The participants were asked if they preferred a written Information Technology Plan for their schools as a guide for what they should do during its implementation. There were 176 responses and two non-responses. The mean was 1.69 with a standard deviation of 0.73 as shown in Appendix E. Table 29 illustrates the information based upon the scale used in the survey, and provides the frequencies and its percentages of the responses. Table 29, shows that of those who strongly agree there were 8 male teachers, or 10.7%, 15 male administrators, or 20%, 25 female administrators, or 33.3%, and 27 female teachers, or 36%. Those who responded, agree, constituted 23 male teachers, or 26.7%, 22 male administrators, or 25.6%, 18 female administrators, or 20.9%, and of 23 female teachers, or 26.7%. Three male administrators, or 30%, 4 female administrators, or 40%, and 3 female teachers, or 30%, responded that they were uncertain. Three male administrators, 1 male teacher, and 1 female teacher disagree with this statement.

A total of 91.48% of the participants asserted that an information technology plan should be written for the schools. Only 5.68% of the participants were uncertain and 2.84% did not need the information technology plan to be written for school. Figure 26 shows that more female teachers and female administrators strongly agree than the male teachers and administrators. A dash (-) indicates that the cells are empty.

Table 29

*Frequencies and Percentage Scores of the Participants' Perception to the statement, Information Technology Plans should be Written for Schools (N=176)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
Information technology plans should be written for schools	SA	8 10.7%	15 20.0%	25 33.3%	27 36.0%	75 100.0%
	A	23 26.7%	22 25.6%	18 20.9%	23 26.7%	86 100.0%
	U	- -	3 30.0%	4 40.0%	3 30.0%	10 100.0%
	D	2 50.0%	1 25.0%	- -	1 25.0%	4 100.0%
	SD	- -	- -	- -	1 100.0%	1 100.0%

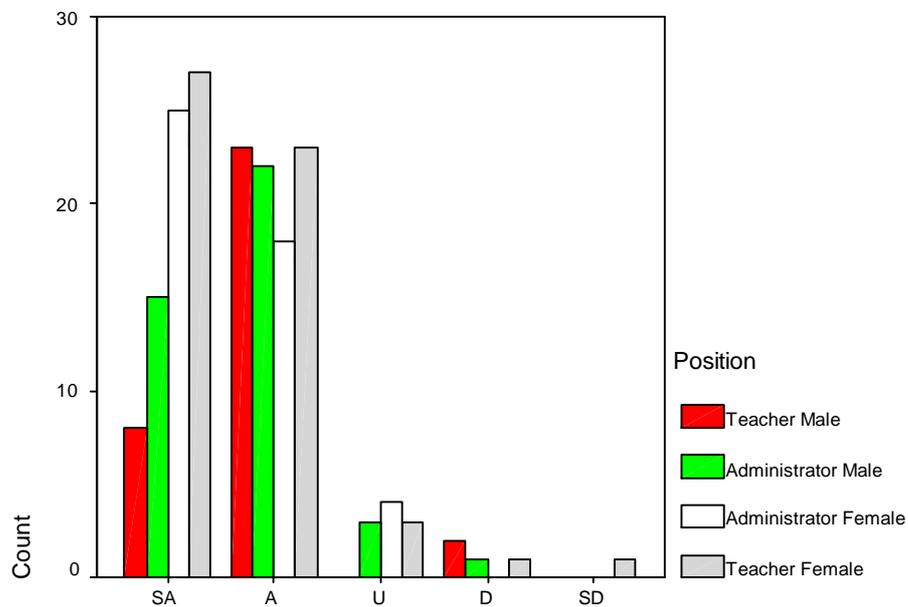


Figure 26. Distribution of the Responses to the statement, “Information Technology Plans should be Written for Schools.”

### *Teachers should have Knowledge of Information Technology*

The participants were asked whether or not teachers should have knowledge of information technology in order to infuse it in planning and instruction. There were 176 responses and two non-responses. The overall mean was 2.98, with a standard deviation of 0.95 as shown in Appendix E. Table 30 breaks down the information based upon the scale that used in the survey and provides frequencies and percentages of the responses. A strongly agree responses one male teacher, or 8.3%, 3 male administrators, or 25%, 4 female administrators, or 33.3%, and 4 male teachers, or 33.3%. Agree responses included 6 male teachers, or 16.7%, 10 male administrators, or 27.8%, 8 female administrators, or 22.2%, and 12 male teachers, or 33.3%. Uncertain responses constituted 15 male teachers, or 18.5%, 16 male administrators, or 19.8%, 26 female administrators, or 32.1%, and 24 male teachers, or 29.6%. Disagree responses broke down into 7 male teachers, or 18.4%, 11 male administrators, or 28.9%, 7 female administrators, or 18.4%, and 13 male teachers, or 34.2%. Strongly disagree responses represented 2 male teachers, or 22.2%, one male administrator, or 11.1%, 2 female administrators, or 22.2%, and 4 male teachers, or 44.4%.

Consequently, 46.02% of the participants were uncertain and 21.6% of the participants were disagree. The number of participants who agree and disagree was almost equal. Figure 26 indicates that female administrators and teachers represented most of the participants who said they were uncertain whether teachers should have knowledge of information technology. Female teachers (17) mostly disagree.

Table 30

*Frequencies and Percentage Scores of the Participants toward Teachers should have Knowledge of Information Technology (N=176)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
Teachers should have knowledge of information technology	SA	1	3	4	4	12
		8.3%	25.0%	33.3%	33.3%	100.0%
	A	6	10	8	12	36
		16.7%	27.8%	22.2%	33.3%	100.0%
	U	15	16	26	24	81
	18.5%	19.8%	32.1%	29.6%	100.0%	
	D	7	11	7	13	38
		18.4%	28.9%	18.4%	34.2%	100.0%
	SD	2	1	2	4	9
		22.2%	11.1%	22.2%	44.4%	100.0%

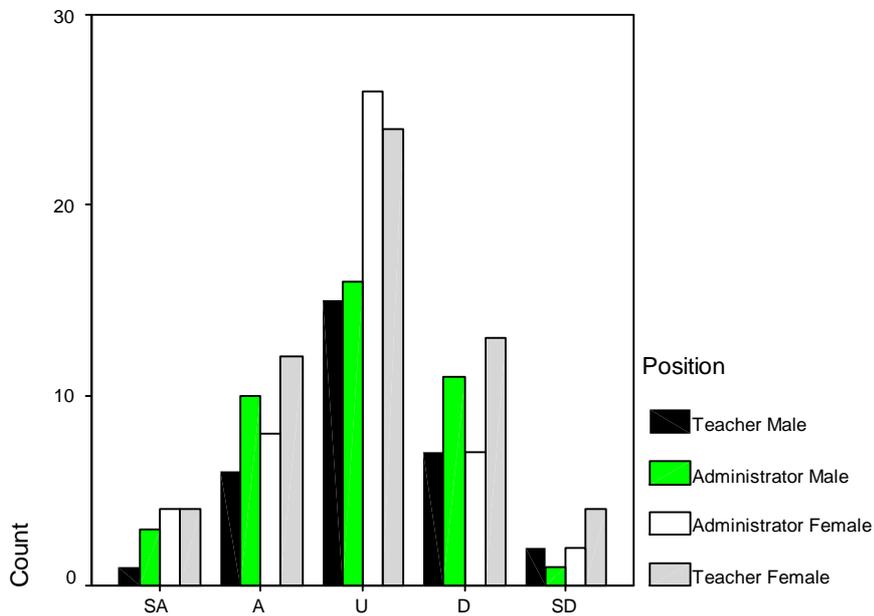


Figure 27. Distribution of the Responses to the statement, “Teachers should have Knowledge of Information Technology.”

### *Teachers should be Involved in an Information Technology Plan*

This question focused on whether teachers should be involved in developing an information technology plan. There were 176 responses and two non-responses. The overall mean was 1.78 with a standard deviation of 0.86 as shown in Appendix E. Table 31 illustrates the information based upon the scale used the survey and provides the frequencies and percentages of the responses. Strongly agree responses split into 14 male teachers, or 18.2%, 17 male administrators, or 22.1%, 24 female administrators, or 31.2%, and 22 female teachers, or 28.6%. Of those who said, agree, there were 17 male teachers, or 23%, 18 male administrators, or 24.3%, 17 female administrators, or 23%, and 22 female teachers, or 29.7%. Two male teachers, or 13.3%, 5 male administrators, or 33.3%, one female administrator, or 6.7%, and 7 male teachers, or 46.7% were uncertain. Of the participants who disagree, there was 1 male administrator, or 10%, three female administrators, or 30%, and 6 male teachers, or 60%. Whereas only one female administrator was strongly disagree.

A total of 85.8% of the participants asserted that teachers should be involved in an information technology plan, 8.52% of the participants were uncertain, and 5.68% of the participants disagree. Figure 28 indicates that more female teachers and administrators strongly agree that teachers should be involved in technology planning than other participants. More female teachers agreed with this statement than the other participants. A dash (-) indicates that the cells are empty.

Table 31

*Frequencies and Percentage Scores of the Participants toward, Teachers should be Involved in an Information Technology Plan (N=176)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
Teachers should be involved in an information technology plan	SA	14 18.2%	17 22.1%	24 31.2%	22 28.6%	77 100.0%
	A	17 23.0%	18 24.3%	17 23.0%	22 29.7%	74 100.0%
	U	2 13.3%	5 33.3%	1 6.7%	7 46.7%	15 100.0%
	D	- -	1 10.0%	3 30.0%	6 60.0%	10 100.0%
	SD	- -	- -	1 100.0%	- -	1 100.0%

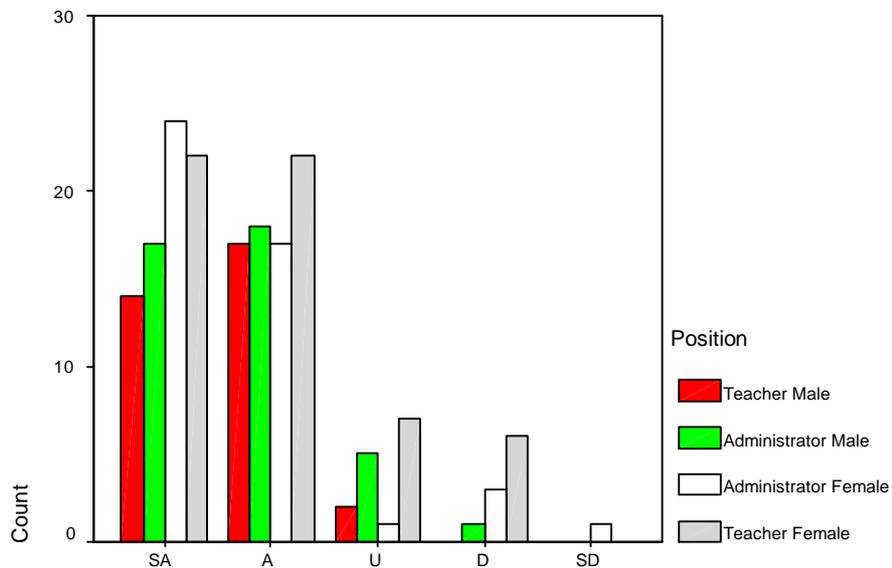


Figure 28. Distribution of the Responses' Perception to the statement, "Teachers Should Be Involved in an Information Technology Plan."

*Developing an Information Technology Mission Statement, Goals, and Objectives  
Are Necessary for Students Learning.*

The participants were asked about the importance of developing an information technology mission, goals, and objectives for students' learning. There were 176 responses and two non-responses. The overall mean was 1.68 with a standard deviation of 0.66 as shown in Appendix E. Table 32 illustrates the information based upon the scale used the survey and provides the frequencies and percentages of the responses. Strongly agree responses included 13 male teachers, or 17.8%, 18 male administrators, or 24.7%, 20 female administrators, or 30.1%, and 22 male teachers, or 30.1%. Of the participants who said, agree, 18 were male teachers, or 20.5%, 18 were male administrators, or 20.5%, 25 were female administrators, or 28.4%, and 27 were male teachers, or 30.7%. Those who were uncertain were divided into one male teacher, or 7.7%, 3 male administrators, or 23.1%, 2 female administrators, or 15.4%, and 7 male teachers, or 53.8%. There were only one male administrator and one female teacher who disagreed. There was only one female administrator who chose strongly disagree.

A total of 91.48% of the participants emphasized that an information technology plan should include mission, goals and objectives. Figure 29 indicates that most of the participants strongly agree or agree with this statement. A dash (-) dash indicates that the cells are empty.

Table 32

*Frequencies and Percentage Scores of the Participants toward Developing an Information Technology Mission, Goals and Objectives is Necessary for Student Learning (N=176).*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
Developing an information technology mission, goals, and objectives is necessary for student learning	SA	13 17.8%	18 24.7%	20 27.4%	22 30.1%	73 100.0%
	A	18 20.5%	18 20.5%	25 28.4%	27 30.7%	88 100.0%
	U	1 7.7%	3 23.1%	2 15.4%	7 53.8%	13 100.0%
	D	1 50.0%	-	-	1 50.0%	2 100.0%

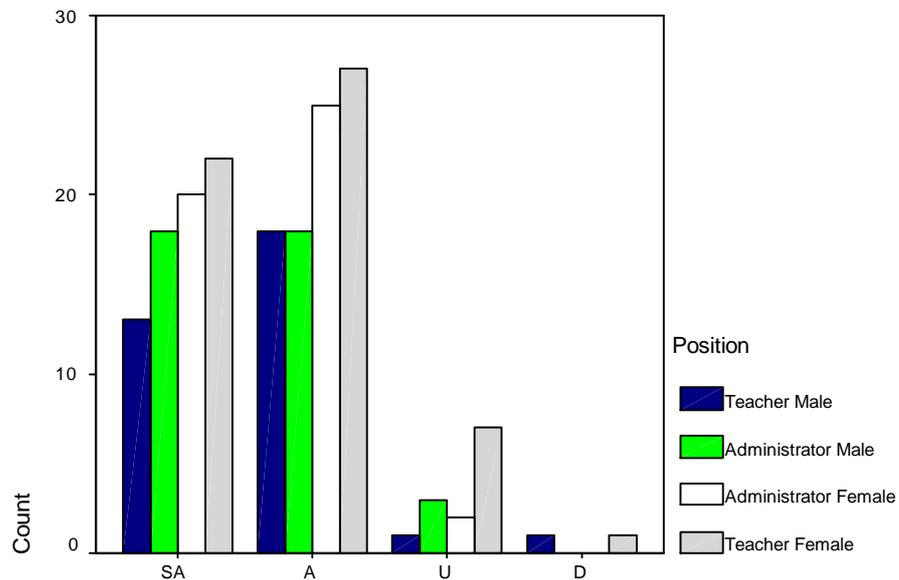


Figure 29. Distribution of the Responses to the statement, “Developing an Information Technology Mission, Goals and Objectives is Necessary for Student Learning.”

*An Information Technology Plan Should Include Integrating the Local Area Network and Wide Area Network*

The question was examined the perceptions of the participants as to whether or not an information technology plan should include integrating the local and wide area network. Table 33 indicates that the overall mean was 1.43 with a standard deviation of 0.57 as shown in Appendix E. Table 33 illustrates the information based upon the scale used the survey and provides the frequencies and percentages of the responses. Strongly agree responses break down into 17 male teachers, or 15.7%, 25 male administrators, or 23.1%, 32 female administrators, or 29.6%, and 34 female teachers, or 31.5%. Agree responses break down into 14 male teachers, or 23%, 12 male administrators, or 19.7%, 14 female administrators, or 23%, and 21 male teachers, or 34.4%. Uncertain responses included one male teacher, or 14.3%, 3 male administrators, or 42.9%, one female administrator, or 14.3%, and 2 female teachers, or 28.6%. None of the respondents answered strongly disagree.

A total of 96.02% of the participants emphasized that local and wide area network should be part of information technology plan. Figure 30 shows that the majority of the participants replied, strongly agree and agree. A dash (-) indicates that the cells are empty.

Table 33

*Frequencies and Percentage Scores of the Participants toward an Information*

*Technology Plan should Include Integrating the Local and Wide Area Network (N=176)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
An information technology plan should include integrating the local area network and wide area network	SA	17 15.7%	25 23.1%	32 29.6%	34 31.5%	108 100.0%
	A	14 23.0%	12 19.7%	14 23.0%	21 34.4%	61 100.0%
	U	1 14.3%	3 42.9%	1 14.3%	2 28.6%	7 100.0%

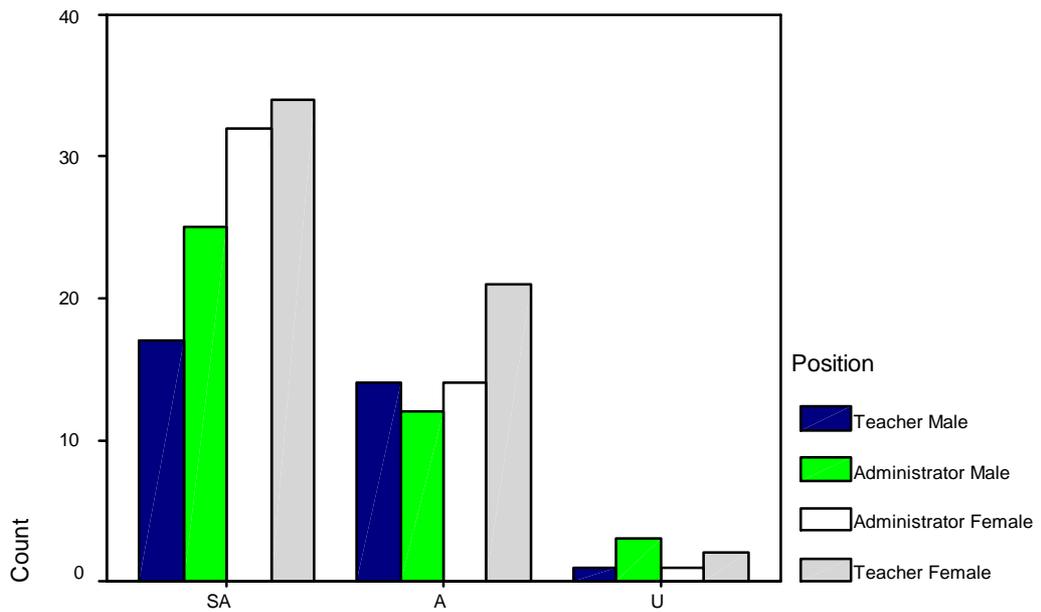


Figure 30. Distribution of the Responses to the statement, “an Information Technology Plan should Include Integrating the Local and Wide Area Network.”

*An information Technology Plan should Include Improvements in Teaching and Learning by using Information Technology.*

This question examined the perceptions of the administrators and teachers toward an information technology plan should include improvements in teaching and learning by using information technology. There were 178 responses. The overall mean was 2.92 with a standard deviation of 1.04 as shown in Appendix E. Table 34 illustrates the information based upon the scale used the survey and provides the frequencies and percentages of the responses. Strongly agree responses were divided into 2 male teachers, or 11.8%, 3 male administrators, or 17.6%, 6 female administrators, or 35.3%, and 6 female teachers, or 35.3%. Agree responses broke down into 7 male teachers, or 15.6%, 9 male administrators, or 20%, 14 female administrators, or 31.1%, and 15 male teachers, or 33.3%. The participants who reported, uncertain, include 13 male teachers, or 22%, 14 male administrators, or 23.7%, 19 female administrators, or 32.2%, and 13 male teachers, or 22%. Disagree divided into 9 male administrators, or 18.4%, 14 male teachers, or 28.6%, 7 female administrators, or 14.3%, and 19 female teachers, or 38.8%. Two male teachers, or 25%, one male administrator, or 12.5%, one female administrator, or 12.5%, and 4 female teachers, or 50%, strongly disagreed.

Overall, 33.15% of the participants were uncertain, 27.53% of the participants disagreed, 4.49% of the participants strongly disagree, while 34.83% of the participants agreed that information technology plan includes improvement in teaching and learning by using information technology. Figure 31 indicates most of the participants were uncertain and disagreed with this statement.

Table 34

*Frequencies and Percentage Scores of the Participants toward an Information Technology Plan Should Include Improvements in Teaching and Learning by Using Information Technology (N=178)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
An information technology plan should include improvements in teaching and learning by using Information technology	SA	2	3	6	6	17
		11.8%	17.6%	35.3%	35.3%	100.0%
	A	7	9	14	15	45
		15.6%	20.0%	31.1%	33.3%	100.0%
	U	13	14	19	13	59
		22.0%	23.7%	32.2%	22.0%	100.0%
	D	9	14	7	19	49
		18.4%	28.6%	14.3%	38.8%	100.0%
	SD	2	1	1	4	8
		25.0%	12.5%	12.5%	50.0%	100.0%

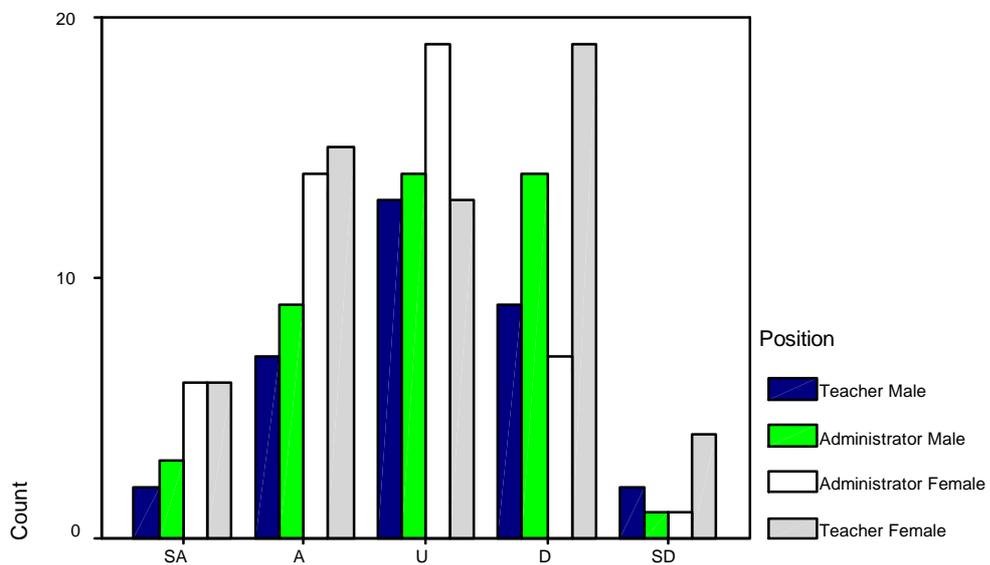


Figure 31. Distribution of the Responses to the statement, "an Information Technology Plan Should Include Improvements in Teaching and Learning by Using Information Technology."

*Developing an Information Technology Plan Is Based on the Stakeholders' Vision.*

The question focused on the importance of visions in developing and creating an information technology plan for school. There were 178 responses. The overall mean was 1.8 with a standard deviation of 0.813 as shown in Appendix E. Table 35 illustrates the information based upon the scale used the survey and provides the frequencies and percentages of the responses. Strongly agree responses included 9 male teachers, or 14.8%, 13 male administrators, or 21.3%, 20 female administrators, or 32.8%, and 19 female teachers, or 31.1%. Agree responses included 17 male teachers, or 17.9%, 23 male administrators, or 24.2%, 23 female administrators, or 24.2%, and 32 male teachers, or 33.7%. Uncertain responses were divided into 5 male teachers, or 45.5%, 3 male administrators, or 27.3%, 2 female administrators, or 18.2%, and one female teacher, or 9.1%. Disagree broke down into one male administrator, or 10%, 2 male teachers, or 20%, 2 female administrators, or 20%, and 5 female teachers, or 50%. Only one male teacher strongly disagree.

Female administrators represented the highest percentage of those who strongly agree, or 32.8%, and female teachers represented the highest percentage of those who agree, or 33.7%. A total of 87.64% of the participants asserted that the stakeholders' vision is important in developing an information technology plan. Figure 32 shows the majority of the participants both strongly agree and agree with the statement. The female teachers more often supported the importance of the stakeholders' vision in an information technology plan than the male teachers. A dash (-) indicates that the cells are empty.

Table 35

*Frequencies and Percentage Scores toward Developing an Information Technology Plan Is Based on the Stakeholders' Vision (N=178)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
Developing an information technology plan is based on the stakeholders' vision	SA	9 14.8%	13 21.3%	20 32.8%	19 31.1%	61 100.0%
	A	17 17.9%	23 24.2%	23 24.2%	32 33.7%	95 100.0%
	U	5 45.5%	3 27.3%	2 18.2%	1 9.1%	11 100.0%
	D	1 10.0%	2 20.0%	2 20.0%	5 50.0%	10 100.0%
	SD	1 100.0%	- -	- -	- -	1 100.0%

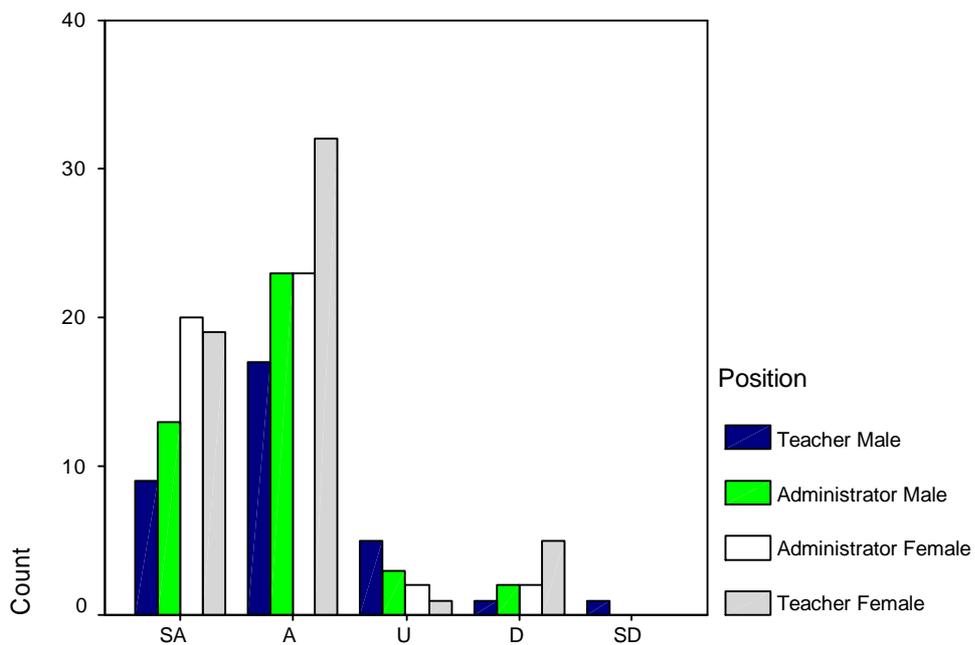


Figure 32. Distribution of the Responses to the statement, “Developing an Information Technology Plan is Based on the Stakeholders' Vision.”

### *Information Technology in Administrative Work*

#### *Using Computer Technology for Grade Keeping Is Efficient.*

Teachers and administrators were asked whether or not employing computer technology for grade keeping is efficient. There were 178 responses. The mean was 1.11 with a standard deviation of 0.36 as shown in Appendix F., Table 36 illustrates the information based upon the scale used the survey and provides the frequencies and percentages of the responses. Table 36 shows that those of the participants who strongly agree with the statement were 31 male teachers, or 19.3%, 34 male administrators, or 21.1%, 45 female administrators, or 28%, and 51 female teachers, or 31.7%. In addition, of those agreed with the statement, there were 1 male teacher, or 7.1%, 5 male administrators, or 35.7%, 2 female administrators, or 14.3%, and 6 female teachers, or 42.9%. In addition, 1 male teacher, or 33.3%, 2 male administrators, or 66.7%, were uncertain of their agreement with the statement. None of the participants disagree or strongly disagree.

Overall, the majority of respondents (98.3%) asserted the importance of computer technology in an efficient grading system. Female administrators and teachers were more likely to strongly agree than male teachers and administrators, representing 59.63%. Female were also the minority of them who were uncertain (1.7%). Figure 33 shows distribution of the participants to the statement. A dash (-) indicates that the cells are empty.

Table 36

*Frequencies and Percentage Scores toward Using Computer Technology for Grade*

*Keeping is Efficient (N=178)*

		Position				
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	Total
Using computer technology for grade keeping is efficient	SA	31 19.3%	34 21.1%	45 28.0%	51 31.7%	161 100.0%
	A	1 7.1%	5 35.7%	2 14.3%	6 42.9%	14 100.0%
	U	1 33.3%	2 66.7%	-	-	3 100.0%

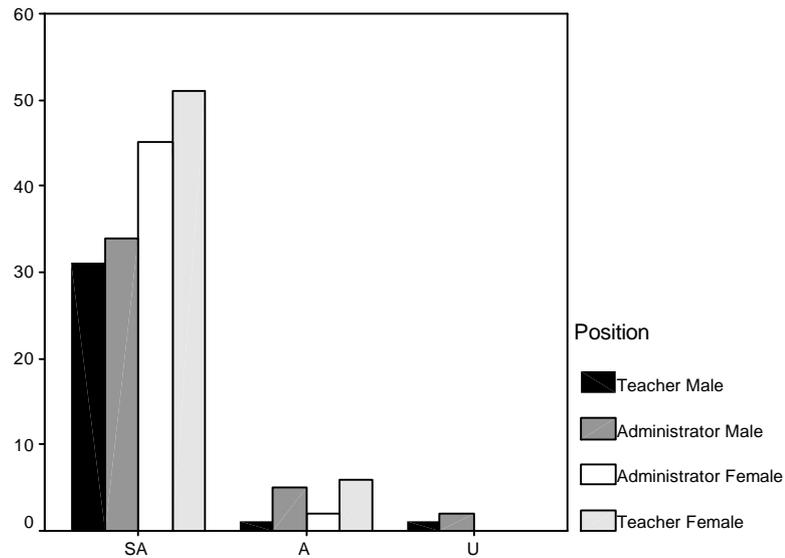


Figure 33. Distribution of the Responses to the statement that, “Using Computer Technology for Grade Keeping is Efficient.”

*Using Computer Technology for Equipment Inventory Is Important.*

This question addressed whether or not the use of computer technology is important for equipment inventory control. There were 178 responses. The overall mean was 1.37 with a standard deviation of 0.61 as shown in Appendix F. Table 37 illustrates the information based upon the scale used the survey and provides the frequencies and percentages of the responses. According to Table 37, 25 male teachers, or 20.3%, 30 male administrators, or 24.4%, 32 female administrators, or 26.7%, and 36 female teachers, or 29.3%, responded that they strongly agreed with the statement that computer technology supports equipment inventory systems. Five male teachers, or 10.9%, 10 male administrators, or 21.7%, 12 female administrators, or 26.1%, and 19 female teachers, or 41.3%, chose the answer, agree. Three male teachers, or 42.9%, one male administrator, or 14.3%, one female administrator, or 14.3%, and 2 female teachers, or 28.6%, were uncertain. Only two female administrators chose the response, disagree.

Most of the participants (94.9%) emphasized that computer technologies represent a great tool in equipment inventory. A majority of the, female administrators and female teachers (55.3%) most strongly agree of the participants who reported strongly agree. 67.4% female administrators and female teachers reported agree that represented the most of the participants who replied agree. Female administrators and teachers that often asserted that computer technology appropriate system to support inventory system. Only a small portion of the participants (3.93%) were not certain that computer technologies support the inventory system. None of the participants reported disagree or strongly disagree. Figure 34 shows that the majority of the respondents asserted that computer

technology is an appropriate system to establish a mechanism to make the inventory system more efficient. A dash (-) indicates that the cells are empty.

Table 37

*Frequencies and Percentage Scores of the Responses to the Statement that Using Computer Technology for Equipment Inventory Is Important (N=178)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
Administrators and teachers should utilize information technology in administrative work	SA	16	23	24	29	92
		17.4%	25.0%	26.1%	31.5%	100.0%
	A	14	14	21	27	76
		18.4%	18.4%	27.6%	35.5%	100.0%
	U	2	3	1	1	7
		28.6%	42.9%	14.3%	14.3%	100.0%
	D	1	1	1	-	3
		33.3%	33.3%	33.3%	-	100.0%

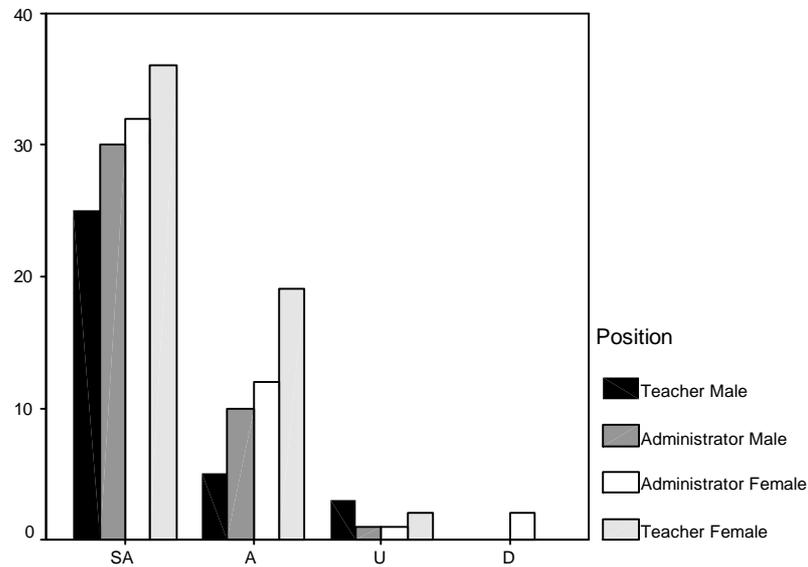


Figure 34. Distribution of the Responses to the statement, “Using Computer Technology for Equipment Inventory is Important.”

*Computer Technology Can Help in Textbook Inventory.*

This question focused on whether or not the use of computer technology is able to help in textbook inventory management. There were 178 responses and two non-responses. The overall mean was 1.54 with a standard deviation of 0.69 as shown in Appendix F, Table 38 indicates 15 male teachers, or 15.5%, 25 male administrators, or 25.8%, 24 female administrators, or 24.7%, and 33 female teachers, or 34%, strongly agree with the use of computer technology to supplement textbook inventory systems. Also, 17 male teachers, or 25%, 10 male administrators, or 22.1%, 16 female administrators, or 23.5%, and 20 female teachers, or 29.4%, chose the answer, agree. One male teacher, or 12.5%, 5 female administrators, or 62.5%, and 2 female teachers, or 25%, were uncertain. Only 1 male administrator, or 25%, 2 female administrators, or

50%, and 1 female teacher, or 25%, who chose the response, disagree. Most of the participants (93.2%) believed that computer technologies represent a good tool in textbook inventory control. The female teachers were the participants who most strongly agree with the statement. They represented 34% of responses that strongly agree. Of the participants who agree (29%) were female teachers who asserted that computer technology is appropriate to support the textbook inventory systems. A small number of those who were not certain that computer technology support the textbook inventory system was 4.5% male and female, while 2.3% male and female said they disagree with the statement. A majority of the female administrators (62.5%) said they were uncertain. Figure 35 shows the majority of the respondents asserted that computer technology is an appropriate method to make the inventory system more efficient of which most of the respondents were female teachers. In addition, the majority of those who were uncertain and disagreed with the statement were female administrators. A dash (-) indicates that the cells are empty.

Table 38

*Frequencies and Percentage Scores of the participants toward Computer Technology Can Help in Textbook Inventory (N=178)*

		Position				
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	Total
Computer technology can help in textbook inventory	SA	15	25	24	33	97
		15.5%	25.8%	24.7%	34.0%	100.0%
	A	17	15	16	20	68
		25.0%	22.1%	23.5%	29.4%	100.0%
	U	1	-	5	2	8
		12.5%	-	62.5%	25.0%	100.0%
	D	-	1	2	1	4
		-	25.0%	50.0%	25.0%	100.0%

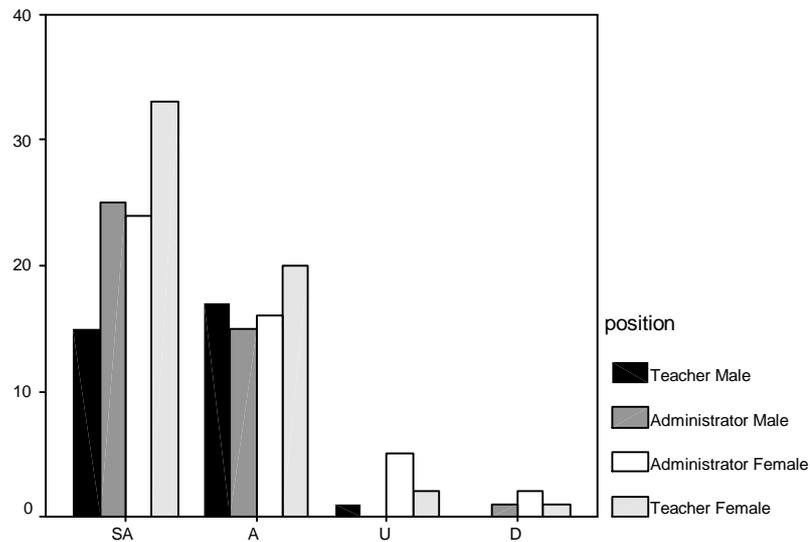


Figure 35. Distribution of the Responses to the “Computer Technology Can Help in Textbook Inventory.”

### *Computer Technology Assists in Organizing Library Catalogs*

The participants were asked whether or not they realized the importance of the use of computer technology to organize library indexes. There were 176 responses and two non-responses. The overall mean was 1.39 with a standard deviation of 0.60 as shown in Appendix F. Table 39 breaks down the information of the question based upon the scale that the survey used and provides the frequencies and percentages of the responses. Table 39 indicates 20 male teachers, or 17.1%, 25 male administrators, or 26.5%, 29 female administrators, or 24.8%, and 37 female teachers, or 31.6%, responded that they strongly agreed with the statement that computer technology supplement textbook inventory system. Only 10 male teachers, or 19.2%, 8 male administrators, or 15.4%, 15 female administrators, or 28.8%, and 19 female teachers, or 36.5%, chose the answer, agree. One male teacher, or 20%, one female administrator, or 20%, 3 female administrator, or 60%, were uncertain. One male administrator, or 50%, and one female teacher, or 50%, chose the response, disagree. The majority of the participants (96%) affirmed that computer technology represent a great tool to organize library catalogs. Of the participants that strongly agree 31.4% were female teachers. Of the participants who said agree 36% were female teachers. Only a small portion (3.92%) were uncertain and disagree that computer technologies support library catalogs was 3.9%. Figure 36 shows that the majority of the respondents asserted that computer technology is appropriate system to assists in organizing library catalogs. A (-) dash indicates that the cells are empty.

Table 39

*Frequencies and Percentage Scores of the Participants toward Computer Technology Assists in Organizing Library Catalogs (N=176)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
Computer technology assists in organizing library catalogs	SA	20 17.1%	31 26.5%	29 24.8%	37 31.6%	117 100.0%
	A	10 19.2%	8 15.4%	15 28.8%	19 36.5%	52 100.0%
	U	1 20.0%	1 20.0%	3 60.0%	-	5 100.0%
	D	-	1 50.0%	-	1 50.0%	2 100.0%

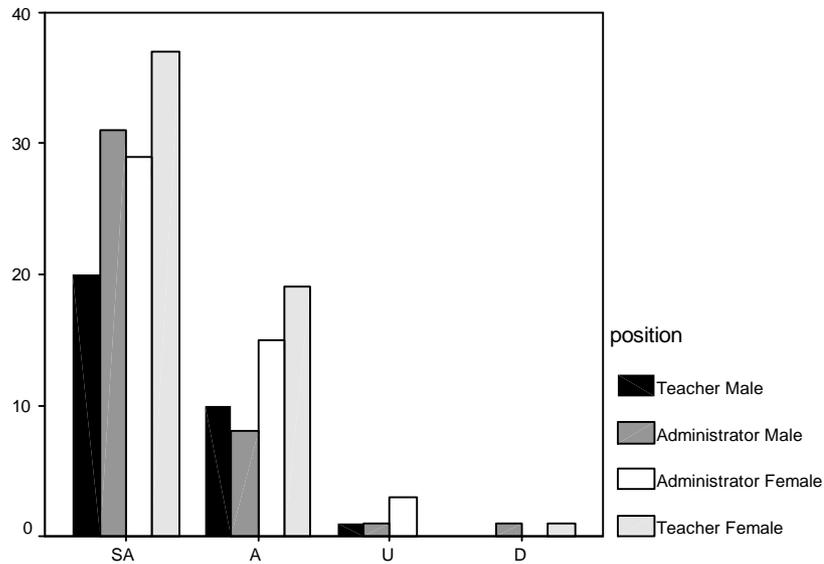


Figure 36. Distribution of the Responses to the statement, “Computer Technology Assists in Organizing Library Catalogs.”

### *Computer Technology Is Useful in Managing the School Budget*

This question focused on whether or not computer technology is an appropriate technique to manage school budgets. There were 177 responses and one non-response. The overall mean was 1.75 with a standard deviation of 0.97 as shown in Appendix F. Table 40 breaks down the information of the question based upon the scale that the survey used and provides the frequencies and percentages of the responses. Table 40 indicates that 16 male teachers, or 19.5%, 19 male administrators, or 23.2%, 17 female administrators, or 20.7%, and 30 female teachers, or 36.6%, responded that they strongly agreed that computer technology assists to manage school budgets. Fourteen male teachers, or 21.5%, 10 male administrators, or 15.4%, 22 female administrators, or 33.8%, and 19 female teachers, or 29.2%, chose the answer, agree. Three male teacher, or 12.5%, 11 male administrators, or 45.8%, 3 female administrator, or 12.5%, 7 female administrator, or 29.2% were uncertain. Four female administrators, or 80%, and one female teacher, or 20%, chose the response, disagree. There was only one female administrator who strongly disagreed. The majority of the participants (83.1%) affirmed that computer technologies provide a tool to manage school budgets. The female teachers were the participants who most strongly agreed and represented 36.6% of the respondents who strongly agree. Whereas 19.5% of male teachers and 33.8% of the female administrators reported agree. The majority of the participants who responded uncertain were male administrators 45.8%. The female administrators represented 80% of the participants who said disagree. Figure 37 shows that the majority of the respondents asserted that computer technology is a useful system to manage school budgets. A dash (-) dash indicates that the cells are empty.

Table 40

*Frequencies and Percentage Scores of the Participants toward Computer Technology is Useful in Managing School Budgets (N=177)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
Computer technology is useful in managing school budgets	SA	16	19	17	30	82
		19.5%	23.2%	20.7%	36.6%	100.0%
	A	14	10	22	19	65
		21.5%	15.4%	33.8%	29.2%	100.0%
	U	3	11	3	7	24
		12.5%	45.8%	12.5%	29.2%	100.0%
	D	-	-	4	1	5
		-	-	80.0%	20.0%	100.0%
	SD	-	-	1	-	1
		-	-	100.0%	-	100.0%

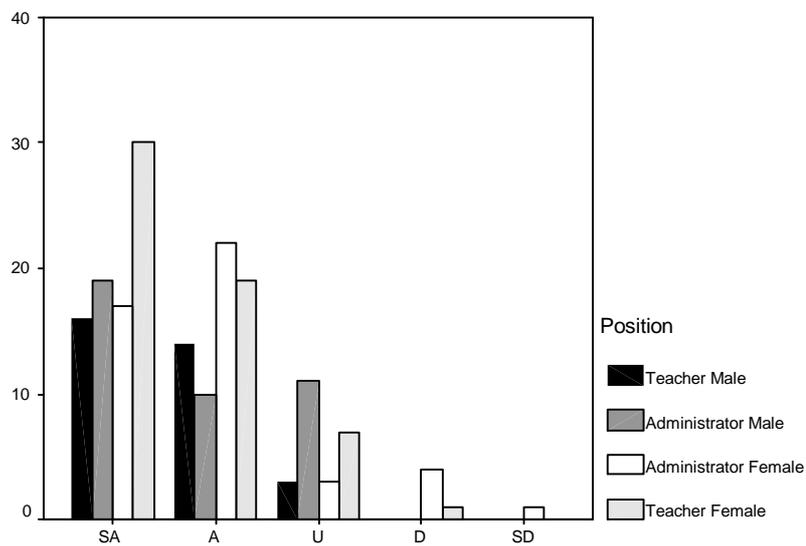


Figure 37. Distribution of the Responses to the statement, “Computer Technology is Useful in Managing School Budgets.”

### *Computer Technology Can Help to Create Accurate Class Schedules*

Teachers and administrators were asked whether or not computer technology could help to create accurate class schedules. There were 177 responses and one non-response. The mean was 1.79 with a standard deviation of 0.97 as shown in Appendix F. Table 41 breaks down the information of the question based upon the scale that the survey used and provides the frequencies and percentages of the responses. Table 41 shows that of the participants who strongly agree with the statement there were 19 male teachers, or 21.1%, 24 male administrators, or 26.7%, 18 female administrators, or 20%, and 29 female teachers, or 32.2%. Of the participants who said they agree with the statement, there were 9 male teachers, or 17.6%, 12 male administrators, or 23.5%, 14 female administrators, or 27.5%, and 16 female teachers, or 31.4%. Whereas 4 male teachers, or 19%, 2 male administrator, or 9.5%, 8 female administrators, or 34%, 7 male teachers, or 33.3%, were uncertain about the statement. One male teacher, or 7.1% disagree. Thirty male administrators, or 21.4%, 5 female administrators, or 35.7%, 5 female teachers, or 35.7%, and only one female administrator said strongly disagree.

Figure 38 shows that most of the participants (50.8%) strongly agree with the use of computer technology in creating accurate class schedules and 28.8% of the participants agreed with the statement. The majority of respondents (79.7%) asserted the importance of computer technology in developing class schedules. The female teachers more strongly emphasized the importance of computer technology in developing class schedules than male teachers and administrators. In addition, female administrators and teachers were the most uncertain participants. A dash (-) indicates that the cells are empty.

Table 41

*Frequencies and Percentages Scores Responses to the Statement that Computer Technology Can Help to Create Accurate Class Schedules (N=177)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
Computer technology can help to create accurate class schedules	SA	19 21.1%	24 26.7%	18 20.0%	29 32.2%	90 100.0%
	A	9 17.6%	12 23.5%	14 27.5%	16 31.4%	51 100.0%
	U	4 19.0%	2 9.5%	8 38.1%	7 33.3%	21 100.0%
	D	1 7.1%	3 21.4%	5 35.7%	5 35.7%	14 100.0%
	SD	- -	- -	1 100.0%	- -	1 100.0%

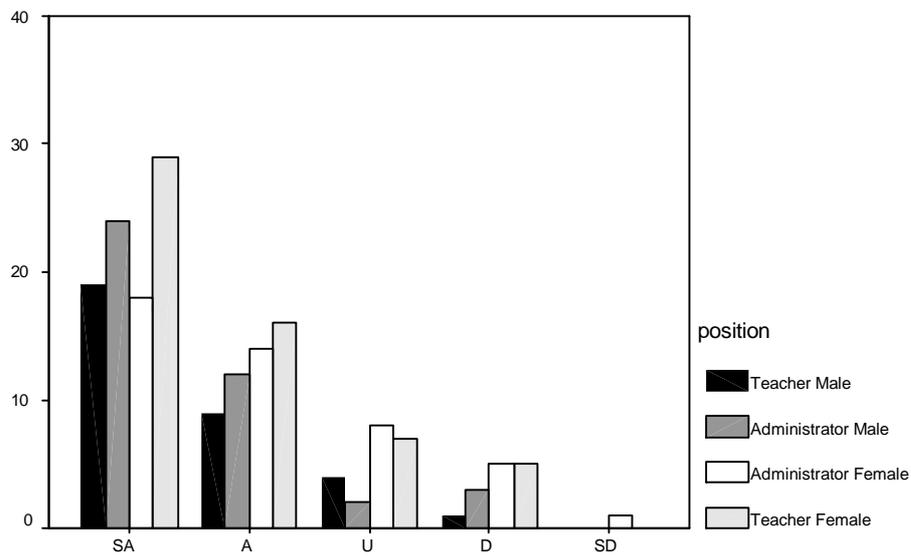


Figure 38. Distribution of the Responses to the Statement, “Computer Technology can Help to Create Accurate Class Schedules.”

*A Computer Technology Application Is an Appropriate Way to Organize Daily Appointments.*

Teachers and administrators were asked whether or not the application of computer technology is an appropriate method to organize daily appointments. There were 172 responses and six non-responses. The mean was 2.11 with a standard deviation of 0.89 as shown in Appendix F. Table 42 breaks down the information of the question based upon the scale that the survey used and provides the frequencies and percentages of the responses. Table 42 shows that of the participants who strongly agree with the statement, there were 5 male teachers, or 11.6%, 10 male administrators, or 23.3%, 13 female administrators, or 30.2%, and 15 female teachers, or 34.9%. Of the participants who reported a response of agree there were 16 male teachers, or 19.5%, 23 male administrators, or 28%, 24 female administrators, or 29.3%, and 19 female teachers, or 23.2%. Seven male teachers, or 20.6%, 4 male administrator, or 11.8%, 7 female administrator or 20.6%, 16 male teachers, or 47.1%, were uncertain. Two male teachers, or 18.2%, one male administrator, or 9.1%, 3 female administrators, or 27.3%, 5 female teachers, or 45.5%, and one male teacher, or 50%, were responded disagree. One male administrator or 50% who said strongly disagree.

Of the participants (47.7%) strongly agree and 25% agree to the use of computer technology in organizing daily appointments. The majority of the participants asserted that computer technology has significant value in organizing daily appointments. Female teachers represented the majority who said uncertain and disagree that computer technology was appropriate in organizing daily appointments. Figure 39 shows that female teachers and administrators and male teachers were the ones most in agreement

with the importance of computer technology in organizing daily appointment.

Female teachers were more likely to answer that they were uncertain. A dash (-) indicates that the cells are empty.

Table 42

*Frequencies and Percentage Scores of the Participants toward Computer Is an Appropriate Way to Organize Daily Appointments (N=172)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
A computer is an appropriate way to organize daily appointments	SA	5	10	13	15	43
		11.6%	23.3%	30.2%	34.9%	100.0%
	A	16	23	24	19	82
		19.5%	28.0%	29.3%	23.2%	100.0%
	U	7	4	7	16	34
		20.6%	11.8%	20.6%	47.1%	100.0%
	D	2	1	3	5	11
		18.2%	9.1%	27.3%	45.5%	100.0%
	SD	1	1	-	-	2
		50.0%	50.0%	-	-	100.0%

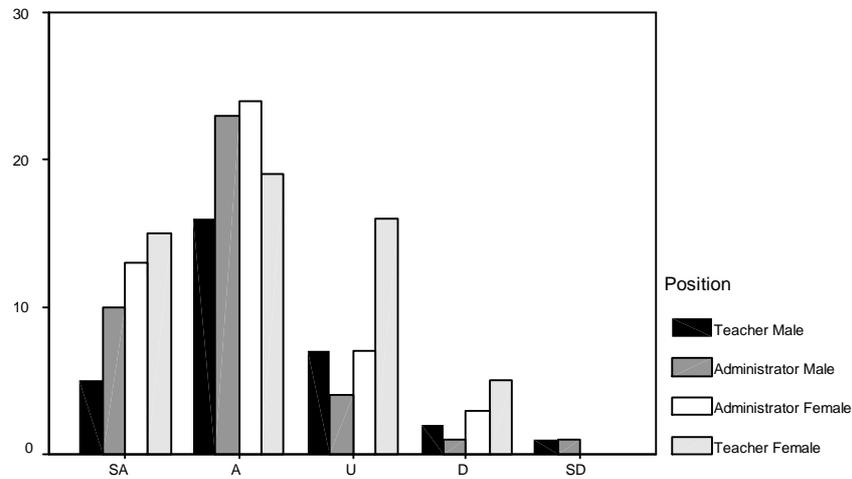


Figure 39. Distribution of the Responses to the Statement that "Computer is an Appropriate Way to Organize Daily Appointments."

*Computer Technology Makes Communication Easy and Fast for Exchanging Information.*

Teachers and administrators were asked to explore whether or not the use of computer technologies made communication easy and fast for exchanging information in administrative work. There were 178 responses. The overall mean was 1.62 with a standard deviation of 0.71 as shown in Appendix F. Table 43 breaks down the information of the question based upon the scale that the survey used and provides the frequencies and percentages of the responses. According to the Table 43, 18 male teachers, or 21.2%, 19 male administrators, or 22.4%, 21 female administrators, or 24.7%, and 27 female teachers, or 31.8%, responded that they strongly agreed that computer technology supports communication and makes in administrative work easier. Thirteen male teachers, or 16.3%, 18 male administrators, or 22.5%, 26 female

administrators, or 32.5%, and 23 female teachers, or 28.8%, chose the answer, agree. One male teacher, or 11.1%, 3 male administrators, or 33.3%, and 5 female teachers, or 55.6%, were uncertain. There were only one male teacher, or 33.3%, one male administrator, or 33.3%, and one female administrator, or 33.3%, who chose the response, disagree. Only one female teacher responded, strongly disagree. Most of the participants (92.7%) emphasized that computer technology makes communication easier to enhance administrative work. 56.5% of the Female administrators and female teachers were the ones who most strongly agree, as well as 61.3% of who responded, agree. A small number (5.1%) of the participants were uncertain. Most of these respondents were female teachers and male administrators. Figure 40 shows that the majority of the respondents asserted that the use of computer technology enhances communication in administrative work. A dash (-) indicates that the cells are empty.

Table 43

*Frequencies and Percentage Scores of the Respondents toward Computer Technology Makes Communication Easy and Fast for Exchanging Information (N=178)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
Computer technology makes communication easy and fast for exchanging information	SA	18 21.2%	19 22.4%	21 24.7%	27 31.8%	85 100.0%
	A	13 16.3%	18 22.5%	26 32.5%	23 28.8%	80 100.0%
	U	1 11.1%	3 33.3%	-	5 55.6%	9 100.0%
	D	1 33.3%	1 33.3%	-	1 33.3%	3 100.0%
	SD	-	-	-	1 100.0%	1 100.0%
			-	-	-	

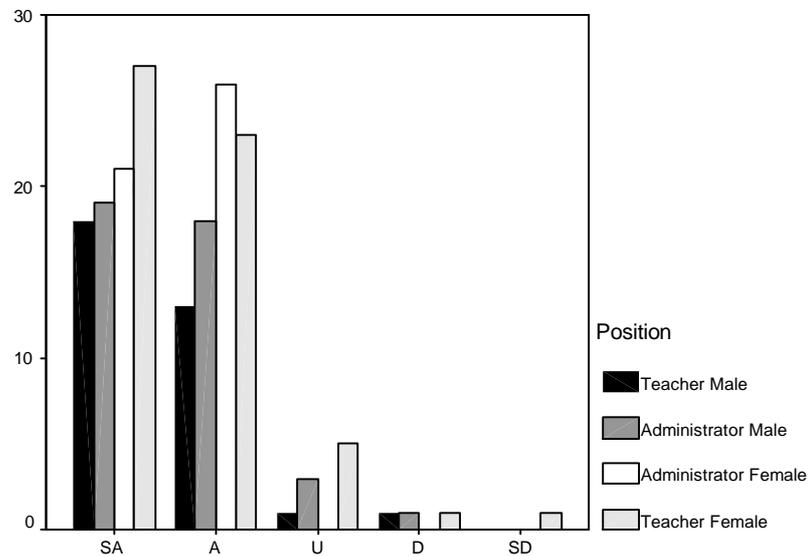


Figure 40. Distribution of Responses to the Statement, "Computer Technology Makes Communication Easy and Fast for Exchanging Information."

*It is Easy to Use Computer Technology for Students' Attendance.*

This question considered whether or not computer technology is easy to use for students' attendance. There were 176 responses and two non-responses. The overall mean was 2.06 with a standard deviation of 0.91 as shown in Appendix F. Table 44 breaks down the information of the question based upon the scale that the survey used and provides the frequencies and percentages of the responses. Eight male teachers, or 15.1%, 20 male administrators, or 37.7%, 13 female administrators, or 24.5%, and 12 female teachers, or 22.6%, responded that they strongly agreed with the statement that computer technology enhances students' attendance. Thirteen male teachers, or 17.6%, 15 male administrators, or 20.3%, 15 female administrators, or 20.3%, and 31 female teachers, or 41.9%, chose the answer, agree. Eight male teachers, or 21.6%, 4 male

administrator, or 10.8%, and 15 female administrators, or 40.5%, and 10 female teachers, or 27%, were uncertain. There were 2 male teachers, or 20%, one male administrator, or 10%, 4 female administrators, or 40%, and 3 female teachers, or 30%, who chose the response, disagree. Only one male administrator, or 50%, and one male teacher, or 50%, reported that they strongly disagree. A majority of the participants (72.2%) emphasized that computer technologies provide a great tool for students' attendances. Male administrators (37%) most strongly agree and more female teachers (41.9%) reported, agree, than male teachers. 21% of the participants were not certain that computer technologies support students' attendances. Figure 41 shows that the majority of the respondents asserted that computer technologies support students' attendance, and some of the participants were uncertain. A dash (-) indicates that the cells are empty.

Table 44

*Frequencies and Percentage Scores of the Participants toward Easy to Use Computer Technology for Students' Attendance (N=176).*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
It is easy to use computer technology for students' attendance	SA	8 15.1%	20 37.7%	13 24.5%	12 22.6%	53 100.0%
	A	13 17.6%	15 20.3%	15 20.3%	31 41.9%	74 100.0%
	U	8 21.6%	4 10.8%	15 40.5%	10 27.0%	37 100.0%
	D	2 20.0%	1 10.0%	4 40.0%	3 30.0%	10 100.0%
	SD	1 50.0%	1 50.0%	- -	- -	2 100.0%

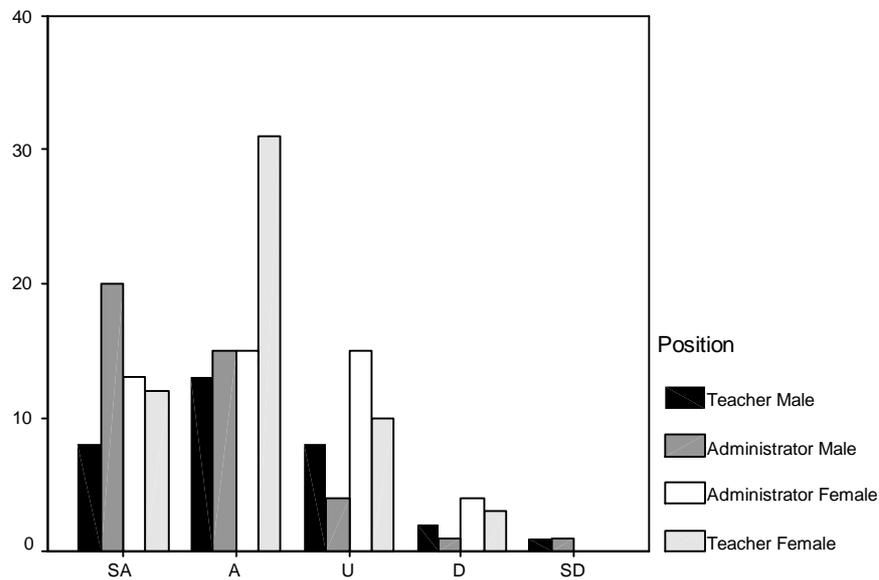


Figure 41. Distribution of the Responses to the Statement, “It Is Easy to Use Computer Technology for Students’ Attendance.”

*Computer Technology Is Useful for Keeping the Track of Students’ Information.*

This question considered whether or not computer technologies support electronically tracking students’ information. There were 176 responses and two non-responses. The overall mean was 1.68 with a standard deviation of 0.765 as shown in Appendix F. Table 45 breaks down the information of the question based upon the scale that the survey used and provides the frequencies and percentages of the responses. There were 14 male teachers, or 16.9%, 25 male administrators, or 30.1%, 21 female administrators, or 25.3%, and 23 female teachers, or 27.7%, who responded that they strongly agreed with the statement that computer technologies support tracking students’ information. Also, there were 15 male teachers, or 20.8%, 12 male administrators, or 16.7%, 21 female administrators, or 29%, and 24 female teachers, or 33.3%, who chose

the answer, agree. Four male teachers, or 23.5%, one male administrator, or 5.9%, 5 female administrators, or 29.4%, and 7 female teachers, or 41.2%, were uncertain. There were 2 male administrators, or 66.7%, and one teacher female, or 33.3%, who chose the response, disagree. Only one male administrator responded, strongly disagree.

The majority of the participants (72.20%) emphasized that computer technologies support tracking students' information. More male administrators (30.1%) responded strongly agree with the statement than the other participants. More female administrators and teachers (62.5%) reported that they agree than male administrators and teachers. 9.7% of the participants were not certain that computer technologies support tracking students' information. Figure 42 shows that the majority of the respondents asserted that computer technologies support tracking students' information. A dash (-) indicates that the cells are empty.

Table 45

*Frequencies and Percentage Scores of the Participants toward Computer Technology Is Useful for Keeping Track of Students' Information (N=176)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
Computer technology is useful for keeping the track of students' information	SA	14	25	21	23	83
		16.9%	30.1%	25.3%	27.7%	100.0%
	A	15	12	21	24	72
		20.8%	16.7%	29.2%	33.3%	100.0%
	U	4	1	5	7	17
		23.5%	5.9%	29.4%	41.2%	100.0%
	D	-	2	-	1	3
		-	66.7%	-	33.3%	100.0%
	SD	-	1	-	-	1
		-	100.0%	-	-	100.0%

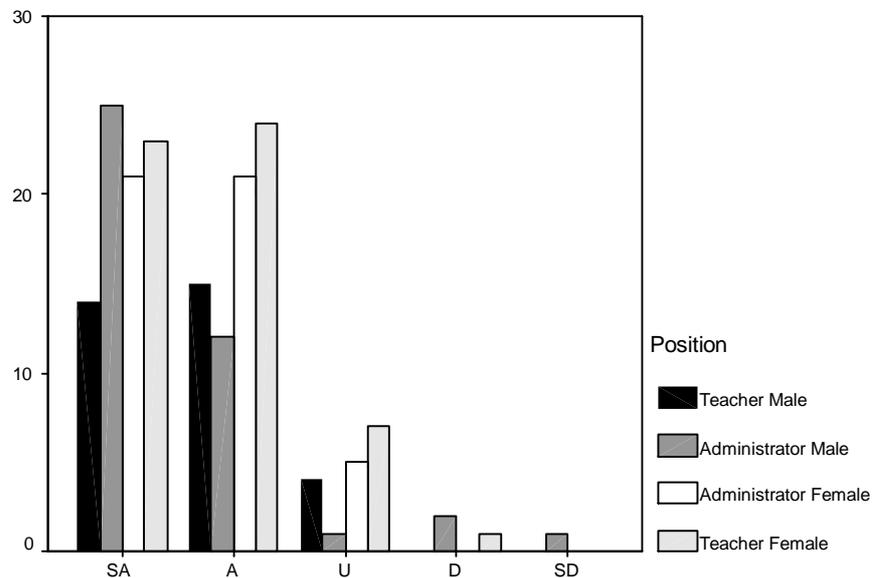


Figure 42. Distribution of the Responses to the statement, “Computer Technology is Useful for Keeping Track of Students’ Information.”

*Administrators and Teachers should Utilize Information Technology in Administrative Work.*

Teachers and administrators were asked whether or not they should employ information technology in administrative work. There were 178 who responded. The mean was 1.56 with a standard deviation of 0.65 as shown in Appendix F. Table 46 breaks down the information of the question based upon the scale that the survey used and provides the frequencies and percentages of the responses. Table 46 shows that of the participants who strongly agreed with the statement, there were 16 male teachers, or 17.4%, 23 male administrators, or 25%, 24 female administrators, or 26.1%, and 29 female teachers, or 31.5%. Of those who agree with the statement, there were 14 male teachers, or 18.4%, 14 male administrators, or 18.4%, 21 female administrators, or

27.60%, and 27 female teachers, or 35.5%. Two male teachers, or 28.6%, 3 male administrator, or 42.9%, one female administrator, or 14.3%, and one female teacher, or 14.3% were uncertain. One male teacher, or 33.3%, one male administrator, or 33.3%, and one female administrator, or 33.3% reported they strongly disagree.

The majority of participants (94.4%) asserted that administrators and teachers should utilize information technology in administrative work. Female administrators and teachers strongly agreed (57.6%) and agree (63.1%). Figure 43 shows the distribution of the participants. It shows that most of the participants strongly agreed and agree that information technology must be used in administrative work. A dash (-) indicates that the cells are empty.

Table 46

*Frequencies and Percentage Scores of the Participants toward Administrators and Teachers should Utilize Information Technology in Administrative Work (N=178)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
I have the knowledge to use computers in administrative work	SA	2 6.7%	13 43.3%	10 33.3%	5 16.7%	30 100.0%
	A	7 11.9%	17 28.8%	22 37.3%	13 22.0%	59 100.0%
	U	19 38.8%	5 10.2%	9 18.4%	16 32.7%	49 100.0%
	D	4 11.4%	6 17.1%	4 11.4%	21 60.0%	35 100.0%
	SD	1 20.0%	-	2 40.0%	2 40.0%	5 100.0%

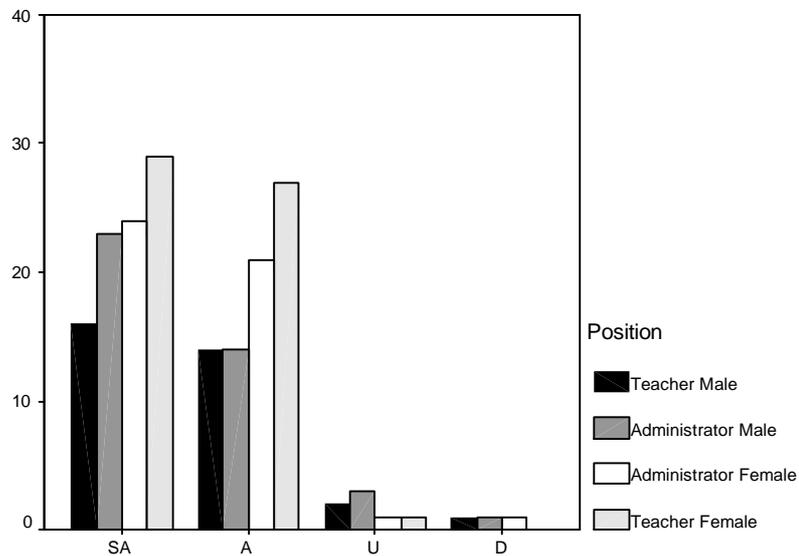


Figure 43. Distribution of the Responses to the statement, "Administrators and Teachers should Utilize Information Technology in Administrative Work."

### *Knowledge and Skills of Information Technology*

#### *I Use The Internet for Communication, Such as Email.*

Teachers and administrators were asked whether or not they used the Internet for communication, such as email. There were 175 responses and 3 non-responses. The mean was 1.74 with a standard deviation of 0.86 as shown in Appendix G. Table 47 breaks down the information of the question based upon the scale that the survey used and provides the frequencies and percentages of the responses. Table 47 shows that of the participants who strongly agree with the statement they were 19 male teachers, or 22.9%, 20 male administrators, or 24.1%, 21 female administrators, or 25.3%, and 23 female teachers, or 27.7%. Those who agreed with the statement were 8 male teachers, or 12.5%, 17 male administrators, or 26.6%, 19 female administrators, or 29.7%, and 20

female teachers, or 31.3%. Whereas, 4 male teachers, or 21.1%, 3 male administrators, or 15.8%, 5 female administrators, or 26.3%, and 7 female teachers, or 36.8%, were uncertain.

Most of the participants (84%) asserted they strongly agree or agree that it is essential to use e-mail in communications. 10.9% of the participants reported that they were not certain, most of whom were represented by the male teachers, female administrators and female teachers. Of those who said, disagree the majority were female teachers. Figure 44 shows the distribution of the participants. A dash (-) indicates that the cells are empty.

Table 47

*Frequencies and Percentage Scores Responses to the Statement, I Use the Internet for Communication, such as Email (N=175)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
I use the Internet for communication, such as email	SA	19 22.9%	20 24.1%	21 25.3%	23 27.7%	83 100.0%
	A	8 12.5%	17 26.6%	19 29.7%	20 31.3%	64 100.0%
	U	4 21.1%	3 15.8%	5 26.3%	7 36.8%	19 100.0%
	D	- -	1 12.5%	2 25.0%	5 62.5%	8 100.0%
	SD	1 100.0%	- -	- -	- -	1 100.0%

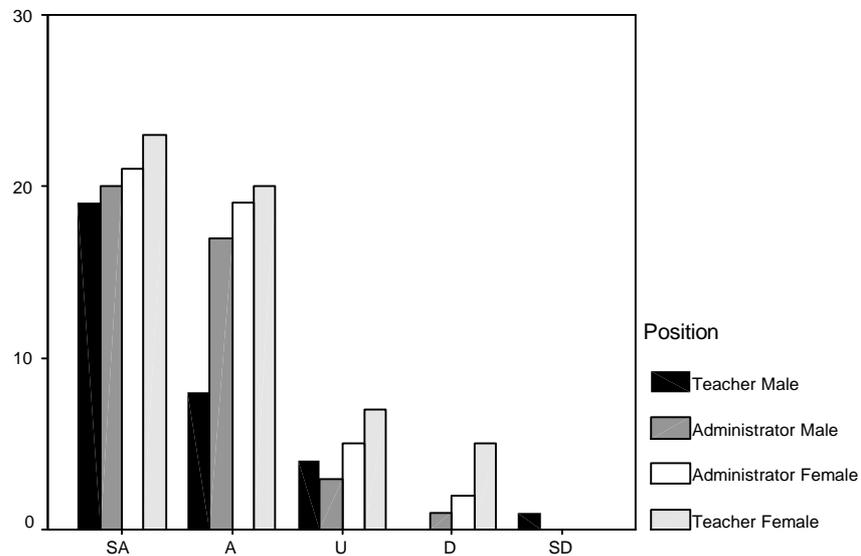


Figure 44. Distribution of the Responses to the statement, “I Use the Internet for Communication, such as Email.”

*I Have the Ability to Use Basic Computer Functions*

The question explored whether administrators and teachers have the ability to conduct basic computer functions. There were 177 responses and one non-response. The overall mean was 2.68 with a standard deviation of 1.05 as shown in Appendix G. Table 48 breaks down the information of the question based upon the scale that the survey used and provides the frequencies and percentages of the responses. According to Table 48, one male teacher, or 4.0%, 11 male administrators, or 44.0%, 6 female administrators, or 24.0%, and 7 female teachers, or 28.0%, responded that they strongly agree that they had the ability to use the basic of the computer functions. Thirteen male teachers, or 24.5%, 9 male administrators, or 17.0%, 17 female administrators, or 32.1%, and 14 female teachers, or 26.4%, chose the answer, agree. Fourteen male teachers, or 23.0%, 11 male

administrators, or 18.0%, 16 female administrators, or 26.2%, and 20 female teachers, or 32.8%, were uncertain. There were 4 male teachers, or 13.3%, 8 male administrators, or 26.7%, 5 female administrators, or 16.7%, and 13 male teachers, or 43.3%, who chose the response, disagree. Only one male teacher, or 12.5%, one male administrator, or 12.5%, 3 female administrators, or 37.5%, and 3 male teachers, or 37.5%, who chose the response, strongly disagree. 34.5% of the participants reported that they were uncertain whether they had enough skills use computer functions. Male and female (teachers and administrators) who did not possess the skills constituted 21.4% of the participants. Male and female (teachers and administrators) that were able to use computer functions represent 44.1%. The majority of the participants who reported that they did not know the basic of computer functions were female administrators, female teachers and male teachers. Figure 45 shows that the many of the participants were uncertain or disagreed with the statement.

Table 48

*Frequencies and Percentage Score of the Responses to the Statement, I Have the Ability to Use Basic Computer Functions*

(N=177)

		Position				
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	Total
I have the ability to use basic computer functions.	SA	1 4.0%	11 44.0%	6 24.0%	7 28.0%	25 100.0%
	A	13 24.5%	9 17.0%	17 32.1%	14 26.4%	53 100.0%
	U	14 23.0%	11 18.0%	16 26.2%	20 32.8%	61 100.0%
	D	4 13.3%	8 26.7%	5 16.7%	13 43.3%	30 100.0%
	SD	1 12.5%	1 12.5%	3 37.5%	3 37.5%	8 100.0%

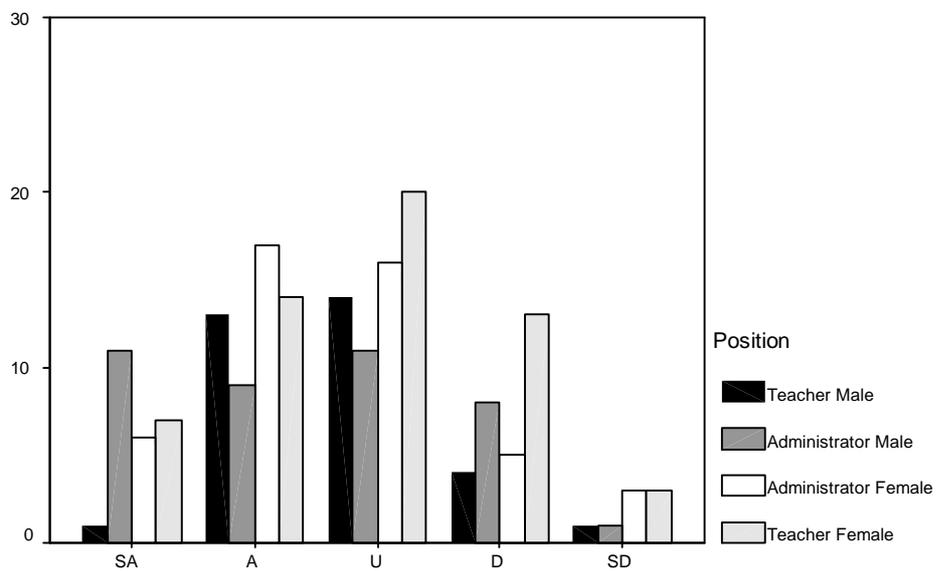


Figure 45. Distribution of the Responses to the statement, “I Have the Ability to Use Basic Computer Functions.”

*I Can Use an Operating System Such as Windows.*

This question investigated whether or not the participants have the ability to use operating systems such as *Windows*. There were 177 responses and one non-response. The overall mean was 2.06 with a standard deviation of 1.10 as shown in Appendix G. Table 49 breaks down the information of the question based upon the scale that the survey used and provides the frequencies and percentages of the responses. Table 48 data indicated that 11 male teachers, or 15.9%, 19 male administrators, or 27.5%, 18 female administrators, or 26.1%, and 21 female teachers, or 30.4%, responded that they strongly agreed that they were able to use the *Windows* operating system. Also, 12 male teachers, or 21.1%, 16 male administrators, or 28.1%, 12 female administrators, or 21.1%, and 17 female teachers, or 29.8%, chose the answer, agree. Nine male teachers, or 32.1%, 14 female administrators, or 50%, and 5 female teachers, or 17.9%, were uncertain. There were only one male administrator, or 5.6%, 6 male administrators, or 33.3%, 1 female administrator, or 5.6%, and 10 female teachers, or 55.6%, who chose the response disagree. Two female administrators, or 40%, and 3 female teachers, or 60%, who strongly disagree. Most of the participants (71.2%) maintained that they are able to use operating systems such as *Windows*. Those who were uncertain or did not have the skills to use the *Windows* operating system represented 28.2% of all the participants. Of the participants who did not have these skills, were female teachers, and female and male administrators. The majority of those who said strongly agree, were female teachers and who those who agree the least were the male teachers. Figure 46 shows that the majority of the respondents asserted that they knew how to use operating systems such as *Windows*. A dash (-) indicates that the cells are empty.

Table 49

*Frequencies and Percentage Scores Responses to the Statement, I Have the Ability to Use Operating Systems, such as Windows (N=177).*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
I can use an operating system such as Windows	SA	11 15.9%	19 27.5%	18 26.1%	21 30.4%	69 100.0%
	A	12 21.1%	16 28.1%	12 21.1%	17 29.8%	57 100.0%
	U	9 32.1%	-	14 50.0%	5 17.9%	28 100.0%
	D	1 5.6%	6 33.3%	1 5.6%	10 55.6%	18 100.0%
	SD	-	-	2 40.0%	3 60.0%	5 100.0%
		-	-			
		18.6%	23.2%	26.6%	31.6%	100.0%

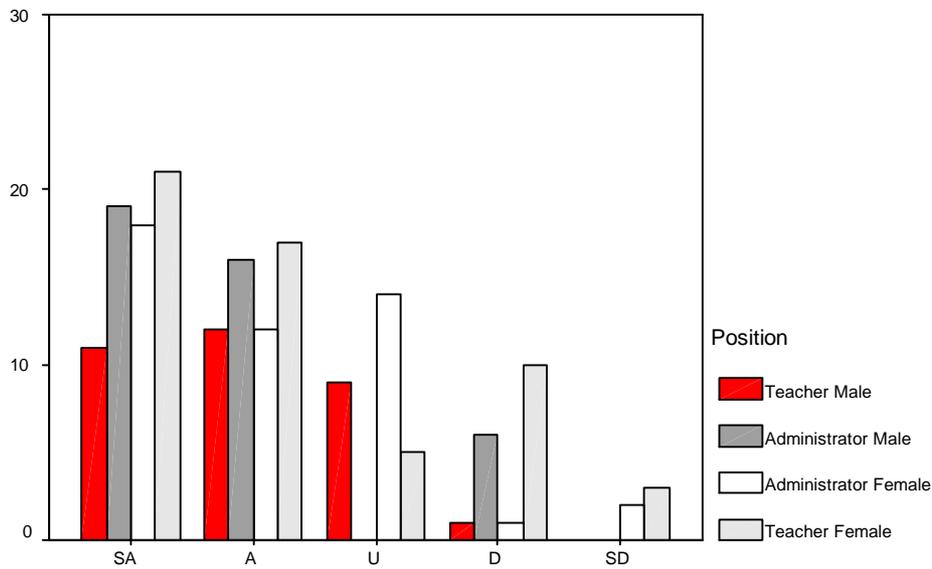


Figure 46. Distribution of the Responses to the statement, “I Have the Ability to Use Operating Systems, such as Windows.”

*I have the Ability to Use PowerPoint.*

This question discussed whether or not the participants have the skills and knowledge to use PowerPoint. There were 175 responses and 3 non-responses. The overall mean was 2.14 with a standard deviation of 0.89 as shown in Appendix G. Table 50 breaks down the information of the question based upon the scale that the survey used and provides the frequencies and percentages of the responses. Table 50 indicates 2 male teachers, or 10%, 7 male administrators, or 35%, 3 female administrators, or 15%, and 8 female teachers, or 40%, responded that they strongly agree. This response meant they are able to use PowerPoint. Also, 9 male teachers, or 29%, 9 male administrators, or 29%, 6 female administrators, or 19.4%, and 7 female teachers, or 22.6%, chose the answer, agree. Twelve male teachers, or 19%, 8 female administrators, or 12.7%, 27 female administrators, or 42.9%, and 16 female teachers, or 25.4% were uncertain. There were 8 male teachers, or 14.8%, 17 male administrator, or 31.5%, 7 female administrators, or 13%, and 22 female, or 40.7%, who chose the response, disagree. Of those who reported, strongly disagree, were 2 male administrators, or 22.2%, 3 female administrators, or 33.3%, and 4 female teachers, or 44.4%. The majority of the participants (72%) affirmed that they were uncertain or did not have the skills to use PowerPoint.

The majority of those who indicated uncertain were female administrators and female teachers. The majority most of those who disagreed were male administrators and female teachers. Figure 47 shows that most of the respondents (72%) asserted that they did not or were uncertain of their skills and knowledge of the PowerPoint application. A dash (-) indicates that the cells are empty.

Table 50

*Frequencies and Percentage Scores Responses to the Statement, I have the Ability to Use PowerPoint (N=175).*

		Position				
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	Total
I have the ability to use PowerPoint	SA	2	7	3	8	20
		10.0%	35.0%	15.0%	40.0%	100.0%
	A	9	9	6	7	31
		29.0%	29.0%	19.4%	22.6%	100.0%
	U	12	8	27	16	63
		19.0%	12.7%	42.9%	25.4%	100.0%
	D	8	17	7	22	54
		14.8%	31.5%	13.0%	40.7%	100.0%
	SD	2	-	3	4	9
		22.2%	-	33.3%	44.4%	100.0%

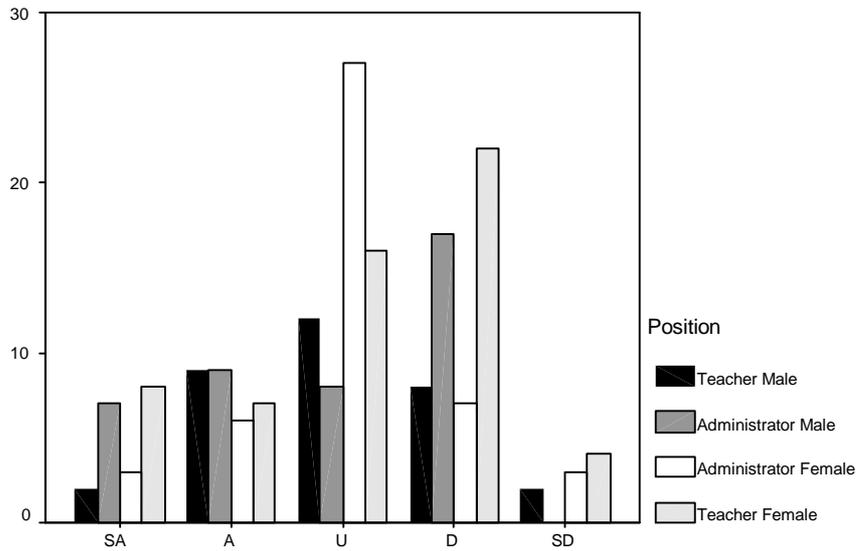


Figure 47. Distribution of the Responses to the statement, “I have the Ability to Use PowerPoint.”

*I Can Use a Spreadsheet, Such as Excel, to Analyze Data in order to Represent My Work.*

This question addressed the knowledge and skills of administrators and teachers in employing spreadsheets, such as *Excel*, in their work. There were 177 responses and one non-response. The overall mean was 2.14 with a standard deviation of 0.89 as shown in Appendix G. Table 51 breaks down the information of the question based upon the scale that the survey used and provides the frequencies and percentages of the responses. Table 51 indicates 13 male teachers, or 25.5%, 9 male administrators, or 17.6%, 12 female administrators, or 23.5%, and 17 female teachers, or 33.3%, responded that they strongly agree with the statement. Fourteen male teachers, or 25%, 14 male administrators, or 25%, 14 female administrators, or 25%, and 14 female teachers, or 25%, chose the answer, agree, while 5 male teachers, or 8.1%, 15 male administrators, or 24.2%, 19 female administrators, or 30.6%, 23 female teachers, or 37.1%, were uncertain. There were 2 male administrators, or 40%, one female administrator, or 20%, and 2 female teachers, or 40%, who chose the response, disagree. There was only one female teacher who strongly disagreed.

Of the participants (38.9%) indicated that they did not have the skills and knowledge of spreadsheets such as *Excel* in the work place. The majority were uncertain with a majority of this number being female teachers, female administrators and male administrators, respectively. Figure 48 shows that many of the participants did not possess the skills and knowledge of spreadsheets in order to analyze data to represent their work.

Table 51

*Frequencies and Percentage Score Responses to the Statement I Can Use a Spreadsheet, Such as Excel, to Analyze Data in order to Represent My Work (N=177)*

		Position				
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	Total
I can use a spreadsheet, such as Excel, to analyze data and draw chart in order to represent my work	SA	13 25.5%	9 17.6%	12 23.5%	17 33.3%	51 100.0%
	A	14 25.0%	14 25.0%	14 25.0%	14 25.0%	56 100.0%
	U	5 8.1%	15 24.2%	19 30.6%	23 37.1%	62 100.0%
	D	-	2 40.0%	1 20.0%	2 40.0%	5 100.0%
	SD	-	-	-	1 100.0%	1 100.0%
			-	-	-	

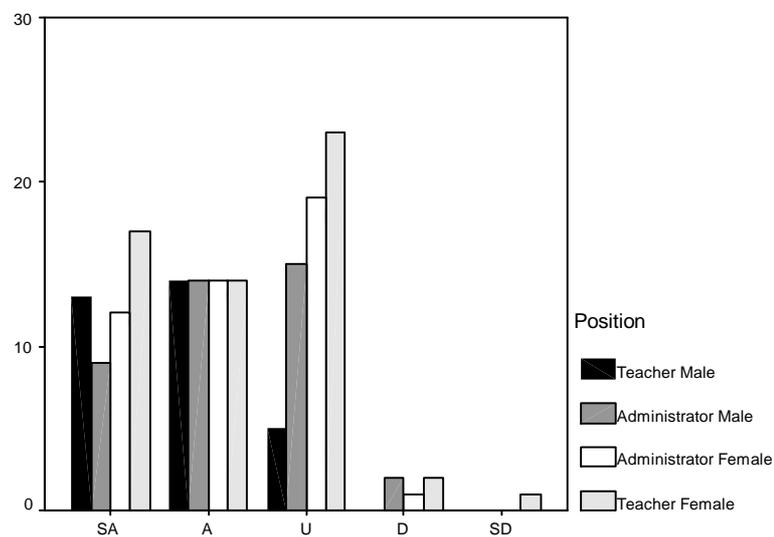


Figure 48. Distribution of the Responses to the statement, “I Can Use a Spreadsheet, Such as Excel, to Analyze Data in order to Represent My Work.”

*I have the Ability to Organize My Files on a Hard Drive, Zip Disc, or Floppy Disc.*

Teachers and administrators were asked whether or not they are able to organize their information on a hard drive, zip disc, or floppy disc. There were 177 responses and one non-response. The mean was 2.42 with a standard deviation of 1.11 as shown in Appendix G. Table 52 breaks down the information of the question based upon the scale that the survey used and provides the frequencies and percentages of the responses. Of the participants who strongly agree with the statement, there were 5 male teachers, or 11.6%, 13 male administrators, or 30.2%, 9 female administrators, or 20.9%, and 16 female teachers, or 37.2%. Of those who agreed with the statement, there were 14 male teachers, or 24.6%, 17 male administrators, or 29.8%, 16 female administrators, or 28.1%, and 10 female teachers, or 17.5%. Meanwhile, 10 male teachers, or 25%, 5 male administrators, or 12.5%, 13 female administrator or 32.5%, 12 male teachers, or 30%, were uncertain. Of those who responded, disagree were 3 male teachers, or 9.1%, 6 male administrators or 18.2%, 9 female administrators, or 27.3%, and 15 female teachers, or 45.5%. Only 4 female teachers who participated said they strongly disagree. Sixteen female teachers reported they strongly agree. Fifteen female teachers stated they did not have ability or disagree.

Consequently, 43.5% of the respondents reported that they did not have the ability to organize their information on the various storage apparatus, such as a hard drive, zip disc, or floppy disc. The majority of the respondents who were not certain were, sequentially (in regards to their inability), 13 female administrators, 12 female teachers, 5 male administrators and 10 male teachers. Those who did not have the skills and knowledge to organize their information on electronic media were, sequentially (in

regards to their inability), female teachers, female administrators, and male administrators. Figure 49 shows the distribution of the participants. A dash (-) indicates that the cells are empty.

Table 52

*Frequencies and Percentage Scores Responses to the Statement, I Have the Ability to Organize My Files on a Hard Drive, Zip Disc, or Floppy Disc (N=177)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
I have the abilities to organize my files on a hard drive, zip disc, or floppy disc	SA	5 11.6%	13 30.2%	9 20.9%	16 37.2%	43 100%
	A	14 24.6%	17 29.8%	16 28.1%	10 17.5%	57 100%
	U	10 25.0%	5 12.5%	13 32.5%	12 30.0%	40 100%
	D	3 9.1%	6 18.2%	9 27.3%	15 45.5%	33 100%
	SD	-	-	-	4 100.0%	4 100%
		-	-	-		

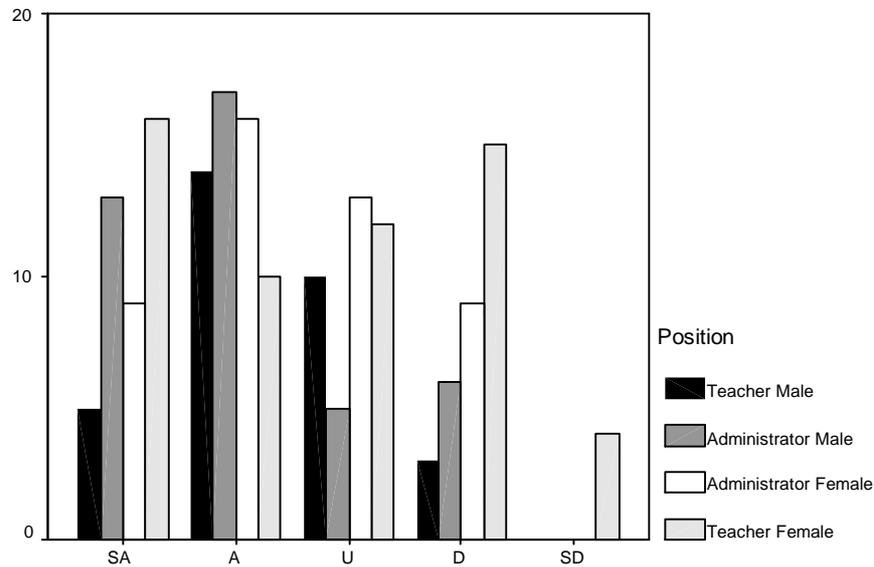


Figure 49. Distribution of the Responses to the statement, “I have the Ability to Organize my Files on a Hard Drive, Zip Disc, or Floppy Disc.”

*I Know How to Use the Internet Search Engines in order to Seek Information.*

Teachers and administrators were asked whether or not they knew how to use the Internet search engines to seek information that they need. There were 178 responses. The mean was 2.65 with a standard deviation of 1.02 as shown in Appendix G. Table 53 breaks down the information of the question based upon the scale that the survey used and provides the frequencies and percentages of the responses. Table 53 shows that of the participants who strongly agreed with the statement, there were 5 male teachers, or 19.2%, 8 male administrators, or 30.8%, 6 female administrators, or 23.1%, and 7 female teachers, or 26.9%. Of those who agreed with the statement, there were 13 male teachers, or 24.5%, 16 male administrators, or 30.2%, 9 female administrators, or 17%, and 15 female teachers, or 28.2%. Whereas, 13 male teachers, or 21.3%, 8 male administrator,

or 13.1%, 25 female administrators, or 41%, and 15 male teachers, or 24.6%, were uncertain. Of those who disagreed were 2 male teachers, or 5.9%, 9 male administrators, or 26.5%, 7 female administrators, or 20.6%, and 16 female teachers, or 47.1%, while 4 female administrators, or 50%, strongly disagreed.

A majority of the participants (54.6%) asserted that they did not have the knowledge and skills to use search engines on the Internet to get information that they need. Most of those who were not certain were, sequentially (in regards to their inability), female administrators, female teachers, and male teachers. The majority of those who disagreed were female teachers and those who disagreed the least were male teachers. Figure 50 indicates there were many participants who were not able to use the web search engines to acquire information. A dash (-) indicates that the cells are empty.

Table 53

*Frequencies and Percentage Scores Responses to the Statement, I Know How to Use the Internet Search Engines in Order to Seek Information (N=178)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
I know how to use the Internet search engines in order to seek information	SA	5 19.2%	8 30.8%	6 23.1%	7 26.9%	26 100.0%
	A	13 24.5%	16 30.2%	9 17.0%	15 28.3%	53 100.0%
	U	13 21.3%	8 13.1%	25 41.0%	15 24.6%	61 100.0%
	D	2 5.9%	9 26.5%	7 20.6%	16 47.1%	34 100.0%
	SD	-	-	-	4 100.0%	4 100.0%
		-	-	-		

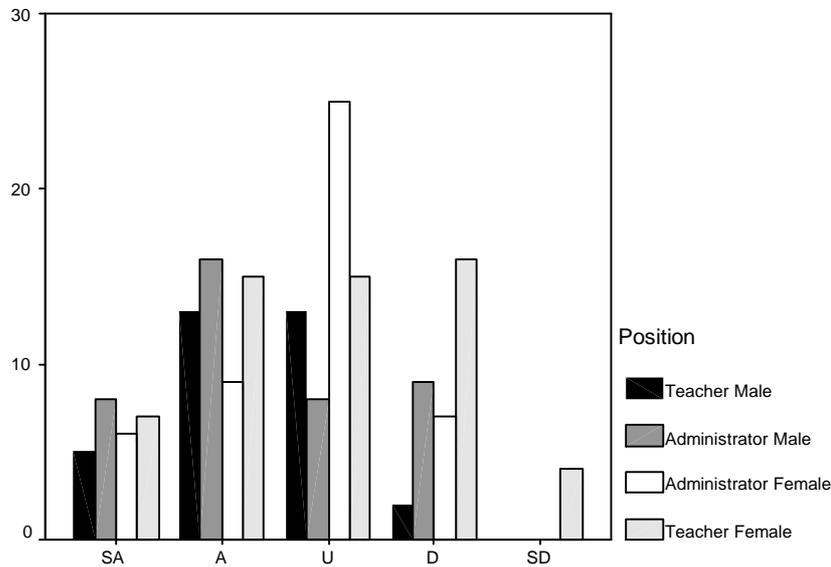


Figure 49. Distribution of the Responses to the statement, “I Know How to Use the Internet Search Engines in order to Seek Information.”

*I have the Skills to Develop My Own Web Page.*

Teachers and administrators were asked whether or not they have skills and knowledge to develop a web page. There were 177 responses and one non-response. The overall mean was 2.65 with a standard deviation of 1.02 as shown in Appendix G. Table 54 breaks down the information of the question based upon the scale that the survey used and provides the frequencies and percentages of the responses. According to Table 54, three female administrators, or 75%, and one female teacher, or 25%, responded that they strongly agree that they were able to develop their own web pages. Four male teachers, or 18.2%, 5 male administrators, or 22.7%, 4 female administrators, or 18.2%, and 9 female teachers, or 40.9%, chose the answer, agree. Eight male teachers, or 14%, 9 male administrators, or 15.8%, 23 female teachers, or 40.4%, and 17

male teachers, or 29.8% were uncertain. There were 17 male teachers, or 22.4%, 21 male administrators, or 27.6%, 13 female administrators, or 17.1%, and 25 female teachers, or 32.9%, who chose the response, disagree. Four male teachers, or 22.2%, 5 male administrators, or 27.8%, 4 female administrators, or 22.2%, and 5 female teachers, or 27.8%, who strongly disagree with the statement.

Most of the participants (85.15%) did not have the skills and knowledge to develop their own web pages. A dash (-) indicates that the cells are empty.

Table 54

*Frequencies and Percentage Scores Responses to the Statement, I Have the Skills to Develop My Own Web Page (N=177)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
I have the skills to develop my own web page	SA	-	-	3	1	4
		-	-	75.0%	25.0%	100.0%
	A	4	5	4	9	22
		18.2%	22.7%	18.2%	40.9%	100.0%
	U	8	9	23	17	57
		14.0%	15.8%	40.4%	29.8%	100.0%
	D	17	21	13	25	76
		22.4%	27.6%	17.1%	32.9%	100.0%
	SD	4	5	4	5	18
		22.2%	27.8%	22.2%	27.8%	100.0%

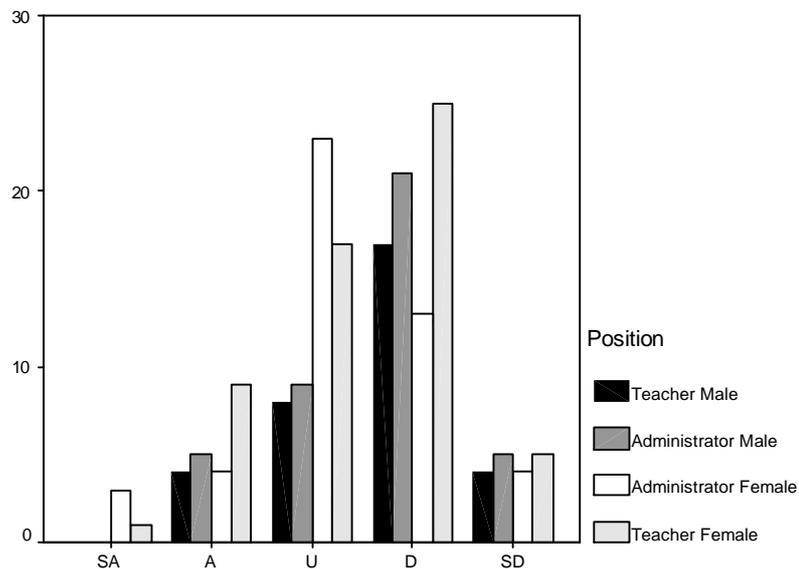


Figure 51. Distribution of the Responses to the statement, “I have the Skills to Develop My Own Web Page.”

*I Can Use Word Processing Functions to Write and Edit My Text.*

This question considered whether or not teachers and administrators are able to use word processing functions to write and edit text. There were 178 responses. The overall mean was 2.36 with a standard deviation of 1.10 as shown in Appendix G. Table 55 breaks down the information of the question based upon the scale that the survey used and provides the frequencies and percentages of the responses. According to the data in Table 55, 9 male teachers, or 17.4%, 11 male administrators, or 23.9%, 10 female administrators, or 21.7%, and 17 female teachers, or 37%, strongly agree that they have the skills that allow them to use word processing functions. Ten male teachers, or 16.9%, 20 male administrators, or 33.9%, 15 female administrators, or 25.4%, and 14 female teachers, or 23.7%, chose the answer, agree. Twelve male teachers, or 29.3%, 3 male

administrators, or 7.3%, and 16 female administrators, or 39%, 10 female teachers, or 24.4% were uncertain. There were 2 male teachers, or 7.4%, 6 male administrators, or 22.2%, 6 female administrators, or 22.2% and 13 female teachers, or 48.1%, who chose the response, disagree and one male teacher, or 20%, one male administrator, or 20%, and 3 male teachers, or 60%, who strongly disagree.

Consequently, 41% of the participants indicated that they did not have word processing skills. They were unable to utilize word processing in their work. The majority of those who were uncertain were female administrators and male teachers. The majority of those who said, disagree were female teachers. Figure 52 shows that some of the participants did not possess the skills and knowledge to employ word processing in their work. A dash (-) indicates that the cells are empty.

Table 55

*Frequencies and Percentage Scores Responses to the Statement, I Can Use Word Processing Functions to Write and Edit My Text (N=178).*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
I can use word processing functions to write and edit my text	SA	8	11	10	17	46
		17.4%	23.9%	21.7%	37.0%	100.0%
	A	10	20	15	14	59
		16.9%	33.9%	25.4%	23.7%	100.0%
	U	12	3	16	10	41
		29.3%	7.3%	39.0%	24.4%	100.0%
	D	2	6	6	13	27
		7.4%	22.2%	22.2%	48.1%	100.0%
	SD	1	1	-	3	5
		20.0%	20.0%	-	60.0%	100.0%

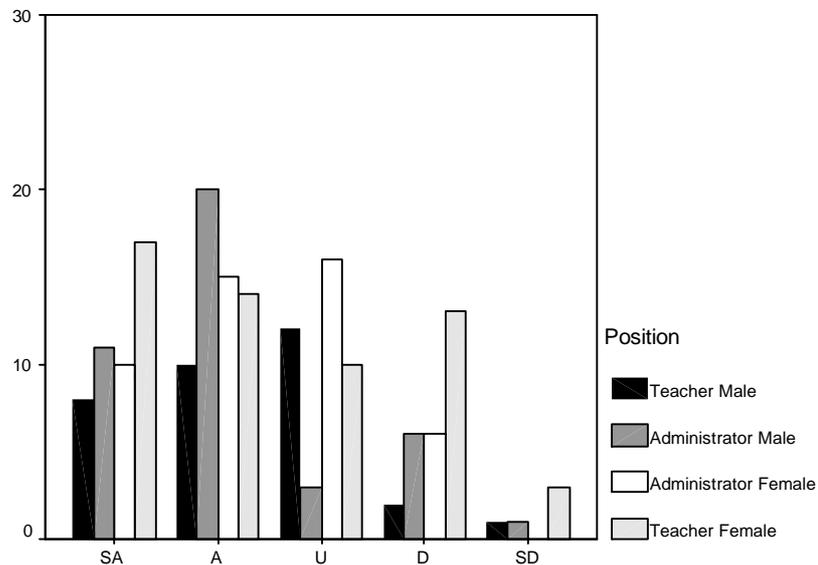


Figure 52. Distribution of the Responses to the statement, “I Can Use Word Processing Functions to Write and Edit My Text.”

*I Have the Knowledge to Use Information Technology in Administrative Work.*

This question considered whether or not teachers and administrators were able to use computer technologies to support administrative work. There were 178 responses. The overall mean was 2.58 with a standard deviation of 1.07 as shown in Appendix G. Table 56 breaks down the information of the question based upon the scale that the survey used and provides the frequencies and percentages of the responses. According to Table 56, 2 male teachers, or 6.7%, 13 male administrators, or 43.3%, 10 female administrators, or 33.3%, and 5 female teachers, or 16.7%, responded that they strongly agreed with the statement that computer technologies support tracking students’ information. Seven male teachers, or 11.9%, 17 male administrators, or 28.8%, 22 female administrators, or 37.3%, and 13 female teachers, or 22%, chose the answer,

agree. However, 19 male teachers, or 38.8%, 5 male administrators, or 10.2%, 9 female administrators, or 18.4%, and 16 female teachers, or 32.7%, were uncertain. There were 4 male administrators, or 11.4% and 6 male teacher, or 17.1%, 4 female administrators, or 11.4%, 21 female teachers, or 60%, chose the response, disagree. One male administrator, or 20%, 2 female administrators, or 40%, and 2 female teachers, or 40% reported that they strongly disagree.

Consequently, 50% of the participants reported that they don't have the skills to use computer technology in administrative work. A dash (-) dash indicates that the cells are empty. Figure 53 shows that half of the respondents did not have computer technology skills to use for their administrative work.

Table 56

*Frequencies and Percentage Scores of the Responses to the Statement, I Have the Knowledge to Use Computers in Administrative Work (N=178)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
I have the knowledge to use computers in administrative work	SA	2 6.7%	13 43.3%	10 33.3%	5 16.7%	30 100.0%
	A	7 11.9%	17 28.8%	22 37.3%	13 22.0%	59 100.0%
	U	19 38.8%	5 10.2%	9 18.4%	16 32.7%	49 100.0%
	D	4 11.4%	6 17.1%	4 11.4%	21 60.0%	35 100.0%
	SD	1 20.0%	-	2 40.0%	2 40.0%	5 100.0%

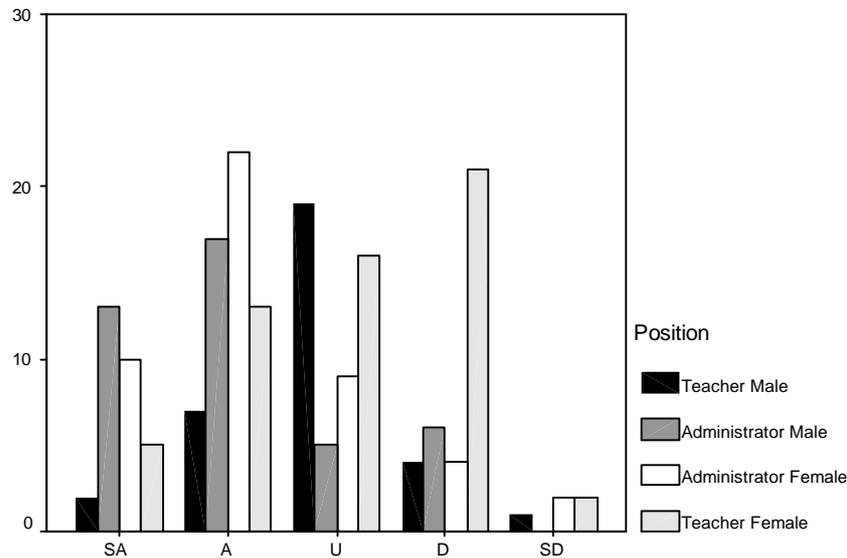


Figure 53. Distribution of the Responses to the statement, “I Have the Knowledge to Use Computers in Administrative Work.”

*I Have the Ability to Select and Evaluate Software for School.*

This question investigated whether teachers and administrators had obtained the skills and knowledge to permit them to evaluate software and courseware for their schools. There were 178 responses. The mean was 2.8 with a standard deviation of 1.035 as shown in Appendix G. Table 57 breaks down the information of the question based upon the scale that the survey used and provides the frequencies and percentages of the responses. Table 57 shows that of those participants who strongly agree with the statement, there were 2 male teachers, or 10%, 6 male administrators, or 30%, 9 female administrators, or 45%, and 3 female teachers, or 15%. Of those who agree with the statement, there were 8 male teachers, or 19%, 16 male administrators, or 38.1%, 10 female administrators, or 23.8%, and 8 female teachers, or 19%. Whereas, 12 male

teachers, or 18.2%, 9 male administrators, or 13.6%, 19 female administrators, or 28.8%, and 26 female teachers, or 39.4%, were uncertain. Nine male teachers, or 20.9%, 9 male administrators, or 20.9%, 6 female administrators, or 14%, and 19 female teachers, or 44.2%, disagree. Two male teachers, or 28.6%, 1 male administrator, or 14.3%, 3 female administrators, or 42.9%, and 1 female teacher, or 14.3% strongly disagree.

Consequently, most of the participants (65.2%) indicated that they do not have the skills and knowledge to allow them to evaluate and choose appropriate software for school. Of those who were uncertain were 26 female teachers, 19 female administrators, 12 male teachers and 9 male administrators. Those who disagree and strongly disagree were, 20 female teachers, 11 male teachers, 10 male administrators and 9 female administrators. Figure 54 shows that the majority of the participants do not have the skills and knowledge to give them the ability to consider what type of software to use in school.

Table 57

*Frequencies and Percentage Scores of the Responses to the Statement, I Have the Ability to Select and Evaluate Software for School (N=178)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
I have the ability to select and evaluate software for school	SA	2	6	9	3	20
		10.0%	30.0%	45.0%	15.0%	100.0%
	A	8	16	10	8	42
		19.0%	38.1%	23.8%	19.0%	100.0%
	U	12	9	19	26	66
		18.2%	13.6%	28.8%	39.4%	100.0%
	D	9	9	6	19	43
		20.9%	20.9%	14.0%	44.2%	100.0%
	SD	2	1	3	1	7
		28.6%	14.3%	42.9%	14.3%	100.0%

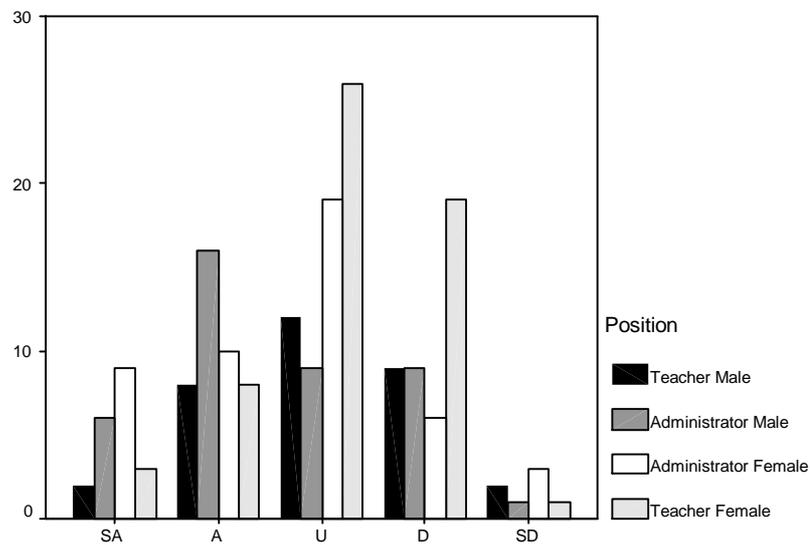


Figure 54. Distribution of the Responses to the Statement, “I Have the Ability to Select and Evaluate Software for School.”

*I have the Ability to Select and Evaluate Hardware for School.*

The teachers and administrators were asked whether or not they have the skills and knowledge of evaluating hardware for school. There were 178 responses. The mean was 2.88 with a standard deviation of 0.99 as shown in Appendix G. Table 58 breaks down the information of the question based upon the scale that the survey used and provides the frequencies and percentages of the responses. Table 58 shows that of those participants who strongly agree with the statement were 2 male teachers, or 11.8%, 4 male administrators, or 23.5%, 7 female administrators, or 41.2%, and 4 female teachers, or 23.5%. Of those who agreed with the statement, there were 8 male teachers, or 20%, 15 male administrators, or 37.5%, 10 female administrators, or 25%, and 7 female teachers, or 17.5%. Thirteen male teachers, or 17.1%, 14 male administrators, or 18.4%, 20 female administrators, or 26%, and 29 female teachers, or 38.2%, were uncertain. Seven male teachers, or 18.9%, 7 male administrators, or 18.9%, 7 female administrators, or 18.9%, and 16 female teachers, or 43.2%, responded that they disagreed. Whereas, three male teachers, or 37.5%, 1 male administrator, or 12.5%, 3 female administrators, or 37.5%, and 1 female teacher, or 12.5%, strongly disagree.

Most of participants (68%) pointed out that they had not acquired the skills and knowledge of information technology that allow them to evaluate the computer technology hardware for school. Of the participants who were uncertain were 29 female teachers, 20 female administrators, 14 male administrators, and 13 male teachers. Those who disagree and strongly disagree were 17 female teachers, 10 female administrators, 10 male teachers, 8 male administrators. Figure 55 shows that most participants had not acquired knowledge and skills about information technology.

Table 58

*Frequencies and Percentage Scores of the Responses to the Statement, I Have the Ability to Select and Evaluate Hardware for School (N=178)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
I have the ability to select and evaluate hardware for school	SA	2	4	7	4	17
		11.8%	23.5%	41.2%	23.5%	100.0%
	A	8	15	10	7	40
		20.0%	37.5%	25.0%	17.5%	100.0%
	U	13	14	20	29	76
		17.1%	18.4%	26.3%	38.2%	100.0%
	D	7	7	7	16	37
		18.9%	18.9%	18.9%	43.2%	100.0%
	SD	3	1	3	1	8
		37.5%	12.5%	37.5%	12.5%	100.0%

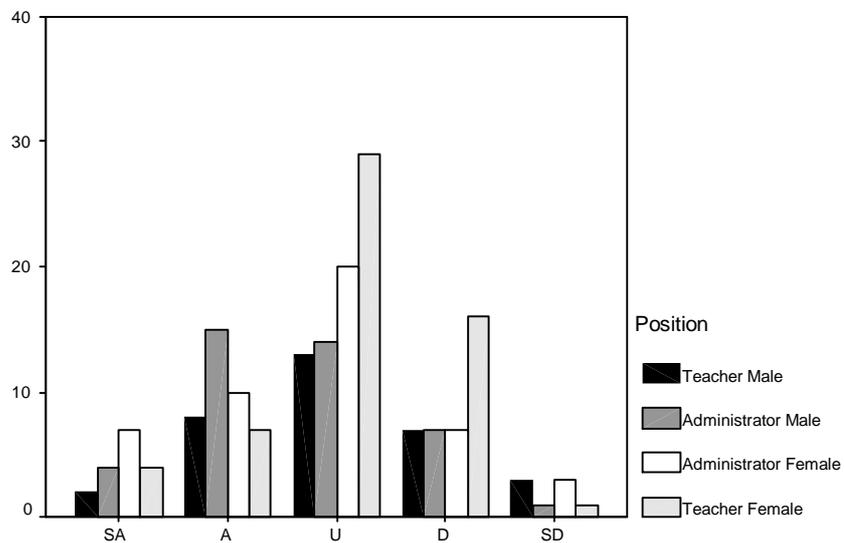


Figure 55. Distribution of the Responses to the statement, “I Have the Ability to Select and Evaluate Hardware for School.”

*Information Technology Staff Development*

The administrators and teachers were asked whether they have taken information technology courses related to computers and the Internet. Table 59 illustrates the participants' information in two categories, yes or no. Of the respondents who had taken courses there were 15 male teachers, or 22.4%, 15 male administrators, 22.4%, 15 female administrators, or 22.4%, and 22 female teachers, or 32.8%. Of the participants who reported that they had not take courses in this field, 18 were male teachers, or 16.2%, 26 were male administrators, or 23.4%, 32 were female administrators, or 28.8%, and 35 were female teachers, or 31.5%.

The majority of the participants (62.4%) had not taken computer. The majority of those who said they had taken courses were female teachers. Those who reported they had not taken courses were: 31.5% female teachers, 28.8% female administrators, 23.4% male administrators, and 16.2% male teachers. Figure 55 shows how the majority of participants have not taken information courses.

Table 59

*Frequencies and Percentage Scores Responses to the Question, Have you Taken a Computer or the Internet Course? (N=178)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
Have you taken a computer or Internet course(s)?	Yes	15 22.4%	15 22.4%	15 22.4%	22 32.8%	67 100%
	No	18 16.2%	26 23.4%	32 28.8%	35 31.5%	111 100%

Table 60

*Frequencies and Percentage Scores of the Participants who Have Taken Computer or the Internet Courses or Not (N=178.*

	Frequency	Percent
Yes	67	37.6
No	111	62.4
Total	178	100.0

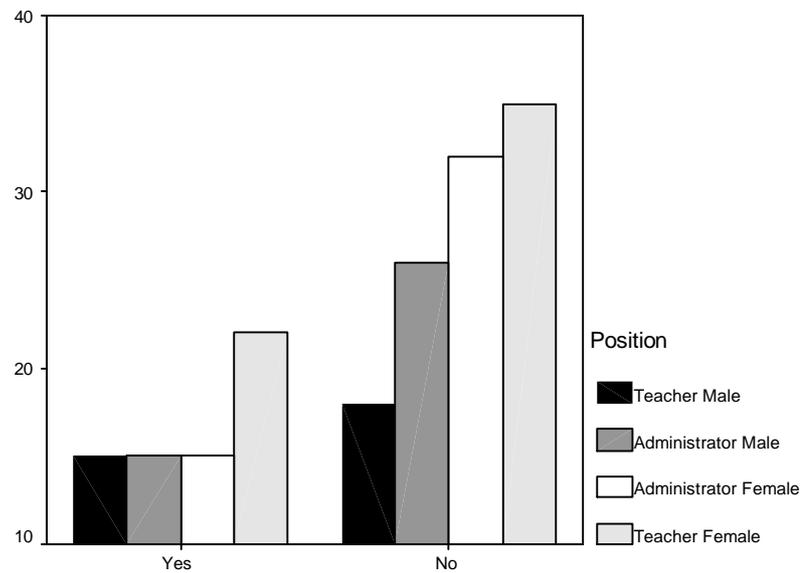


Figure 55. Distribution of the Responses to the Question, “have you Taken a Computer or the Internet Course?”

*Information Technology Staff Development Plan*

This question investigated whether teachers and administrators have a staff development plan that manages and develops their knowledge and skills of information technology. Table 61 breaks down the information of the question based upon the scale

that the survey used and provides the frequencies and percentages of the responses.

Respondents to this question were who reported a 'yes' response were 1 male teacher, or 7.7%, 3 male administrators, or 23.1%, 7 female administrators, or 53.8%, and 2 female teachers, or 15.4%. Conversely, those who replied 'no' were 7 male teachers, or 10%, 20 male administrators, or 28.6%, 23 female administrators, or 32.9%, 20 female teachers, or 28.6%. Twenty-five male teachers, or 27.2%, 17 male administrators, or 18.5%, 16 female administrators, or 17.4%, and 34 female teachers, or 37%, responded that they did not know.

The majority of the respondents (92.6%) were divided into two factions: the participants who said no (40%) and those who did not know whether or not there is a staff development plan (52.6%). The majority of the respondents who said 'no' were 23 female administrators, 20 female teachers, and 20 male teachers. The majority who reported I don't know were 34 female teachers, 25 male teachers, 17 male administrators and 16 female administrators. Figure 57 shows that the majority of the participants (92.6%) did not know anything about a staff development plan.

Table 61

*Frequencies and Percentage Scores Responses to the Question, Do you have a Staff Development Plan at your School? (N=175)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
Do you have a staff development plan at your school?	Yes	1 7.7%	3 23.1%	7 53.8%	2 15.4%	13 100%
	No	7 10.0%	20 28.6%	23 32.9%	20 28.6%	70 100%
	I do not know	25 27.2%	17 18.5%	16 17.4%	34 37.0%	92 100%

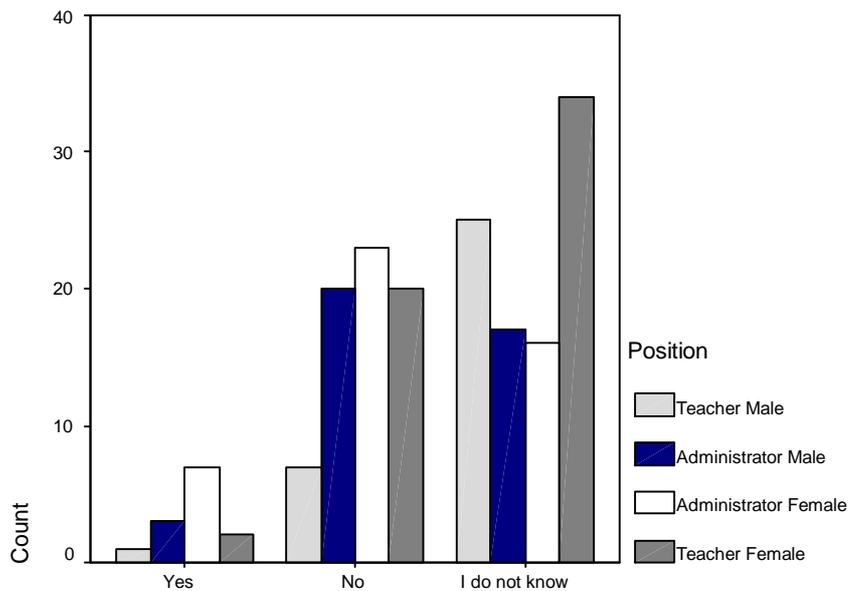


Figure 57. Distribution of the Responses to the Question, “Do you Have a Staff Development Plan at you School?”

*Indicate Your Current Need for Computer Training the Programs in Following Scale?*

The teachers and administrators were asked whether they need to acquire skills and knowledge of information technology so that they can implement it in an educational setting. Table 62 breaks down the information of the question based upon the scale that the survey used and provides the frequencies and percentages of the responses. The respondents who reported that they need these skills were 14 male teachers, or 18.7%, 18 male administrators, or 24%, 16 female administrators, or 27%, and female teachers, or 36%. Those who indicated that they strongly need these skills were 19 male teachers, or 19.2%, 21 male administrators, or 21.2%, 29 female administrators, or 29.3% and 30 female teachers, or 30.3%.

The majority of the participants (98.3%) asserted that staff development of information technology is strongly needed. Figure 58 shows how the participants stressed that staff development should be part of their educational institutions. A dash (-) indicates that the cells are empty.

Table 62

*Frequencies and Percentage Scores of the Responses to the Statement, Indicate your Current Need for Computer Training Programs (N=177)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
Indicate your current need for computer training the programs in following scale	No Need	-	2	1	-	3
	Need	-	66.7%	33.3%	-	100%
	Need	14 18.7%	18 24.0%	16 21.3%	27 36.0%	75 100%
	Strong Need	19 19.2%	21 21.2%	29 29.3%	30 30.3%	99 100%

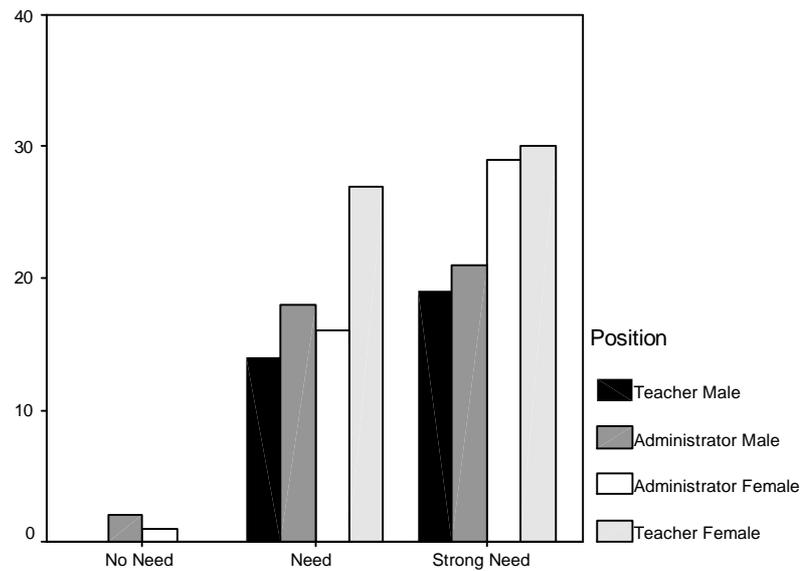


Figure 58. Distribution of the Responses to the statement, “Indicate Your Current Need for Computer Training Programs.”

### *Constructivism and Behaviorism Approaches*

The questions that were asked of the participants were composed of eight constructivism statements and eight behaviorism statements, in order to identify which approach the participants followed in instruction. Table 63 provides information on which method the participants followed in their instruction. An analysis of the data indicated that there were three groups. The first group includes all those who answered a number of constructivism questions equal to the number of behaviorism questions, and ranked them neither constructivist nor behaviorist. There were 19 participants in this category. This represented 10.7% of the participants. Of these, 2.2% were male teachers, 4.5% were male administrators, 1.7% were female administrators, and 2.2% were female teachers. The second constructivism group included 14 participants, which represented 7.9% of the participants. Of these, 4.5% were male administrators, 2.2% were female administrators, and 1.1% were female teachers. A majority of the participants (145) identified themselves as behaviorists, which represented 81.5%. Of these, 16.3% were male teachers, 14% were male administrators, 22.5% were female administrators, and 28.7% were female teachers. Figure 58 shows that most of the participants were influenced by the behaviorist approach.

### *Methods of Instruction Used*

Tables 64 and 65 show the number of the participants who responded to each question. Table 64 contains all of the questions that represent the constructivism method. There were 26 participants who answered 5 or and more questions. Table 65 provides information that represents the behaviorist method. 125 participants responded to five or

more questions. This represented 70.22% of the subjects. A dash (-) indicates that the cells are empty.

Table 63

*Frequencies and Percentage Scores of the Participants Toward Method and Philosophy of Teaching (N=178)*

		Position				Total
		Teacher Male	Administrator Male	Administrator Female	Teacher Female	
Method of teaching that is used	Equal	4 21.1%	8 42.1%	3 15.8%	4 21.1%	19 100.0%
	Cognitive	- -	8 57.1%	4 28.6%	2 14.3%	14 100.0%
	Behaviorist	29 20.0%	25 17.2%	40 27.6%	51 35.2%	145 100.0%

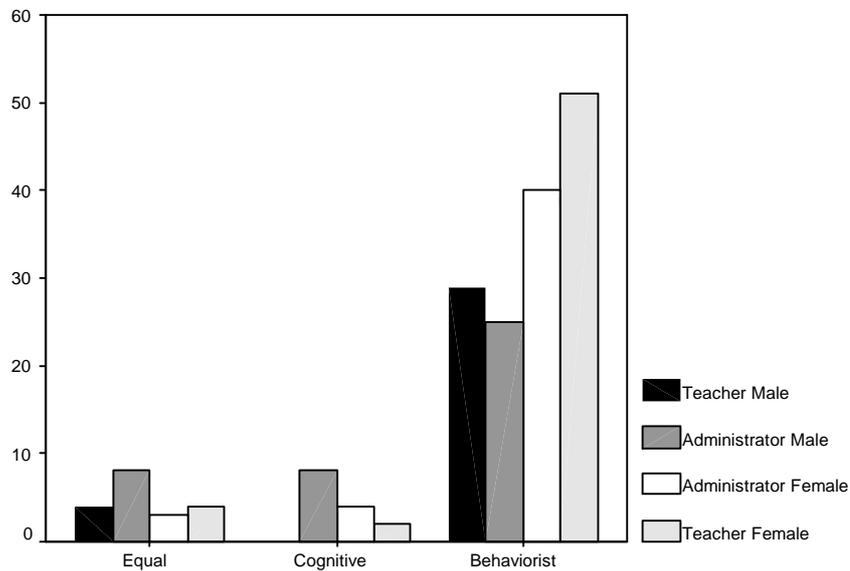


Figure 59. Distribution of the Participants toward Method and Philosophy of Teaching.

Table 64.

*Constructivist Items and How Many Participants Answered Each Question (N=178)*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	23	12.9	12.9	12.9
	1	35	19.7	19.7	32.6
	2	31	17.4	17.4	50.0
	3	40	22.5	22.5	72.5
	4	23	12.9	12.9	85.4
	5	13	7.3	7.3	92.7
	6	5	2.8	2.8	95.5
	7	5	2.8	2.8	98.3
	8	3	1.7	1.7	100.0
	Total	178	100.0	100.0	

Table 65

*Behaviorist Items and How Many Participants Answered Each Question (N=178)*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	2	1.1	1.1	1.1
	1	10	5.6	5.6	6.7
	2	8	4.5	4.5	11.2
	3	16	9.0	9.0	20.2
	4	17	9.6	9.6	29.8
	5	26	14.6	14.6	44.4
	6	27	15.2	15.2	59.6
	7	34	19.1	19.1	78.7
	8	38	21.3	21.3	100.0
	Total	178	100.0	100.0	

### *The Results of Hypotheses Investigation*

#### *Multivariate Analysis of Variance (MANOVA)*

A two-way multivariate analysis of variance (MANOVA) was conducted as an appropriate test to compare the group means of information technology in instruction and the development of an information technology plan for the position of the teachers and administrators and gender (male and female). In the study, the significant level used was 0.05. Appendix H indicated that  $F(2, 150) = 3.014, P = .052$ . The result of MANOVA showed there is no significant interaction between gender and position based on the combination of information technology plan and information technology in instruction as shown in the Figure 60 & 61.

Appendix H indicated that the result of MANOVA testing shows that there is no significant difference according to position, where  $F(2, 150) = .888, P = .413$ , and there is no difference according to gender, where  $F(2, 150) = 1.208, P = .302$ .

The result of the MANOVA test indicates there were no significant differences between gender and position on combination of information technology plan and information in instruction.

The overall mean for the dependent variable, the information technology plan, was 1.91. This indicated that the participants asserted the importance of information technology plan. The overall mean for the dependent variable, information technology in instruction, was 2.03, which indicated that the participants affirmed the vital nature of information technology in instruction.

Figure 60 shows that there was no interaction between the position and gender on information technology plan. The two lines that represented the participants' perceptions

were parallel. This indicates that the perception of male and female (teachers and administrators) concerning development of an information technology plan are similar.

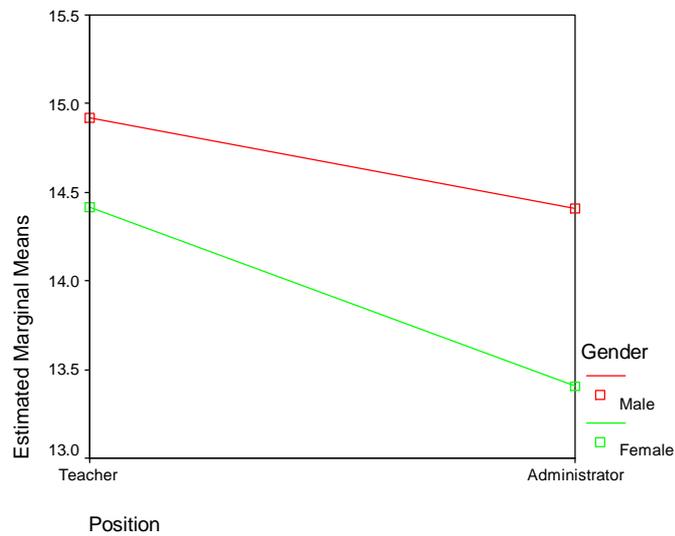


Figure 60. Estimated Marginal Means of Information Technology Plan.

Figure 61 shows that there was no interaction between the position and gender on information technology in instruction. The interaction between gender and position as shown in Figure 61 is false. The result is very clear in the next test, which is univariate analysis.

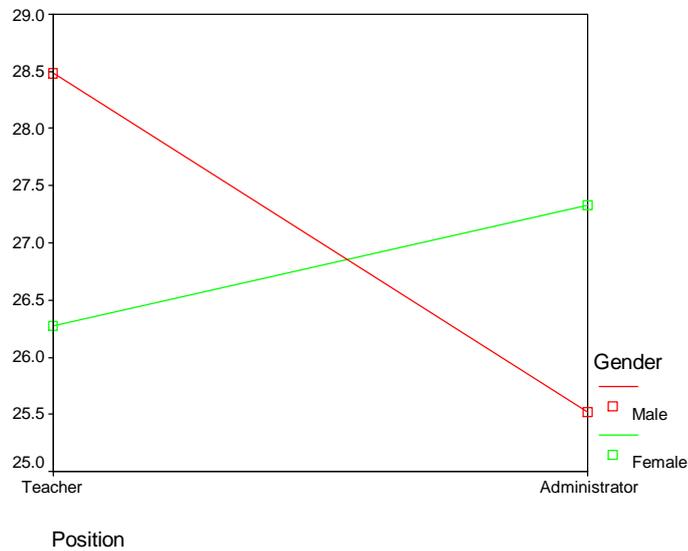


Figure 61. Estimated Marginal Means of Information Technology in Instruction.

#### *Univariate Analysis (Analysis of Variance, ANOVA)*

In the univariate analysis (ANOVA), each dependent variable tests with two independents. The first dependent variable was information technology plan. Appendix I indicated that the result from ANOVA test shows that there is no significant difference in the information technology plan, where  $F(1,169) = 1.81, P = 0.18$ . There is no difference according to gender where  $F(1, 16) = 1.006, P = 0.31$ . The ANOVA test indicated there is no significant interaction between position and gender on information technology plan, where  $F(1, 16) = 0.43, P = 0.51$ . The lines are paralleled as shown in Figure 60.

The second dependent variable was information technology in instruction. Appendix I indicated that the result from ANOVA test shows that there is no significant difference in information technology in instruction, where  $F(1, 16) = 1.48, P = .22$ . There is no difference according to gender, where  $F(1, 16) = 1.06, P = .98$ . The univariate

analysis test indicated there is no significant interaction between position and gender on information technology in instruction, where  $F(1, 16) = 2.37, P = .12$ . The lines show there is interaction as shown in Figure 61 but the true result is that there is no interaction, where  $P = 0.12$ .

*Assumptions of Multivariate Analysis of Variance (MANOVA)*

1. Independence of observation

Each of the respondents answered independently the items of the questionnaire.

2. Homogeneity of covariance

There were no significant differences between the variance and covariance matrixes, so the multivariate homogeneity assumption was met,  $P = 0.13$ , as shown in Table 66.

Table 66

*Box's Test of Equality of Covariance Matrices*

Box's M	F	df1	df2	Sig.
14.157	1.532	9	107384.254	.130

3. Normality

For the first dependent variable (information technology in instruction), the normality assumption was not met for the teacher group,  $P = 0.01$ . The administrator group met the normality assumption,  $P = 0.20$ , as shown in Table 67. For the second dependent variable (information technology plan), both groups met the normality assumption, where the teacher group was  $P = 0.20$

and the administrative group was  $P = 0.20$ , as shown in Table 67.

The normality assumption was met for three groups except one. That means they did not violate the assumption for three groups but that for the other group the normality assumption was violated.

Table 67

*Test of the Normality*

		Kolmogorov-Smirnov		
	Position	Statistic	df	Sig.
Information Technology in Instruction	Teacher	.117	76	.011
	Administrator	.075	79	.200
Information Technology Plan	Teacher	.079	76	.200
	Administrator	.081	79	.200

*Item Analysis*

Item analysis has been done for two dependent variables, information technology plan and information technology in instruction. A discrimination index was used to evaluate the quality of the items. Based on this index, all the items have good quality to discriminate among the participants as shown in Appendix J because the discrimination index was greater than 0.19, as based on Ebel and Frisbie (1986). Appendix J indicated that the result from the discrimination index for the highest item was 0.63 and for the lowest item was 0.30.

All items for the second dependent variable, based on this index, have good discrimination among the participants as shown in Appendix J, where the discrimination index was greater than 0.19, as based on Ebel and Frisbie (1986). Appendix J indicated that the result from the discrimination index for the highest item was 0.54 and for the

lowest item was 0.201. That means all the items worked well to measure the independent variable, based on Ebel and Frisbie (1986).

The consequence of item analysis for the two dependent variables specified that all the items that composed each of them had good quality to discriminate among the participants.

### *Reliability*

The reliability for the two dependent variables was determined from the actual data. The first dependent variable, information technology plan, includes 7 questions and the Cronbach Alpha was 0.71 as shown in Appendix J. The second dependent variable, information technology in instruction, includes 14 questions and the Cronbach Alpha was 0.86 as shown in Appendix J.

### *Correlation*

The result of the Pearson Correlation Coefficient was 0.56, which is a positive correlation between two independent variables, information technology plan and information technology in instruction, as shown in Table 68.

Table 68

*Correlation*

		Information Technology Plan	Information Technology in Instruction
Information Technology Plan	Pearson Correlation	1	.596**
	Sig. (2-tailed)	.	.000
	N	170	155
Information Technology in Instruction	Pearson Correlation	.596**	1
	Sig. (2-tailed)	.000	.
	N	155	162

\*\* . Correlation is significant at the 0.01 level (2-tailed).

*Qualitative Data Analysis*

Question eleven and the comments of the participants were analyzed by use of a qualitative method that depends on combining all the data that is similar in one category to make analysis easy. The themes that derived from the qualitative data are as follows.

*Mechanism Administration vs. Manual Work.*

Both male and female teachers and administrators, recognize the advantages of employing information technology in school. A female administrator reported, “Computer technology assists us to save all information and easily to retrieve it when it will be needed.” Another said information technology makes it “easy to get the final reports and statistical summary.” A female administrator reported that unless schools implement new technology, such as computers and the Internet in all of their activities, those schools would lose the many benefits of information technology that would improve the quality of administrative work and make it faster and more efficient than the traditional methods. A male administrator pointed out that “computer technology is

helpful for statistical analysis.” A male teacher reported, “Computer technology helps us to follow up students’ daily information.”

#### *Information Technology Enhances Learning.*

The respondents believe that information technology has significant value in teaching, learning, and support of content. A female teacher reported, “The Internet is important for teaching and learning to support subject matter.” Another teacher said, “We can enhance each content by the Internet.” Furthermore, a male teacher indicated that “computer technology as resources for information.” There was a male administrator who said, “information technology provides us all the information that we need in administration and education.” A female administrator realized how information technology provides useful information that they need to explore the web, enhancing their knowledge, and pointed out it was important “to know the current information in the field of education.”

#### *Electronic Information Maintains Research*

The respondents indicated that information technology provides an enormous and varied type of information for those developing their research. They believed the Internet has significant value in that it can provide what the researchers need thus saving them time and effort. They can access information provided by various organizations, such as private, government or non-profit organizations. A male administrator indicated, “The Internet provides information and makes it available to us.” So, there was a male administrator stated, “It makes information available for researchers.” Another administrator reported, “The Internet enables us to access new educational research.”

### *Conformation of Occupation Information Technology*

This study included participants who had obtained diverse degrees such as geography, anthropology, English language, Math, Islamic studies, and Arabic language. Most of the respondents proposed that information technology is imperative for school administration and instruction. A female teacher said, "It provides new information in anthropology and psychology sciences." Another teacher said, "...it is important for reading and writing in order for students to grow in information technology." A female teacher asserted that, "The Internet provides information that enhances fine arts education." A male administrator indicated that, "Information technology supports all the subject matter without exception." A female administrator indicated that the Internet allows us to "learn new information in education and administration."

### *Evil of the Internet*

Utilizing information technology in teaching and learning at school was acceptable to the most of the participants but there were some who disagreed with employing the Internet at school. They believed that it is evil in that it can negatively affect the cultural status quo and students' behaviors. A male teacher stated, "I strongly disagree with using the Internet in school because of its wickedness."

A female administrator asserted that, "It is critical to use computers and the Internet in classroom but teachers should observe the students and prevent them to use inappropriate sites."

### *Information Technology Provides Integrity of Information*

Traditional methods in recording students' scores are inefficient because many mistakes may happen. Displaying all of the statistical information that provides a

summary of the data. The respondents indicated that information technology is an appropriate tool that allows us to save, adjust and retrieve information with reasonable speed. It is more efficient than the traditional method. A female teacher reported, “Computer technology is an appropriate means to record students’ scores and the rate of the students in the final reports. This saves our time and effort.” A female administrator supported the use of computer technology. “I support its use in administrative work because....reduces mistakes that happen when we use the traditional method.”

#### *Information Technology Planning*

Technology planning is the backbone of the implementation of information technology in schools. This includes the mission statement, goals and objects of the plan. The respondents indicated that there is no planning for temporary technology in the schools. They reported that computers and the Internet cannot be efficiently used in schools without the development of an appropriate technology plan to ensure its implementation in administrative work and instruction. A female administrator reported, “It is important to develop an information technology plan to guide the successful implementation of technology in schools successfully. If there is no plan, it is difficult to utilize information technology in schools.”

#### *Constructivism Versus Behaviorism*

The behaviorism theory is widespread in the Saudi educational institutions. It is based on the teacher-centered method of learning. The respondents indicated that they used this method in teaching and learning. Female teachers and administrators prefer the constructivism though and they critique the behaviorism approach. A female teacher said, “Often teacher-centered classroom.” Female teachers and administrators have visions of

using the constructivism approach. They need students to work as a group and to use various resources, not just the textbook, so that they can build a coherent knowledge base. A female teacher reported, “Unfortunately, students use only the textbooks as the main resources for developing their knowledge.” A female administrator stated that “Students never use other resources. They always use the textbook.”

#### *Imperative Staff Development Programs*

The creation and development of teachers’ and administrators’ knowledge and skills of information technology cannot be obtained unless staff development takes place in school. The participants indicated that there are no staff development programs that enhance their knowledge and skills. All of the male and female participants agreed that they need training programs. Some schools developed their own programs for only administrators in order to execute administrative work. A female teacher said “we need training programs.” A male administrator stated “There is a schedule in the Ministry of Education for training.” Most of teacher and administrators did know this schedule.

Many teachers and administrators specified that it is important to develop staff training for schools. They believed that it is obligatory for each of the schools to offer the training programs either during the day work or after works. A female teacher said, “it is necessary to develop staff development during the work hours.” A male teacher indicated “it is important to create staff development programs for all teachers and administrators. They must enroll to improve their knowledge and skills.”

A male teacher reported “I suggest schools in conjunction with an out side company to create staff development programs for the teachers. The training should transpire after school day.”

### *Exchange Experiences Globally*

The participants realized how critical the Internet is for the exchange of information, experiences and ideas with the other nations and Saudi Arabia people who are based in other cultures. Participants realized that the Internet is a universal link and that it is one of the resources that provide enlightenment for students, teachers and administrators.

### *Aspiration of Information Technology Acquisition*

Teachers and administrators desire to learn about information technology, including the Internet and computer technology, in order to employ it in their schools. They are eager to enroll in information technology staff development programs to develop new knowledge that allows them to acquire abilities that they do not presently have but which are implemented in the real world. A female teacher reported, "I hope that I am able to enroll in a staff development program in order to obtain the knowledge and skills of information technology."

### *Electronic Mail*

Electronic mail is the means to increase communication among people and organizations, and among people in one organization. Email has made communication more efficient in that it saves time and effort between people. Email is important to educational institutions because it has the ability to increase the interaction between teachers and students. The participants asserted that email is critical for instruction and administrative work. They also stated that email saves time. A female teacher indicated that, "Using electronic mail supports shared information among the schools and the

Presidency of Girls' Education." A male teacher stressed that, "Electronic mail makes communication easy among schools, school districts, students, and teachers."

### *Independent Learning*

Some participants indicated that information technology is an appropriate approach for those who want to learn by themselves, to explore new information, and to assist individuals to develop new meanings of learning. A female teacher recognized that the Internet plays a good role in increasing individual learning. She indicated that "the Internet is an interesting approach that motivated and encouraged to obtain new information." Another teacher said, "Any information that I do not possess can be found and provided by the Internet." A male administrator described the Internet and computer technology as "self independent education."

## CHAPTER FIVE

### *Summary, Discussion, Further Finding and Recommendations*

#### *Summary and Discussion*

The purposes of this study were to investigate male and female teachers' and administrators' perceptions toward the use of information technology in schools and particularly how it related to in instruction, staff development, information technology planning, and the participants' skills and knowledge. A multivariate analysis (MANOVA) was used to inspect the hypotheses. Crosstabs was the appropriate method utilized to answer the descriptive questions.

Information technology is widespread and is found in all fields. Its features have the ability to be an integral part of all organizations to improve activities and process daily work. New innovations of information technology comprise of benefits that should take place in educational settings, and the leaders should recognize and implement them. Kallick and Wilson III (2001) described how information technology has become an essential part of educational institutions. "The advent of information technology offers many opportunities and challenges that will change our knowledge of student performance and our practice as educators" (p. xi).

This study was designed to examine the perceptions of teachers and administrators (male and female) toward successfully employing information technology and staff development in high school education in Saudi Arabia.

The study attempted to find answers to the research questions, which are:

*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?

Regarding the first research question,

*What are the perceptions of the respondents toward using information technology in instruction?*

This question examined the male and female teachers' and administrators' perceptions as to whether or not information technology has positive effects on instruction. A majority of the participants (66.85%) agreed or strongly agreed to the use of computer technology in all curricula in order to enhance the content and to provide new information related to the course activities. Crane (2000) stated that the Internet is the main medium to provide students with an effective access to information and to promote their exploration of learning so that they can develop new knowledge. Crane indicated, "We must be prepared for the changes that using Internet technology will bring to our classrooms, to the way we teach, and to our students. The units that follow illustrate using the Internet as an integral part of projects in cross-curricular units" (p. 80). Provenzo, Bett and McCloskey (1999) found that computer technology can be used as an innovative instrument to be integrated with curricula and to support instruction in all grades. Provenzo, Bett and McCloskey further claimed that the computer and the Internet make

... it is impossible for us to ignore its impact on the curriculum. We have passed a threshold grounded in technology, which brings with it a new curriculum and to a significant degree, new models of instruction for our classrooms. (p. 139)

The result was support for the using that students use information technology in all curricula. There were participants who were uncertain and disagreed with this

suggestion. Most of these participants were female teachers and female administrators. It should be taken into consideration that female teachers and female administrators might not totally understand how computer technology can be integrated into the curriculum and how it can affect teaching and learning because they lacked of staff development. Of the participants (73.6%) asserted that all teachers should use information technology in instruction because it provides new and multiple sources of information that enrich the content. Willis (1997) indicated that

...educators and those who teach them must recognize and accept the computer and its software, not as replacements for the content of the disciplines at the core of the curriculum, but as extensions complementary to that content. (p. 142)

The majority who agreed with this research question were female teachers, male administrators and female administrators. Among those who were not certain or disagreed, the survey indicated that there was a lack of knowledge and skills about information technology that would have allowed them to make an informed decision. A female teacher reported, "I hope to enroll in staff development programs in order to obtain knowledge and skills of information technology that includes the computer and the Internet." A male teacher indicated "It is important to create staff development programs for all teachers and administrators. They must enroll to improve their knowledge and skills." Most of the participants (90%) emphasized that computer technologies represent great tools to improve learning. The overall mean was 1.67 (with 1 being strongly agree). Female teachers and administrators represented the majority of the participants who supported this statement. It provides information through utilizing various computer

applications, such as simulations, that allow students to learn as in the real world.

Computer technology provides information that gives students opportunities to manipulate a real problem where they have to think and seek more information to derive an appropriate solution for the problem being studied. Most of the participants, or 82%, affirmed that information technologies play an important role in problem solving.

Crawford (1997) indicated that (DFE, 1995a) clarified that information technology assists learners to collect, analyze and develop their model, as well as “using information sources and IT tools to solve problems” (p. 6). Software has such a positive impact on the students’ learning that Newby, et al., (1996) declared, “Problem-solving applications are designed to promote students’ higher-order thinking skills, such as logic, reasoning, pattern recognition and strategies” (p. 231). In this statement, more female teachers and administrators asserted that information technology assist students in problem solving than male teachers and administrators.

Female teachers represented the majority of those who were uncertain (35.7%), because of their lack of knowledge pertaining to utilizing information technology in problem solving. Regarding drill and practice, which is another function of computer technology, the majority of the participants (90%) stated that utilizing drill and practice applications is appropriate to improve learning. This application allows students to use computer technology to examine their knowledge after they finished a unit because drill and practice software provides feedback information, whether or not the result is correct. When students get correct answers, there is a reward in order to reinforce the learners. Bitter and Pierson (1999) reported,

In general, drill and practice software allows learners to come in contact with facts, relationships, problems, and vocabulary that they have previously learned until the material is committed to memory or until a particular skills has been refined. (p. 89)

Another computer technology tool for learning is multimedia, which is composed of various features. According to Lee & Owens (2000), “Indeed, the flexibility of computer based learning environments brings some significant advantages to solve today’s business [and educational] needs. Because a computer based learning environment can include video, audio, and graphic elements” (p. 156). The study indicated that the majority of the participants (83.15%). The overall mean 1.85 (with 1 being strongly agree) the participants asserted that multimedia influences learning because its features allow students to engage more of their senses while they learn.

Crawford (1997) cited that, “Multimedia is a means of constructing flexible and attractive teaching and learning resources that integrate the text, pictures, animation, video and sound” (p. 1). Jonassen, Peck & Wilson (1999) reported multimedia has been used in education in a range of forms. In the past a multimedia approach assisted education for many years by using traditional multimedia, such as maps and slides to enhance instruction. Presently, information technology is used to develop content and integrate the many advantages of the new multimedia, such as sound, text, and animation. Joanssen, et al., said they “...have used multimedia representations to convey instructional messages for decades” (p. 86). Also, it encouraged students to learn. Joanssen, et al., said, “...Students could and would eventually learn everything they needed to know from multimedia” (p. 87). The majority of the participants realized that

the contemporary multimedia would enhance teaching and learning. Features of multimedia allow learners to use all their senses during learning process.

Overall, 85.14% of the participants indicated that using computers in instruction helps to build up the knowledge of the students as teachers and students use new approaches that provide enormous amounts of information, such as using CD-ROM, word processing, spreadsheet and so forth. Bielefeldt and Moursund (1999) stated, during their period of their research from 1995-1997, that “students developed hypermedia reports, created digital graphics, authored web pages, searched CD-ROM databases....used software tools, such as word processors to complete assignments, and delivered computer based presentations” (p. 6). The result specified that participants understood the computer’s place in the business environment. The computer was important for teaching and learning new skills such as using a word processor and database management. Female administrators and teachers supported the statement more than the males did.

Another finding of this study was that information technology provides incentives for the learners. The study showed that most of the participants (89.27%) indicated that computer technology *plays important roles to motivate* students to learn. The participants’ perception substantiated the results of a study conducted in 2000 by Ryba and Brown, where they found computer technology created new methods of learning that encouraged students to work as a community, increased their motivation to do their tasks and share information among themselves, and made them enthusiastic to do more. This differs from traditional methods of learning because of its features. Female teachers and

administrators perceive that the computer is able to increase students' motivation to learn. Multimedia features represent the content in new forms and make it more interesting and appealing. Therefore, pupils become motivated to learn more.

In the present study, 87.64% of the participants asserted that computer technology in classroom make subject matter interesting. There was only 12.36% who were uncertain or disagreed. Several indicated they were uncertain because they lack the knowledge and skills pertaining information technology. One female teacher said, "We need training programs." The web is the most common provider for information. It is the mainstream or bank of information that allows educators and students to view updated information related their majors.

In this study, 69.32% of the teachers and administrators reported that the web enhances content. 21.59% were uncertain and did not know how the web is able to enhance the content. Female and male teachers and female administrators had an identical opinion that they were more uncertain than male administrators. Female teachers were more likely to agree that the web enhanced content than male administrators. There were 9 female teachers and administrators and 9 male teachers and administrators who did not support the statement that the web enhances the content. The comments indicated that these participants thought it had more dangerous than the positive qualities. The participants were unaware that the schools can use fire walls to prevent students from having access to specific sites which the school might deem undesirable. This finding was supported by research that indicated, "...technology has

allowed the teacher to go beyond the traditional textbook...information from different sites reveals many different viewpoints..." (Crane, 2000, pp. 249-50).

The majority of the participants (80.9%) maintained that use of the Internet allows access to a greater variety and mixture of information. It enables teachers to move from depending on one resource, the text book, to many resources that discuss specific subjects. There were some participants who were uncertain that the Internet assists to access further information. However, the number of the participants who were uncertain was less than the number for the previous question because they knew that the Internet provides information. They just did not know how it could be used to enhance the content.

This result was compatible with a previous study. Becker (2000) conducted a study that focused on teachers utilizing the Internet. Becker found that 68% of the participants integrated the Internet into course activities. The teachers sought information to enhance their lessons. Another result, 55.68% of the participants stated that use of the Internet enhances instruction.

Eighteen female teachers and administrators, as well 15 male teachers and administrators, who represented 18.76% of the participants rejected the use of the Internet in instruction. Their perceptions were almost identical to those given above. They wanted to refuse to use the Internet in teaching and learning because of concerns about the evil aspects of the Internet. Those who reported they were uncertain (25.57%) did so because they did not know how the Internet provides various activities to supplement teaching and learning. They need to acquire the knowledge and skills to use the Internet in instruction.

A female teacher said, "It is necessary to develop staff development during the work hours." A male teacher indicated "it is important to create staff development programs for all teachers and administrators, and they must enroll in staff development programs to improve their knowledge and skills." The participants who were uncertain or rejected using the Internet in the classroom must be enrolled in a training program in order to increase their knowledge of how the Internet can enhance their teaching and learning. They would also learn methods and the appropriate method to prevent learners from accessing inappropriate sites. 56.82% of the participants supported utilizing the Internet in classroom. A female teacher reported, "The Internet is important for teaching and learning to support subject matter." Another teacher said, "We can enhance each content by the Internet."

The Internet assists teachers and learners by directing them to different sites that help them to increase their knowledge. Bitter, et al., (1999) pointed out, "...schools around the world [will] establish connections to the Internet, and teachers and students gain proficiency with navigating through that vast quantity of readily available information..." (p. 123). Only 11.24% of the participants were uncertain and 6.86% disagreed and strongly disagreed. The participants who reported that they were uncertain did not use the Web for searches. Therefore, they could not provide an exact answer. The participants who disagreed or strong disagreed did so because they do not want to grant students access to inappropriate sites.

The survey result indicated that 81.36% of the participants reported that information technology supplements cooperative learning because the students are able to

connect with students from other schools. The students can in order to exchange information and develop their projects through the use of such tools as e-mail and listserv. The research specified that e-mail allows students who were working on a project to discuss their assignment, exchange information and ideas, and collect suggestions through email. The students were able to finalize their project without ever having to meet physically. Whenever two or more students work together with computers and software, such as HyperStudio, PowerPoint or word processing to develop their project, they obtain various knowledge and skills from each other. Teachers are then able to work as facilitators to assist these students when they encounter an obstacle (Newby, Stepich, Lehman & Russell, 1996, p. 51). Participants who replied uncertain (15.17%) did so because they did not realize how computer technology provides opportunities for students to work together and exchange their information and ideas through cooperative learning. These individuals were unaware that information technology helps them to develop their skills and knowledge (Newby, Stepich, Lehman & Russell, 1996, pp. 50-51).

Information technology provides flexibility for students and teachers to work together (Pelton & Pelton, 1998). Information technology provides appropriate communication tools that increase interaction among students and teachers at any time, anywhere. In the study, 74.43% of the participants emphasized that communication tools increase the exchange of information between teachers and students. Bodzin and Park (2000) conducted a study that indicated that most of the participants agreed that the Internet is a suitable medium to enhance communication. The Internet allows those who did not feel comfortable in the classroom to use asynchronous means to send their

message. Bodzin and Park found that “some participants felt it was easier to give a more honest opinion when they were not directly speaking face to face with an individual” (2000, p.25). Teachers need to know how communication tools support the learning and teaching processes. Teachers and administrators asserted that computer technology should be used in classroom activities rather than the Internet because they ensure that students cannot access inappropriate materials. Teachers and administrators did not oppose the implementation of information technology in the classroom to facilitate and enhance instruction. Teachers and administrators indicated the use of the Internet must be under the supervision of the teachers in order to prevent them from accessing inappropriate sites.

Regarding the second research question,

*What are the perceptions of the respondents toward the development of an information technology plan?*

This research question probed the responses of the respondents toward information technology plans in school. The overall mean was 1.69 (with 1 being strongly agree), close to the second part of the scale which was agree. The majority of responses (91.48%) declared that information technology plans should be written for schools. The plans would assist in developing and the implementation of activities. The technology would assist each member in the school to know the tasks that she or was to perform. The documented information technology plan serves as a road map to assist the school to reach its target(s) without wasting time, funds and the schools to make the adjustments and be flexible during the implementation period.

The researchers utilizing information technology in education support that the plan must be written for school (Jukes, 1996; Reksten, 2000; Ward, 1999). Additionally, Renksten (2000) indicated that the information technology plan “should be a living document, not one that is one is buried on a shelf after it has been formulated...” (p. 7). The perceptions of the teachers and administrators of the present study were compatible with those found in the literature which clarified that, “A technology plan must have the support of administrators, teachers...community partners such as parents, business representatives, and religious leaders...” (McNab, et al., 1999, p.10). The majority of those who supported written information technology plans were female teachers, male administrators and female administrators. Female administrators and teachers supported written information technology plans slightly more than the male teachers and administrators. Those who responded uncertain were 15.17% and female teachers were the majority of this percentage. Those who chose uncertain did so because they did not know why information technologies plans were written for schools. They need to know the purpose of it through staff development.

A mission statement, goals and objectives comprise the backbone of the information technology plan. The overall mean of the respondents was 1.68 (with 1 being strongly agree), which indicated that the participants mostly agreed that these were essential elements of information technology planning. A majority of the participants (91.48%) emphasized that the three elements worked as a base line to develop an appropriate information technology plan. Bielfeldt (2000) conducted research regarding information technology plan. The result of his research was 65% of respondents indicated that goals and objectives should be included during the planning. Fishman and

Pinkard (2001) indicated that vision in information technology planning is imperative for implementing information technology plans. They stated, “without [the] common vision, which helps to ensure that teachers and administrators are in pursuit of similar goals, it is difficult to implement technology that works the way teachers need it to” (p. 67). The majority of the participants who reported that a mission, goals and objectives are necessary for students to learn were female teachers and administrators. The percentage of those who said uncertain was 7.39%. Most of those who were uncertain were female teachers. This refers to the lack of information regarding how an information technology plan plays an important role in the support of educational institutions’ environments. There was no subject who answered, strongly disagree. This indicates that none of the participants, believe that the mission statement, goals and objectives are not important but rather that they did know how these elements support teaching and learning.

The result was 85.8% of the participants asserted that teachers should be involved in an information technology plan. The overall mean was 1.78 (with 1 being strongly agree). The participants’ visions indicated that they consider it necessary for teachers to be involved in developing the information technology plans. They recognize what they should implement during the implementation stage. The result of the present study is compatible with those done by Fisman & Pinkard (2001); Browman, Newman and Masterson (2001) studies in that they emphasized that teachers heart of developing information technology plans. Teachers are the one of the main part of the committee planning members who is responsible for integrating information technology into teaching and learning.

Developing and creating an information technology plan must involve the “teachers and administrators in all phases of the process was identified as a key component of the project’s initiation as well as all subsequent stages” (Browman, Newman & Masterson, 2001, p. 88). Browman, Newman and Masterson (2001) recognized how teachers are able to make the information technology plan effective. That led them to report, “Teachers must be involved in all phases of the planning process even if they have limited understanding of how they will use technology” (p.84). The study indicates that female teachers and administrators appreciated the necessity of involving teachers in developing of information technology plan. Those who were uncertain represented 8.52% and the participants who disagreed represented 5.68%. the participants who reported uncertain and disagreed did not observe the teachers’ importance in developing the information technology plan and its advancement.

Another important element that connects the information technology plan is the network. Most of the participants (94.94%) observed that local and wide-area networks were critical in order to connect schools locally and with outside educational organizations. These actions improved communications among them and eliminated a waste of time and effort. These responses matched closely with Cox’s (1999) report, that the networking system plays a critical role in connecting local systems and making them function as one unit. Linking schools with the external environment and remote areas enables them to make all of the activities effective inside the organizations. None of the participants reported disagree or strongly disagree. The participants perceive that the network saves time and effort. Administrators were also assisted during their communication with educational organization.

An important finding was that information technology plans must include stakeholders who are able to develop a practical plan. In the study, 87.64% of the participants asserted that the stakeholders' vision is essential to develop the information technology plan. The overall mean was 1.85 (with 1 being strongly agree), this indicates the participants recognized the stakeholders' function in developing the information technology plan. The results were well-matched with a study by Bielefeldt & Moursund (1999), which emphasized in importance of the stakeholders as resources for ideas and new methods that enrich the planning for technology in school. Female teachers and administrators observed that the stakeholders' vision is essential for developing an information technology plan slightly more than male teachers and administrators did. Female teachers represented (65.8%) and female administrators represented (57%) of the participants who strongly agree and agree.

One-third (34.83%) of the participants asserted that information technology plans should improve instruction. Another third, or 33.15%, were uncertain how the information technology plan could improve teaching and learning. This second group indicated that they did not participate in planning and they did not know how the information technology plan would support instruction. If teachers and administrators have staff development programs that focused on information technology and education, they would recognize the role of information technology planning in instruction. This result opposed the literature review findings that the purpose of information technology is to support teaching and learning. Teachers and administrators supported the claim that an information technology plan is imperative for developing schools in their activities and should it follow formal processes in order to be successful.

Regarding the third research question,

*What are perceptions of the respondents toward using information technology to assist with administrative work?*

The third question examined the perceptions of teachers and administrators toward employing information technology in all aspects of administrative work to improve the productivity of school sections. Hsu (1995) and Forcier (1996) found that information technology must be part of a school management system, which is called the management information system (MIS). This facilitates the information flow from one department to another and ensures that a high quality of information is ready any time for decision makers, such as school committees, administrators and teachers. Implementing MIS in school management enhances its functions. The findings related to this question were that the majority of respondents (98.3%) advocated the importance of computer technology in the grading system. In the present study the mean was 1.11 (with 1 being strongly agree). A review of the literature encouraged educational institutions to implement new technology to keep students' grading records updated until the final report was issued. Kearsly (1990), Forcier (1996), Snider (1998) and Kosakowski (1998) found that computer technology is an appropriate tool to enhance student grades' information and save teachers effort and time. None of the participants reported disagreement with this indicating they perceived the importance of computer technology for grades.

The next statement concerned the use of information technology in administration to organize and follow up schools inventory. In the study, most of the participants

(94.9%) emphasized that computer technologies represent great tools in equipment inventory. The overall mean was 1.37 (with 1 being strongly agree). Kearsly (1990) and Forcier (1996) mentioned that information technology aids schools by its ability to track all the materials in the inventory, such as computer parts and equipment. Information technology assists them to reorder on time to meet the school's needs.

Crawford (1997) discussed how information technology is critical in schools, and he reported, "An inventory of all resources, assets and equipment can be maintained" (129). In the current study the majority of the participants (93.2%), with an overall mean of 1.54 (with 1 being strongly agree) believed that computer technology provides a great tool with which to organize and control textbook inventory. Schools should use computer technology to monitor the stack levels of textbooks for each grader and make the textbook inventory available in the beginning of each academic year. The literature discussed how information technology should be utilized to maintain textbooks inventory. Kearsly (1990), Forcier (1996) and Crawford (1997) asserted that textbook records could be accurately tracked and its information continually be updated. None of the respondents reported that they strongly disagreed with these ideas. This is an indication that most of the subjects recognized how computer technology assists in maintaining textbook inventory.

Another finding was that the majority of the participants (96%), with an overall mean of 1.39 (with 1 being strongly agree), affirmed that computer technologies represent a great tool for organizing library catalogs. School libraries should use this technology to better organize and allow students to more easily search for books and

articles that they need. Information technology makes all of the functions available. It provides systems that help librarians to organize all of the books and journals, as well as make the circulation system very easy to check in or out all the materials, and supply all of the information that the students need. Crawford (1997) pointed out, "Library automation software can be used to organize the borrowing of books and other resources from the school library or other resources centers within the school" (p. 129).

Hudson County Community College in Jersey City (1998) reported that learners and teachers needed to be able to access and connect with all of the resources of information, not just those that were available at their libraries. They needed a method that would assist them academically to support their learning and research. The libraries are the great entrance to the information that must be supported by the information technology system. Information technology gives users abilities to seek information around the world.

The majority of the participants (83.1%), with an overall mean of 1.75 (with 1 being strongly agree), affirmed that the computer is a great tool to assist with managing school budgets. The school must manage the funds that it receives or spends, in order to control the budget. Computer technology provides an application for schools that helps administrators to monitor the school budget. Crawford (1997) indicated that,

Finance and budgeting software can be expected to help with cost control and the monitoring of spending against budgets...the software should produce analyses contrasting spending against budget, possibly showing

actual cash flow per period against profiles of projected outgoings for the school and for cost centers. (p. 129)

Information technology provides reports that enable schools to control their expenses and prepare for their needs for the next academic year (Forcier, 1996). Of the participants 13.56% were uncertain regarding how information technology could assist with managing their budgets because they did not have the knowledge that there is software available that can manage the budget. Only, 4 Female administrators and one female teacher reported they disagree or strongly disagree because they need staff development programs in order to acquire information to direct them in how computer technology is useful to manage financial flow.

The other part of application information technology questioned the participants' attitudes toward computer technology ability to assist with the development of class schedules. The goal was to save preparation time and remove any conflict among teachers. In the study the majority of respondents (79.7%), with an overall mean of 1.79 (with 1 being strongly agree), asserted the importance of computer technology in developing class schedules. Crawford (1997) cited that "The school timetable can be constructed using information technology. Timetabling software can automatically allocate teachers, rooms and other resources to classes, and clashes and shortfalls will be identified" (p. 128). Only 19.77% were either uncertain or disagreed regarding the advantages and abilities of computer technologies assistance with developing class schedules. They need to develop and increase their knowledge of how computer technology is able to assist in scheduling classes.

Most of the participants (70.79%) asserted that computer technology has a significant value in organizing daily appointments. Computer technology provides new software that help teachers and administrators to organize their daily appointments, and update any information that occurs regarding their schedules. Of the participants 19.77% were uncertain or disagreed with this statement. Those who did not assert that information technology can manage daily appointments lacked experience with the functions of computer technology to manage daily appointments.

Most of the participants (92.7%), with an overall mean of 1.62, emphasized that information technology provides a great tool in communication that enhances administrative work. Information technology offers teachers and administrators asynchronous communication tools that allow them to efficiently increase their interaction. This is something that cannot be provided by traditional processes. Administrators are able to meet cooperate, interact and discuss their meeting agendas or solve any problem with the aid of computer technology. The responses supported the findings of other researchers who said that communication tools provide an immediate response and assist staff to save their time (Forcier, 1996; Pea, 2000).

Herschel and Andrews (1997) indicated that new communication technology, such as email, has had a positive effect upon organizational structure and has changed its process. Information technology makes the interaction among employees effective and helpful for making their decisions. Kosakowski (1998) described the communication tools as, "Decreasing isolation by using e-mail and the Internet to communicate with colleagues, parents, and the outside world" (p. 2). There were nine participants who were

uncertain, and five of them were female teachers. They need to know how the communication tools on the Internet are able to make communications more efficient.

Another feature often used in implementing computer technology in administrative work is to monitor the students' attendance. In the study, 72.2% of the participants emphasized that computer technology provides a great tool for monitoring students' attendances. Of the participants 20.79% reported were uncertain. Most of those who reported that they were uncertain were female. This indicates that there were some teachers who did not know about the advantages of information technology and how it may be implemented in monitoring students' attendance. This is an indication that these teachers have a weakness in information technology knowledge and skills.

The literature indicated that information technology is important for students' records one of which is the students' attendance record. This is based upon Kearsly (1990), Forcier (1996), Snider (1998), and Kosakowski (1998) findings. Crawford (1997) reported,

Records of attendance can be kept and analyzed...systems that allow immediate input of attendance data to the computer system can produce a report showing which pupils are absent immediately after registration.

Reports can be printed showing patterns of absence for individual pupils, a group of pupils, a particular class or a year group. (p. 127)

Information technology allows teachers and administrators to follow upon students' information, such as general administration information, address, name, age and family. Other information that it focuses on was his or her achievement during the

academic year. Teachers should record all of the students' scores and grades during the year and also the final report. In this study, the majority of the participants (87.07%), with an overall mean of 1.68 (with 1 being strongly agree) emphasized that computer technologies support tracking students' information. Kearsly (1990), Forcier (1996), Snider (1998) and Kosakowski (1998) reported that information technology manages and assists to record grades, monthly reports, and the final reports. Using information technology enables schools to develop a management information system that ensures that student information is available any time, saves time, effort and is cost efficient.

Crawford indicated that computer technology supports various activities and different software that can be used for diverse functions. Crawford stated that,

Information about pupils be stored. This may be simply the type of information that is routinely kept about pupils, for example, pupils' names, addresses, next of kin...keeping this information on a computer instead of on paper should facilitate access to it. (p. 126)

Of the participants 9.55% uncertain may have been not recognized the functions of computer technology. All teachers and administrators should possess information technology knowledge and use it in school activities, so that they can save their time and effort to finish their jobs with reasonable times.

In the study, most of the participants (94.4%), with an overall mean of 1.56 (with 1 being strongly agree), asserted that administrators and teachers should utilize information technology in administrative work. The participants had high expectations that asserted that teachers should utilize information technology in all of their work in

school. This result was compatible with other researchers' work, such as Lewis (1997) that focused on teachers' perceptions toward utilizing information technology in schools, the study included elementary, middle and secondary schools in Tennessee. Lewis reported that teachers in high schools and middle schools had positive perceptions and agreed or strongly agreed in their responses regarding items that represented features of information technology in the 21<sup>st</sup> century. The items included accomplishing tasks faster, improving the quality of the productivity, job execution and its effectiveness, making jobs easier, controlling the work, increasing productivity and providing more features for the classroom rather than its disadvantages. Teachers and administrators indicated that information technology in administrative work is powerful. One advantage was that it can save their time and effort. Teachers and administrators asserted the Internet will replace the traditional mail method in order to enhance their productivity.

Regarding the fourth research question,

*What are the perceptions of the respondents toward the skills of information technology?*

Crawford claimed that, "IT should be used in administration and throughout the curriculum so that teachers can see that time invested in learning IT skills is not wasted...teachers will need access to appropriate learning resources" (p. 102).

Staff development is the gate that allows teachers and administrators to attain information technology knowledge and skills so that they are able to carry out their tasks.

Based upon the result of the data analysis, there were only a few teachers and administrators who have taken computer courses. Only 37.6% of the participants had

basic computer skills. This is an indication that most of the participants did not acquire information technology knowledge and skills through formal classes. These classes and training would have encouraged them to use what they obtained for instruction.

There were nineteen participants who were uncertain of how to use email and most of them were female teachers and administrators. Requiring teachers and administrators to enroll in staff development programs on how to use email would increase their experiences. As mentioned above, the literature encourages teachers and administrators to use email to enhance communication among themselves. Hoffman and Scheidenhelm (2000) indicated that email should be used among teachers and students to help them save time, enhance communication, and exchange new ideas that support their knowledge. Hefezallah (1999) reported, "E-mail could be used to enrich and to enhance the educational experience of the students...the educational values of e-mail will be presented" (p. 186).

There were 34.5% of the participants who were uncertain how to use the basic functions of computer technology. Female teachers and administrators represent the majority of those who said uncertain. About one-fifth, or 21.4%, did not acquire knowledge of the most basic computer functions. Most of them were female teachers and administrators. Both male and female lack opportunities to be involved in training programs to acquire the use of basic computer functions.

Of the participants 71.2% reported they were uncertain or did not have the ability to use PowerPoint. This indicates that teachers and administrators knowledge and skills

of PowerPoint are weak. Teachers and administrators should have the ability to develop their models and presentation slides which is important for instruction and administrative work. (Maddux, Johnson & Willis, 2001) reported that the presentation software “supporting lectures and discussions with multimedia materials is possible virtually in any subject area and at any grade level” (p. 39). It assists administrators to present and demonstrate their work during a meeting. In this case, administrators should have the experience of presentation software, such as PowerPoint. Bucher (1998) indicated presentation software, such as PowerPoint, is appropriate to be used in all grades, from primary school to high school (p. 291).

Only 38.9% of the participants did not have skills and knowledge concerning spreadsheets. Female teachers and administrators represented most of them. 43.5% did not have the ability or were uncertain about organizing their information on a hard disk, zip disc, or floppy disc. Those who did not have the ability were primarily female teachers and female administrators. Teachers should acquire the knowledge and skills of spreadsheet programs to use in the mathematics classroom. (Maddux, Johnson & Willis, 2001, p. 110). Lockard and Abrams (2001, p.133) and Provenzo, Bett and McCloskey (1999) indicated that all teachers should utilize spreadsheets in order to manage students’ grades. Administrators should obtain the knowledge and skills of spreadsheets to allow them to use it in administrative work.

There were 54.6% of the participants who did not know or were uncertain how to use search engines to access information on the web. This is a fundamental skills needed by all for teachers and students. They need to know how to use search engines on the web in order to get specific information. Maddux, Johnson and Willis (2001) asserted

that the students and teachers cannot reach vast and important information that enriches teaching and learning without using search engines. Maddux, Johnson and Willis asserted, “Both teachers and students should select one or two search engines and learn to use them well” (2001, p. 236).

Most of the participants (85.15%) were not able to develop their own web page in order to enhance their teaching. Teachers should develop their own web pages in order to support teaching and learning by adding the information and resources that enhance the content and any announcements that the students should know before they come to the classroom. Developing a web page is important because,

the variety of new information on Web pages is amazing. Some schools publish information about their community and use the site to inform and update parents about happening in the school. Others use the Web as a publishing template for content-or theme-based learning. (Williams, 1998, p.42)

41% of the participants stated they did not have the ability to use word processing functions. Word processing can be used for all subject matter. This means teachers should be able to use it in classroom activities instead of hand writing and drawing (Roblyer & Edwards, 2000; Provenzo, Bett & McCloskey, 1999). It is imperative that teachers know the functions of word processing and how to implement it in the classroom. Administrators need to know how to use it in order to save their time and effort with the new technology. Of the participants 50% did not know how to use a word processor in administrative work.

Most of the participants (65.2%) did not have the ability to evaluate and choose software for school and the majority of the participants (68%) did not have the ability to evaluate hardware. Teachers and administrators lack the knowledge of evaluating software and hardware. They should have knowledge of software and hardware evaluation and selections criteria. Unless teachers and administrators have reliable knowledge of software and hardware evaluation and selection they cannot contribute in the software and hardware committee evaluation.

Software and hardware evaluation and selection skills are significant for schools in order to purchase appropriate software and hardware that conforms to the school's activities, including administrative work and instruction. Teachers and administrators should know how to choose software that is compatible with the curricula and activities in order to enhance teaching and learning. Bitter and Pierson (1999) indicated, "Teacher, however, should be familiar with the review categories and types of items...important [for] decisions in selecting software" (p. 111). Bitter and Pierson (1999) also asserted that the district or school should have a plan that assists them to choose appropriate software that matches the curriculum goals and objectives. Braun, Fernlund and White (1998) indicated educators must know how to select school hardware. They reported, "Educators need to be able to select the hardware configurations" (1998, p. 51).

Regarding the fifth research question,

*What are the perceptions of the respondents toward staff development (SD)?*

Most teachers and administrators (92.6%) reported they did not have a staff development plan. Those who answered that there is a staff development plan reported

there is a schedule from the district that includes some training programs. The results indicated that there is no visible staff development plan and that each administrator has a copy of its documentation. Teachers and administrators should be involved in staff development and planning because each of these groups has the responsibility to carry important activities that improve the students' achievement. To implement information technology in schools so that it is fruitful necessitated the teachers attain skills and knowledge of information technology (Fisman & Pinkard, 2001). Browman, Newman and Masterson (2001) indicated that staff development is a technique that aids teachers to develop themselves increase their technology abilities and to disarm their anxiety about information technology.

Browman, Newman and Masterson (2001) identified activities for staff development programs and in-service training programs that sustain and maintain the capabilities of teachers. The program includes: "word processing, PowerPoint, Hyper Studio, Front Page, ...using the Internet, Power search, e-mail, and other programs and curriculum ideas that teachers felt were important" (p.86). The planners should develop a long-term. Scheffle and Logan (1999) asserted that staff development must be planned in order to meet not merely the current needs of technology training but also the technology of the future. Unless staff development planning is updated with the teachers' and administrators' needs, it would be very weak and insufficient to face the innovation in modern technology that enhances educational institution environments.

Most of the participants (98.3%) asserted that staff development of information technology is needed. Developing a staff development plan becomes fundamental and

should improve the teachers' and administrators' skills. Teachers then become knowledgeable in how to integrate information technology in teaching, learning and administrative work.

According to the first research question, which discussed whether or not information technology is an appropriate method to supplement instruction, the vision of the respondents was comprehensive – that information technology should be disseminated. This vision cannot be executed unless the school creates a staff development plan that includes activities that enable teachers to diffuse information technology with the curricula. Lauber (1997) reported that an information technology system is useful for instruction but that administrators have to recognize and appreciate the notion of its integration. Teachers have to learn information technology power in classroom instruction and integrate it with the subject matter. Based on the Lauber's concept, administrators and teachers must join in staff development sessions that facilitate the acquisition of information technology implementation in the school.

As a result of the study, there are some barriers that did not allow the participants to obtain information technology skills, these are:

1. There were not enough courses on information technology, such as computer and Internet in the colleges. Teachers and administrators had not been encouraged to acquire skills and knowledge in their undergraduate studies.
2. There were no programs in colleges of education that allowed them to learn how they can integrate information technology with curricula.

3. There were no in-service training programs that permitted them to create and develop their knowledge of information technology processes.

A female teacher reported, “I hope that I enroll in staff development programs in order to obtain knowledge and skills of information technology.” Any implementation of information technology will fail because teachers and administrators are very weak in employing information technology in the school process. An awareness of the need to increase information technology must be now. Otherwise the lack of knowledge would work as an obstacle against the implementation of information technology.

The weaknesses of knowledge and skill of information technology became visible in various programs. In order for the teachers and administrators to use information technology successfully in schools and encourage students to use it in all aspects of life, they must obtain experience with information technology through staff development programs.

Regarding the sixth research question,

*What type of philosophy and method of teaching and learning do they utilize?*

The approach of teaching and learning is the cornerstone of constructing the knowledge of both educators and students. It is the method students have to use the information that they have, what type of resources they seek, as well as what kind of information technology tools that they employ to supplement and explore learning.

In the present study, teachers and administrators were asked about the methods that they utilized in teaching and learning. This was significant in order to enhance the positive aspects of the method that they used, reduce the negatives, or integrate and

merge another method to develop a new modern style of teaching and learning. The students would be empowered to use their capabilities to think, manipulate, and dialogue in the classroom. Leflore (2000) pointed out that the web in the classroom is a significant axis to assist students to develop their models. This includes various information forms, different layouts, both linear and non-linear, that can help students to understand the meaning of learning. Students' models begin to reflect their internal thinking and how they process information. Maddux & Cummings (1999) view the constructivist model as a popular notion in the field of information technology and education that gives students new authority with which to learn the use of information technology to support content.

Students can use various educational software. They were well matched with each subject matter in order to enrich the content with practical information instead of developing upon memorization as means of learning. Each teacher should develop his or her web site and include different resources that enhance the content and allow the learners to compile resources that increase their thinking and ability to judge and discuss diverse information.

An analysis of the data indicated that the majority of male and female teachers used the behaviorism model in school, as shown in Table (?). Female and male administrators expressed that they followed behaviorist theory. Overall, the participants (81.46%) were behaviorist. A constructivism model for teaching and learning was not integrated into teaching and learning. Based upon female teachers and administrators reports, there were strong indications of implementation of the constructivism approach in teaching and learning. The indications included:

1. A female teacher reported, “Unfortunately, students use only the textbook the main resources for developing their knowledge, and teacher-center classroom”.
2. A female administrator indicated that “students never use other resources but they always use the textbook.”

Their viewpoint is that each student needs to use varied resources of information to discover her and his learning meaning. Each teacher must release his or her authority in the classroom and give students the opportunity to adopt his or her responsibilities. All of this cannot occur unless it is through the implementation of the constructivism model.

The implementation of the constructivism model in teaching and learning is a signal that there is a movement to adopt new methods that improve instruction. This is a confirmation that information technology in education is important for teachers and students, which was helpful to the integration of the constructivism model.

The literature and many researchers support the new movement. According to Dalgarno (2001),

Endogenous constructivism emphasizes the importance of learner directed discovery of knowledge. Constructivism CAL materials that draw on this view include hypertext and hypermedia environments allowing learner controlled browsing of content, and simulations and microworlds, which allow active exploration within a virtual environment. (p. 186)

The findings of this study that pertained to the female teachers’ and administrators’ comments were compatible with those of other researchers. Jonassen

(1996) and Fosnot (1996) indicated that teachers do not deliver knowledge to students. According to the contemporary theory of constructivism, teachers have to use an appropriate approach that encourages students to learn and to seek information. This helps them to develop a meaning of learning that constructs their knowledge and their view of the real world. According to this model, students are active learners. They have to develop different knowledge, and to link the prior knowledge with the new knowledge in order to create advanced knowledge. Teachers facilitate learning and students are encouraged to explore learning. This makes them thinking people with the ability to solve problems or develop new concepts (Jonassen, et al., 1999; Fosnot, 1996).

The other finding was that the majority of the participants utilized the behaviorism theory, as shown in Tables 63 & 65. The results indicated they utilized the behaviorist approach in instruction. Spring (1999) mentioned that Freire critiqued the traditional method and named it banking education. This model espoused that the teacher deposits ideas and knowledge with the students, who are receivers and waiting for knowledge from the teachers without spending enough effort to look for the information on their own. Spring encouraged students to think and reflect instead of memorizing.

For the seventh research question, the test of the means was used to investigate whether there was a difference between the means of the respondents' perceptions toward employing information technology in instruction and an information technology plan. It was expected that there would be significant differences. There was no significant interaction between gender and position on a combination of information technology in instruction and information technology plan,  $P > .05$ . Additionally, there were no

significant differences according to the position and gender,  $P > .05$ . This finding was based on the result of a two-way multivariate analysis of variance test. The result from a multivariate analysis of variance (MANOVA) test supported a study done by Ertmer, et al., (1999) that claimed all teachers indicated computer technology was essential for students to learn in a K-12 school in the U.S. They stressed the importance of information technology planning to guide the development and implementation of information technology activities at school. This was compatible with the vision of the developers of information technology plans in the United States of America, such as Olds (1998), Stanton (1998), Zilonis (1998), and Zimmerman (1998). These individuals indicated that use of information technology is imperative for teaching, learning and enhancing educational institutions' environment.

#### *Observations*

1. Most teachers and administrators have a positive perception about utilizing information technology in school for administrative work and instruction.
2. Based on the quantitative analysis, female teachers and female administrators have more desire to implement the constructivism model in school rather than male teachers and administrators.
3. Schools need comprehensive information technology staff development plan.
4. Schools need comprehensive information technology plans to ensure the use of information technology.
5. More of the female comments indicated that importance of utilizing the constructivism model than did the males.

6. Teachers did not have time for enrolling in a staff development programs, even if there are training programs in schools, because of lack of time.
7. Based on quantitative and qualitative results, they did not manage effective staff development programs that encouraged teachers and administrators to be enrolled.
8. Based on demographics information, teachers and administrators don't use the Internet for communication in schools for the school purposes.

### *Recommendations*

The present study showed that the respondents were enthusiastic to use information technology in school activities and connected with the educational organizations in order to gain its benefits in their instruction and administration. From the study, there are suggestions that will work as a road map to employ information technology in educational institutions. These include the following.

1. To ensure integration of information technology in schools, there must be a request for the development of an information technology plan. This would be a guide for implementation features of the successful information technology. It is essential to establish a committee whose members realize how information technology supplements the educational setting. The committee members must have the capability to suggest ideas and information that assists in the development a reasonable information technology plan (ITP). Teachers should be involved in the committee, even if they do not have enough knowledge. The members who come from outside the Ministry of Education must know how an information technology plan is implemented in the educational setting. Developing a mission, goals and

activities are the focal points of the information technology plan (ITP). These will assist the committee to attain the targets.

2. Teachers and administrators need to create and improve their skills and knowledge of information technology. Creating a staff development plan (SDP) becomes the bedrock of performance in the information technology plan process and ensures its success. SDP includes teachers' and administrators' needs in the current time and in future, in order for them update their skills and knowledge to keep in step with the rapid technology changes in the age of information technology. Based on the study, there is a need for two types of training programs. The first is an in-service development. This requires well-planned activities that train groups of teachers in each school. They in turn train other teachers. This method will reduce the cost of staff development. It gives teachers and administrators the opportunity to learn how they can integrate information technology in administration work and the curriculum. The second type is pre-service development. Teachers and administrators would be required to take courses which studying in the universities. Implementing information technology in a school without a staff development program would be a tremendous mistake. Information technology cannot obtain fruition in the absence of information technology staff development. Based on the literature review, staff development provides elevated goals that should be realized by the educational organizations and used to develop efficient staff development plans. These goals are:
  - a. Increase the teachers' capabilities to integrate information technology with the curricula, to encourage the students to acquire information technology concepts

and learn about its impact in the society, and to enhance experience of administrators.

- b. Provide staff development sessions for one to three teachers from each school in order to assist the other teachers to develop and improve their skills and knowledge of information technology.
- c. Support the implementation of an information technology plan.
- d. Ensure continuity of staff development in order for teachers and administrators to follow upon the influx of information technology.
- e. Prepare information technology leaders for the future. (North Central Regional Educational Laboratory, 2001; Weidner, 1999; Shelton & Jones, 1996).
- f. Universities and colleges should develop information technology courses. These courses should include computer technology and the Internet in order for the teachers and administrators to acquire knowledge and skills as well learn how to implement in real time into the curricula and administrative work. It is vital to coordinate between the Ministry of Education, and universities and colleges to develop curriculum plans that increase the quality use of information technology in school settings. Unless they start to develop the outcomes in the university, the problem would remain and increase.
- g. All the information necessary for the technology plan and staff development plan must be documented and declared for all school members to make it easy to be used and adjusted during the implementation stage.

- h. Plans that include information technology planning and staff development planning must be based on factual information that includes an estimation of the cost, administrators' and teachers' needs, and a well-defined time period. Schools must identify their implementation as to when and where it will transpire and/or be introduced.
- i. Administrators are leaders in schools and have a great responsibility to develop their schools in all activities and information technology. Selection of school leaders should be based on specific criteria. One of these conditions must be that they should have knowledge and skills of information technology. This would empower them to motivate the teachers and administrators to utilize information technology in their work and motivate school members towards change in the school environment. The leaders should be able to develop a school plan with the other teachers.
- j. Teachers should have enough time in school during in-service development so that they can learn how technology supports teaching and learning.
- k. Motivate change in those teachers who use traditional methods of teaching and learning that involve teacher-centered classrooms. The appropriate method of teaching for utilizing information technology is the constructivism model. Educators should enhance the content of the curriculum with other resources. Students should be encouraged to work in groups. A moderate constructivism approach should be implemented in schools to allow students to be more active and explore the meaning of their learning.

- l. Enhance the communication tools in schools and educational organizations, as well as among schools and the Ministry of Education.
- m. Teachers and administrators should realize change in educational institution that should be implemented in order to improve the society in all the aspects.

#### *Further Studies*

The study focused on the perception of teachers and administrators toward most of the educational setting needs of information technology features. There are some suggestions for the next studies that might be conducted by other researchers.

Qualitative research is recommended in order to know the perceptions of teachers and administrators toward utilizing information technology in school. This study included all the topics that were appropriate for contemporary schools. A future study can be implemented in a higher education setting in order to understand how they utilize information technology. They should examine staff development plans and information technology plans. This research consists of various topics, including but not limited to: staff development plan, information technology plan, and a constructivism approach. Other researchers can conduct a study at any level, such as primary schools, middle schools, high schools, or the university regarding any of these topics. Other research topics should emphasize the teachers and administrators acquiring skills with software programs such as a data base or spreadsheet.

#### *Implication of the Study*

This research indicated that the majority of the teachers and administrators (male and female) upheld the importance of information technology for learning, teaching, and

administrative work. However, the teachers and administrators had some barriers that prevented them from using information technology even when information technology was available in school.

1. They do not have time to acquire knowledge and skills of information technology.
2. They do not know how to integrate information technology in curricula.
3. There is a lack of training programs.

The literature asserted that computer technology, which included the Internet and communication tools, should take place in the educational institutions in order to enhance classroom activities, manage instruction, and other school activities.

The integration of information technology requires teachers and administrators to develop and improve their knowledge and skills of information technology. This would be accomplished enrollment of the staff development in programs that provide them the opportunity to utilize the features of information technology. The indication is they have positive desires toward integrating information technology. This is important for the decision makers to understand because it indicates than an anxiety barrier toward the new technology has been eliminated. The Ministry of Education should develop an information technology plan (ITP) and staff development plan (SDP) that will guide teachers and administrators with implementation of these plans into the schools.

The schools should connect with the Internet and use firewalls to thwart students' access to inappropriate web sites. Schools are connected with the districts and the Ministry of Education. This connection would be increased and improved through the

utilization of web sites. Each school should develop a web site and allow teachers to develop their own web sites that allow students and parents to access school whenever and wherever. The purposes of ITP and SDP were to supplement the students' learning, assist them to learn the new technology and enhance the subject matter.

Developing another approach for instruction is significant with the constructivism approach because of its advantages for learners. Based on the present study, teachers and administrators who did not already comprehend the constructivism approach concepts were motivated to understand how moderate constructivism integrates teaching. The concepts and learning, which required that teachers work as facilitators in the classroom, as well as, monitor students when they work in groups. Teachers should develop course activities that encourage the students to seek information and explore their learning skills.

## Conclusion

The study examined on information technology in high schools in Saudi Arabia where the use was based on the constructivism and humanism theories. The constructivism approach was devised by Piaget, Bruner and Vygotsky. It requires learners to conduct multiple resource searches among all the information and enables them to develop the optimal solution for the problem under the study. Another theory, humanism, focuses on the learner's whole identity, and was built by Maslow. This approach is composed of five levels that advance from basic needs up to the highest level, which is self-actualization, and which cannot be met without developing the prior levels of Maslow's hierarchy.

Bailey and Pownell created a hierarchy that focused on the needs of information technology in each level of Maslow's hierarchy, and on how teachers, administrators and the other learners develop a variety of knowledge levels that assist them in teaching and administrative work with information technology, and how leaders can develop information technology plans for school districts.

These theories work very well toward developing a coherent model for staff development, learning through technologies and developing optimizing knowledge, and developing information technology plans.

The results from the study included the overall mean for the first dependent variable, information technology in instruction, at 1.916, and the overall mean for the second dependent variable, information technology planning, at 2.034. The other categories were information technology in administrative work, whose overall mean was

1.641, information technology knowledge and skills of the participants with an overall value of 2.567.

The result of the two-way multivariate analysis of variance (MANOVA) was  $P > .05$ . That meant there was no significant interaction between gender and position on the combination of information technology plan and information technology in instruction. The MANOVA result indicated that the participant asserted the importance of information technology plan and information technology in instruction. The participants realized the magnitude of information technology in instruction. They indicated their recognition of the need to place it within the curricula and communication.

According to the constructivists, learners, either students, teachers, or administrators, would be able to access the resources of information, and augment and enhance the communication among learners to increase and evaluate their information in order to develop new knowledge. Accumulative knowledge aids learners in advancing through the levels of information technology in Bailey and Pownell's hierarchy. The overall mean of information technology plan was 2.034. This result indicates that the participants asserted that information technology must be planned in order for learners, teachers, and administrators use its features to improve quality of the output of the school. The overall mean of information technology in administrative work was 1.641, indicating that the majority of the participants realized and stressed the importance of its features in administrative work to improve the quality of their work and to save time and effort.

The overall mean of information technology knowledge and skills of the participant was 2.567, which indicated that their knowledge and skills to employ

information technology in the educational environment is weak. It also indicated that the participant did not meet the information technology hierarchy of Baily and Pownell, that they needed a comprehensive staff development plan to mobilize the knowledge and skills of teachers and administrators through the Bailey and Pownell's hierarchy, which promises to help them use information technology in educational settings and to develop the leaders of the information technology field for the future.