

## 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 that 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.

