FACTORS ASSOCIATED WITH COMPUTER AND INTERNET TECHNOLOGY IMPLEMENTATION IN BIOLOGY, CHEMISTRY, AND PHYSICS EDUCATION IN TURKISH SECONDARY SCHOOLS

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The main purposes of the research were to identify computer and Internet use by biology, chemistry and physics teachers in Turkish secondary schools and identify factors associated with computer and Internet technology. To this end, survey documents were sent by the Provincial Directorate of National Education to 250 selected schools' administrators for further distribution. Administrators were asked to complete the "Computer and Internet Use: School Survey," and to distribute the "Science Teacher Computer and Internet Use" surveys to the two teachers who teach science class. Surveys were then returned to the General Directorate of Educational Technologies.

Research findings showed that computer and Internet use has not occurred effectively. Computers were first introduced to Turkish schools in 1984; unfortunately the current situation of computer and Internet use in science education is not at the projected earlier point in time. Considering the fact that science teachers' participation in technology-related professional development program is higher than other subject teachers, the use of computer and Internet technologies in Turkish secondary schools is still at its early stages. Lack of computer knowledge and not knowing how to integrate computers into education were the major factors reported.

With regard to computer and Internet use, a regression model for Turkish schools, which includes access and knowledge, explains a large part of the variance in study results. There was a significant relationship between computer attitude (computer liking, usefulness, and confidence) and computer and Internet use. Although there was a significant negative relationship between Internet and computer uses and the attitudinal component, computer anxiety, it did not deter individuals from expressing a desire to engage in computer use in education.

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To my supportive parents, ***Gülsün and Abdurrahim Özer***

To my loving husband, ***Fersin Keskin***

and

In memory of my grandfather ***Mehmet Çakıcı***

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Instructional technology is defined as "the theory and practice of design, development, utilization, management and evaluation of process and resources for learning" by the Association for Educational Communications and Technology (AECT) (Seels & Richey, 1994). In other words, instructional technology primarily refers to the use of technological processes for teaching and learning.

The last part of the 20^{th} century has been referred to as the Information Age characterized by automation and information systems. Today, knowledge is perceived as an important factor in an information society (Akkoyunlu, 1999; Eraut, 1991; Nair, 1998). It is stated that "we have to make sure that our children have a sufficient understanding of the technologies that lie at the heart of the Information society" (p.15) (Eraut, 1991).

Developments in science and technology have an essential impact on all segments of our life. In the last two decades, the computer has become a popular tool in society and especially in education. It is necessary to provide technology-supported learning opportunities to prepare students for the Information Age. Most educators agree that using computers in education improves the teaching and learning environment. The U.S. Congress, Office of Technology Assessment (1995) stated that " Many technology–using teachers find that technology can help improve student learning and motivation, address students with different learning styles or special needs, expose students to a wider world of information and experts, and implement new teaching methods" (p. 8).

The Secretary's Commission on Achieving Necessary Skills (SCANS) (U.S. Department of Labor, 1991) prepared a report to delineate the important skills in the working environment. The report was prepared for the schools and teachers to emphasize how the curriculum and instruction should be changed to enable students to develop those skills. The SCANS report outlined that young people should have some fundamental skills such as:

- basic skills like reading, writing, arithmetic, listening, and speaking,
- thinking skills such as creative thinking, decision making, problem solving, seeing things in the mind's eye, knowing how to learn, and reasoning,
- personal qualities including responsibility, self-esteem, sociability, and integrity (U.S. Department of Labor, 1991).

In addition to these skills, the SCANS report identified the workplace competencies in five domains. These competencies are:

- identifying, organizing, planning, and allocating time, money, materials, and human resources,
- interpersonal skills such as negotiating, exercising leadership, working with diversity, teaching others new skills, serving clients and customers, and participating as a team member,
- information skills including using computers to process information and acquiring and evaluating, organizing and maintaining, and interpreting and communicating information,
- systems skills such as understanding systems, monitoring and correcting system performance, and improving and designing systems,
- technology skills including selecting technology, applying technology to a task, and maintaining and troubleshooting technology (U.S. Department of Labor, 1991).

The Department of Labor's Bureau of Labor Statistics (U.S. Department of Labor, 2002) stated that, the fastest growing occupations between 2000 and 2010 are computer related. The top six occupations are computer software engineers, computer support specialists, network & computer systems administrators, network systems & data communications analysists, desktop publishers, and database administrators. Since computer technologies are basic components of today's working environment, computer skills are accepted as a fundamental skill in a technological society. Schools have a responsibility to prepare students to live in an increasingly technological society. For those reasons, integration of computer technologies into the education system is important today.

The computer was first used for instructional purpose in 1950's at Massachusetts Institute of Technology (MIT), and then it was used with school children in 1959 in New York City. The first microcomputers entered the schools in the late 1970's. The Integrated Learning Systems (ILS) and multimedia were used widely after 1990. After 1994, the Internet and World Wide Web played an important role in our life (Roblyer, 2003).

Today technology, especially the computer and the Internet, is everywhere. It is widely accepted that technology should be a part of K-12 education. Computers and the Internet are commonly used in classrooms for teaching and learning purposes in all countries. It is believed that the use of technology in their schools is necessary for improving 21st century education.

Computers and the Internet have been increasingly used all over the world since the personal computer caught on in the early 1980s. Although prior to 1985 there was only one computer for each 10,000 people in the U.S., the computers per capita zoomed to 99 per 1,000 people in 1985 and 342 per 1,000 people in 1995. The worldwide computer per capita was 10 per 1,000 people in 1985 and 40 per 1,000 people in 1995 (Computer Industry Almanac, 1995). The Computer Industry Almanac Inc (2002a) reported that the worldwide number of personal computers (PC)-in-use peaked at 603 million in 2001, up from 530 million in 2000, and 45.1% of these PCs are in homes. The U.S. has the largest number of PCs-in-use with 175 million at year-end 2001. The worldwide number of PCs will nearly double to over 1.15 billion by year-end 2007.

Moreover, the number of Internet users increased from 544 million at year-end 2001 to almost 666 million in 2002. The U.S. has almost 25% of all worldwide Internet users in 2002. The other top countries in Internet usage are Japan (9.73%), China (8.18%), Germany (4.56%) and UK (4.08%). It is predicted that the worldwide number of Internet users will top 1 billion in 2005 (Computer Industry Almanac, 2002b).

Personal computer ownership and Internet use are increasing around all over the world. Like other countries, the growth of computer and the Internet usage in Turkey is increasing at a fast rate. Pastore (2000) declared that Japan (50%), Turkey (26%), Taiwan (60%), Germany (44%), and Saudi Arabia (32%) are the top-five countries which show the largest increases in PC ownership. The Internet use in Turkey has grown fastest (19%), followed by U.S., Germany, and Korea (Pastore, 2000). It is mentioned that there was 609 percent growth in Internet subscribers in Turkey in 2000 (Pastore, 2001). Today, the number of Internet users in Turkey increased from 4.2 million in 2001 to 6.5 million in 2002 (Tuncelli, 2002). Taylor Nelson Sofres PIAR Marketing Research Company declared the percentage of Internet user population was 20% in 2002. (Taylor Nelson Sofres Interactive, 2002).

According to the 2000 census results, the population of Turkey is 67,803,927. Turkey is considered Europe's youngest country with having more than 40% of the population between ages 5 and 29. In the 2002-2003 academic year, there were 13,686,616 students and 557,759 teachers at pre-primary education, primary, secondary schools and formal education (Ministry of National Education, 2001, 2003). Because of the young population of Turkey, education is the most important segment of Turkey's development mission.

The extensive use of information technologies in education is aimed to improve its quality. Turkey has implemented projects for the introduction of computers in education. Computers were first introduced to Turkish schools in 1984 (Yedekcioglu, 1996). In the context of Computer Aided Education, the Turkish Ministry of National Education (MONE) has been working on extending computer use for any course at any level of education. Since the number of computers and access to the Internet in Turkish schools have grown, the next questions are about to what extent these technologies are being used in the classrooms and for what purposes. Unfortunately, there are limited research studies in the area of computer in Turkish secondary schools (Cakiroglu, Cagiltay, Cakiroglu & Cagiltay, 2001). There are even fewer related studies considering secondary science education in terms of science teachers' computer use and the factors that might affect their usage.

Statement of the Problem

Batey (1985) stated that improving higher order thinking skills, including critical thinking and problem solving, is one of the aims of science education. Development of those skills creates people who question, explore solutions, and reach conclusions. Computers offer help to reach the goals of science education. Also, developments of higher order reasoning skills are important to increase students' conceptual understanding of science (Bybee & DeBoer, 1994). Thomas (2001) also outlined the potential value of computers in science classrooms. It is mentioned that "each of these applications has potential educational value and may be seen as compatible with the broad contemporary goals of science education which increasingly focus on providing students with opportunities to explore and understand workplace applications of science, to develop strategies of investigation, reflection and analysis, and to create and/or refine knowledge" (p.30). Like other subject teachers, science educators may include computer and Internet technologies as a part of the education system in order to meet the challenges of 21st century.

Rogers (1995) mentioned that the process for technological innovation involves specific characteristics: the relative advantage of the innovation to the adapter; the compatibility of the innovation with existing values, previous experiences and current needs; the level of complexity of the innovation; trialability (the degree to which it can be experimented with on a limited basis); and the visibility of the innovation's results. The personal characteristics of the adapters, interaction with colleagues, access to the innovation, and perception of the innovation are also other factors that might influence the adoption of innovation.

Teachers are one of the key people to incorporate computers into their classroom. The U.S. Department of Education (2000) reported "... teachers' ability and willingness to use computers and the Internet may depend, to some extent, on the schools and classrooms in which they work, specifically certain characteristics of classroom and schools, such as equipment, time, technical assistance, and leadership may act as either barriers to or facilitator of technology use" (p.4).

The U.S. Department of Education (1998), through the Office of Educational Research and Improvement, mentioned many reasons to evaluate a program. Some of these follow:

- To provide information to program personnel and others on aspects of the program that work well and potential problems;
- To catch potential problems early in the program so they can be corrected before more serious problems occur;
- To guide further evaluation efforts in greater detail;
- To provide information on what technical assistance may be needed; and
- To determine what impact the program is having on participants (p.3).

It is a well known fact that the amount of the technology resources at school does not mean that they are used effectively in education. Understanding computer and Internet usage in secondary science classrooms, and identifying the factors that affect computer use in classrooms may provide information to help understand and solve the problem of integrating computer technologies into instruction and to make recommendations regarding the direction of future technological development.

Knowing how computers are used in the schools is important for allocating financial resources properly. It is also imperative to provide appropriate professional development about educational technology for administrators and teachers. Moreover, identifying what the issues are and understanding whether computer technologies have been integrated into science education are important for future technological plans.

Although the Turkish Ministry of National Education (MONE) has given financial and educational commitment to develop technology since 1984, the studies related to the use of computer and Internet technologies in secondary schools was limited. The MONE provides support to teachers and administrators to encourage the utilization of computers in teaching and the learning environment. But it is not clear the extent to which computer and Internet technologies are being used in secondary science instruction.

The Purpose of the Study

The main purpose of the study was to identify the factors that affect computer and Internet usage in biology, chemistry and physics classes in secondary schools in Turkey. In addition, this study identified whether science teachers at secondary schools have incorporated computer and Internet technologies into their instructional and related professional tasks. Such tasks include testing, grading, preparation of lesson materials, communications with students, parents, and other colleagues, etc. In addition, the other purpose of the study was to identify critical issues regarding the use of computer and Internet technologies.

The data collected will show the current status of computer and Internet use by science teachers at secondary schools that have computer labs in Turkey. Both science teachers and school administrators in secondary schools were surveyed, since both play important roles in the use of computers in the schools. The study determined the factors and issues related to the use of computer and Internet technologies in schools from the point of view of the administrators and teachers.

Definitions of Terms Used

Administrative use: The use of computers to keep records of grades, attendance, scheduling, inventories, student achievement, and communication.

Attitude: "Learned predispositions to respond positively or negatively to certain objects, situations, concepts, or persons" (p.2) (Aiken, 1980).

Computer: An electronic device that has the ability to store, retrieve and process data, and can be programmed with instructions that it remembers.

Computer anxiety: Fear of or intimidation by the use of computer technology. Computer anxiety includes feelings of nervousness or apprehension, which an individual may experience when using a computer (Gressard & Loyd, 1986).

Computer confidence: The degree of self-confidence in the ability to learn about or use computers (Gressard & Loyd, 1986).

Computer- assisted instruction (CAI): The use of computers in the process of teaching and learning. This term indicates any application of the computer which serves the goals and functions of the instruction. The generally used modes of computer-assisted instruction are drill and practice, tutorial, simulation, gaming, and problem solving (Bayraktar, 2000).

Computer experience: The amount of time that people spent using computers (Gressard & Loyd, 1986).

Computer liking: How well one enjoys computer work (Gressard & Loyd, 1986).

Computer usefulness: The ability to perceive computers as a tool for accomplishing tasks (Gressard & Loyd, 1986).

Hardware: The physical part of a computer system. It includes the computer and all equipment attached to it.

Instructional software: The computer applications that are designed using programming tools and algorithms to deliver and assist student learning.

Science education: An educational process dealing with scientific literacy. Scientific literacy is defined as "the knowledge and understanding of scientific concepts and process required for personal decision making participation in civic and cultural affairs, and economic productivity" (National Research Council, 1996).

Secondary education: General or vocational and technical institutions which of for at least three years following primary education (Ministry of National Education, 2000).

Self-efficacy: An individual's judgment about his or her ability to complete a task (Kinzie & Delcourt, 1991). Self-efficacy is the belief in one's capabilities to organize and execute the course of action required to manage situations (Bandura, 1995).

Limitations and Delimitations

The limitations of this study include:

- The study was limited to the list of secondary schools that have computer labs, which is provided by the Turkish MONE statistics.
- Selections of science teachers were determined by the school administrator. The researcher was limited by the fact that she was not provided a list of names of teachers.
- The quality of data would be limited by factors related to the mail-out survey method such as clarity of the questions, misinterpretation of questions, etc.
- Since the science teachers' and administrators' computer attitudes, computer knowledge and skill levels, and their needs regarding computer and Internet technologies change over time, this study was limited to a particular point in time.

The delimitations of this study are:

- The area of technology was limited to the use of computers and the Internet in educational settings.
- The study is limited to in-service science teachers and administrators in Turkish secondary schools that have computer labs.
- This study did not attempt to clarify or identify how well teachers and administrators use the computer technology.

CHAPTER II

REVIEW OF THE LITERATURE

The purposes of the study were to identify the use of computer and Internet technologies in science classrooms in Turkey and to examine the factors that affect the use of computers and the Internet for educational purposes. In this chapter, the previous studies related to the use of computer and Internet technology for educational purposes were summarized. The literatures were categorized into four sections like: computers in education, computers in science education, the effectiveness of computers, and factors affecting computer use.

Computers in Education

"...Technology can clearly assist schools and the nation generally, to more effectively meet many of the goals contained in the legislation. Perhaps most important is the goal that calls for all students to possess demonstrated competency in challenging subject matter and be prepared for productive citizenship, continued learning, and productive employment"(Glennan & Melmed, 1996). Technologies can be used to support *individual learning* activities- such as drill and practice, computational and writing tools, simulations-, *group learning activities-* such as e-mail, presentation software-, *instructional management-* such as management of student portfolios-, *communications* and *administrative functions*.

Since students have different learning styles, different responses to the same styles of instruction, and different backgrounds, educators agree on adapting educational methods suited for individual learner needs and abilities. It is mentioned that educational technology can play an important role in changing education methods to more closely fit individual learner needs and abilities.

Using technology in schools allows people to perform traditional tasks with a speed and quality that were not easily possible in the earlier period. It provides teachers more free time to work intensively with small groups of students with common interests or needs. Also, technology can provide the instructional management systems that teachers can use to guide the student's learning activities and to keep track of the student's mastery of subject matter. In addition to these, technology clearly does contribute other national goals like the support of life-long learning, the professional development of teachers, and the achievement of high proficiency in science (Lemire, 1998). The studies about the applications of educational technology show improvements in student performance, student motivation, teacher satisfaction, and other educational outcomes such as problem-solving or collaboration (Glennan & Melmed, 1996).

The International Federation for Information Processing (IFIP) mentioned that computers should be used in education "to individualize instruction, to contribute to learning mastery, to make higher quality material available more widely, and to stimulate educational reform" (Yedekcioglu, 1996).

Derrick Walker (cited in Schofield, 1995) stated "the potential of computers for improving education is greater than that of any prior invention, including books and writing" (p.3). Although some researchers have argued that there are advantages to usage of computers in education, some studies revealed that there are disadvantages in using them. (Yalcinalp, Geban, & Ozkan, 1995; Bialo & Sivin-Kachala, 1996; Roth, Woszczyna, & Smith, 1996; Soe, Koki, & Chang, 2000; Thomas, 2001; Chang, 2002, Kuech & Lunetta, 2002).

The use of computer technology in the workplace, homes, and schools has increased in recent years. The growth of computer and Internet use has resulted in a demand for people with computer skills and experience. To prepare students for the future in an increasingly technological world, the use of computers, Internet and other information technologies plays a major role in education. Moreover, it is thought that if children are not familiar with computers, they will be left behind in a technological society. This kind of thinking has contributed to the rapid increase of computers in schools (Lancaster, 2000).

The history of computers in educational environments can be traced to sometime in the mid-1960s. Computers and the Internet have been widely used as a tool in education since the 1980s and the 1990s, respectively. The use of computers and the Internet in education has changed the traditional relationship between teachers and students. By using computers in the classroom, traditional teacher-centered models of teaching have been replaced with more interactive student-centered models of teaching. In other words, the model of teaching and learning has changed from the traditional, in which teachers "delivers" knowledge, to a dynamic schooling in which teachers guide students to encourage inquiry and the construction of knowledge (David, 1994; Simsek, 1997; Tokman, 1999).

The number of computers in schools has increased dramatically in recent years. Developed countries, especially the U.S., have widely used computers and the Internet in education. Two of the four Technology Literacy challenge goals are related to the presence of hardware in U.S. schools:

- All teachers and students will have modern multimedia computers in their classrooms
- Every classroom will be connected to the information superhighway.

In the 1995-96 school year, 98 percent of public elementary and secondary schools reported owning a computer (85% have multimedia computers). Sixty-four percent of schools have Internet connections, and approximately one-third are equipped with local area networks (LAN). The ratio of students to computers was 11 to 1 for elementary schools, and 8.4 to 1 for senior highs (Coley, Cradler, & Engel, 1997). The number of students per computer in primary and secondary schools in the U.S. decreased 4.4 in the 2000-01 academic year from 62.7 in the 1984-85 academic year. Moreover, 84.8% of primary and secondary schools have a local network, and 67.4% of the schools have Internet access. Moreover, it is mentioned that 66% of teachers in the U.S. have used computer and Internet technology in the classroom (U.S. Census Bureau, 2001).

As a developing country, Turkey has also aimed to expand computer-assisted education in all the levels of education and to have schools equipped with modern tools and equipment. The Turkish MONE has determined national goals and implemented projects to improve computer use in the classroom. The Ministry of National Education stated that the national objective in regards to information technology is based on "keeping pace with the Information Age, to raise people who think universally and act nationally, to become a society of information and technology, to support each level of the education system with technology so as to continuously increase the competitive power of our people and our society" (Ministry of National Education, 2001).

The MONE aimed to use computer technology effectively in all schools and in this regard initiated a computer-aided education (CAE) project in 1984. During 1985-1987, 2,400 computers were bought and computer courses were offered as an elective course. During 1985-1990, training programs were organized and teachers were trained in computer literacy and programming (Yedekcioglu, 1996).

The Turkish MONE has implemented some projects to spread basic computer education and computer assisted education (Ozar & Askar, 1997): Computer Assisted Education (BDE) (1991), Industrial Schools Project (EOP) (1994), Non-formal Vocational Education Project (YMEP) (1995), Improving the National Education Project (MEGP) (1995), Curriculum Experimental Schools Project (MLO), Basic Education Project (TEP) (1997), Foreign Language Education via Distance Education (2001-2003), Vocational Education via Distance education (2001-2003), Learning Centers (2000), MEBSİS (1987), World Links Project (1998), and Computer Experiemental Schools (BLO). These projcets have been supported by the Ministries, the general government budget, the World Bank, the European Union, and UNICEF (Ministry of National Education, 2002a; Orhun, 2000).

Like other countries, the number of computers in Turkish schools has dramatically increased. Yedekcioglu (1996) reported that there were 818 high schools that have a computer lab and 15, 270 PCs in these labs. Total number of PCs at state high schools were 18, 494 in 1996. 2001 statistics shows that 4,251 schools had 119,073 computers for educational purposes. Also, 1,609 schools had 5,894 computers for administrative purposes. The number of students per computer decreased from 145 in 2000 to 81 in 2001. In 2000, the ratio was 190 students per computer in primary schools and 52 students per computer in secondary schools. The numbers of computers in primary and secondary schools have increased and the number of students per computer decreased in 2001. There were 87 students per computer in primary schools and 37 students per computer in secondary schools. Moreover, 17% of schools in Turkey had a computer lab in 2001, up from 10% in 2000 (General Directorate for Educational Technologies, 2002). The Turkish MONE statistics show that 2,571 secondary schools have a computer lab. The percentage of secondary schools that have a computer lab is approximately 33 in Turkey.

Computer technology can be used from very basic to more complex levels in teaching. There are several theoretical models to characterize levels of computer use. Rieber and Welliver's (1989) Model of Instructional Transformation presented five hierarchical levels of computer use. These levels are familiarization, utilization, integration, reorientation, and evolution. In the first stage (familiarization), a teacher becomes familiar with the capabilities, limitations, and potential of the computer. In the second stage (utilization) the teacher begins to use computers as an adjunct to his or her teaching. In the third stage (integration), teachers use computers and computers are fully integrated into the curriculum. By the fourth stage (reorientation), the teacher's role begins to change, with a rethinking of the relationship between technology and educational goals and objectives. In the fifth, final, stage (evolution), educators continue to learn how to improve their instruction through use of computers. These theoretical models provide a framework for evaluating the extent or level to which computers are being used by identifying measurable behaviors and practices. David Hawkride (cited in Ely, 1995) outlined four common reasons for using computers in schools. These include:

- *The social reason-* Policy makers want children to understand and use computers because computers play an important role in today's world
- *The vocational reason-* children need computer skills to provide them with employment opportunities
- *The pedagogic reason-* computers can teach students, and students can learn from computers
- *The catalytic reason-* computers can be catalysts for change and are important in school reform initiatives (p.18).

Computers in Science Education

Morse (1991) stated that science teachers use different computer applications. Word Processing, test, worksheets, Spreadsheets, grade book programs, test item banks, producing crossword puzzles, word searches, posters, signs, and diagrams were some examples of science teachers' computer use to support instruction. Some special software provides teachers and students use of a computer in laboratory activities. Moreover, computers are used for database searching and also students can gather scientific data from spacecraft and satellites.

Lehman (1994) investigated microcomputer use in secondary science instruction. The study indicated that microcomputers were used in the secondary education for different purposes. It is mentioned that computers were used to improve laboratory work, to increase student motivation toward science, and to increase conceptual understanding.

Studies stated that computer applications have potential educational value for increasing students' conceptual understanding of the science (Kuech & Lunetta, 2002). Kuech and Lunetta (2002) found that using digital technologies in dynamic physics courses helped conceptual understanding. Computer applications develop higher order thinking skills, including critical thinking and problem solving, and offer help for all of the science education goals (Batey, 1985; Bybee & DeBoer, 1994). Moreover, Kuech and Lunetta (2002) reported that using technology provides students more time to examine data. This gave students an opportunity for deeper conceptual understanding associated with the data.

Chang (2002) mentioned that inquiry-oriented instruction or problem based instruction will enhance students' achievement in science. The researcher stated that "... a problem-solving based, computer assisted tutorial held promise for supporting students' earth science learning". Chang (2002) found that using problem-solving-based computer - assisted instruction had potential to enhance earth science concepts.

Many studies agree that using computers in science courses can, and does, add an important level of enhancement (Office of Technology Assessment, 1995). Also, computer use can improve learning and positively influence students' attitudes and self-esteem. This may account for increased interest in science by lower achieving students. Also, the use of computers in a science course may help students to be computer literate, thus, helping them to plan a career in science. Since students interact with computers in a variety of ways in science courses, a student's degree of computer awareness and literacy will increase.

Morse (1991) summarized the studies related to microcomputer use in science education. This study mentioned that it is possible to teach a science course without the use of a computer, but the integration of computers into a science course may improve the learning environment. Also, it was pointed out that use of computers was important for students especially planning a career in science. It was reported that use of computers provides some important results such as higher achievement, positive attitude, improved scientific reasoning skills, developed inquiry skills and self-esteem. Also, Morse (1991) mentioned that some studies result showed that use of computer also increased scientific knowledge even if there were misconceptions at the beginning.

Bayraktar (2000) stated that CAI is excellent for teaching analysis, synthesis, and evaluation skills. CAI helps students to explore the interactions of all components in a complex system. Students develop the ability to find relationships in the system and make accurate predictions about the effect of changes.

The implementation of CAI in science education has a potential to eliminate students' misconceptions about physics, chemistry and biology concepts. Identifying and changing these misconceptions is really important in order to maintain correct conceptualizations of new topics. The studies showed that computer simulations were successful to identify and change students' misconceptions (Bayraktar, 2000).

The majority of studies reported that the CAI improves academic achievement in science education. Yalcinalp and her colleagues (1995) mentioned that using CAI tutorial programs enhanced student achievement in chemical formulas and the mole concept at the secondary level. Studies showed that groups using computers had significantly higher scores than a control group instructed by traditional methods (Bayraktar, 2000). Results of the study revealed that the instruction including computers provided significantly better results than the instruction including different instructional methods.

Students' attitudes toward science subjects are important because they correlate with science achievement. Yalcinalp et al. (1995) and Chang (2002) mentioned that classroom instruction which includes computers produced significantly more positive attitude toward chemistry than the instruction enhanced with additional recitation hours.

Trindade, Fiolhais, and Almedia (2002) investigated the potential of 3-D virtual environments in science education. The researchers analyzed whether or not these environments are more useful for students with higher reasoning and comprehension skills. The study results showed that 3-D virtual environments provided these students better conceptual understanding.

Predavec (2001) compared the students' learning outcomes from computer-based instruction with a conventional dissection. The study reported that the students who completed e-rat, a computer-based rat dissection, had higher scores in the quiz. The researcher stated that specific software like e-rat can be used effectively in science education.

Although the majority of studies on the effectiveness of CAI reported positive achievement effects, contradictory findings were also reported. These studies found traditional instructional methodologies are more effective than CAI. Also, some studies suggested that there were no significant differences between traditional instruction and CAI in terms of achievement effects.

The Effectiveness of Computer Use

Coley et al. (1997) reported that teachers were using computers in a variety of ways. Teachers used computers to deliver traditional instruction such as drill and practice exercises, to teach software applications, and to provide students with opportunities to explore, and construct their own knowledge, as well as non- instructional tasks such as preparing class materials, developing lesson plans, and tracking academic progress. In addition, the Internet allows teachers and students to use electronic mail, file transfer, conferencing, and the World Wide Web, etc. for educational purposes.

During the last decade, educators have investigated how using computer technology can enhance learning. Most researchers mentioned that computers may provide powerful learning opportunities, if used appropriately. Numerous studies about technology show improvements in student performance, student motivation, teacher satisfaction, and other important educational outcomes (Coley et al., 1997). Studies showed that technology has a significant positive impact on student achievement in all subject areas, across all grade levels, and in regular and special- needs classrooms. During the 1980s, studies verified that using computer technology could motivate students, enhance instruction for special needs students, improve students' attitudes toward learning, and motivate teachers and free them from some routine instructional tasks (Bialo & Sivin-Kachala, 1996).

Kulik (1994) analyzed studies of the use of computers for instruction prior to 1990. The findings of this study can be summarized as follows:

- Students usually learn more in classes in which they receive Computer-based instruction.
- Students learn their lessons in less time with computer-based instruction.
- Students also like their classes more when they receive computer help in them.
- Students develop more positive attitude toward computers when they receive help from them in school.
- Computers do not have positive effects in every area.

In 1996 Bialo and Sivin-Kachala prepared a meta-analytic report on the effectiveness of technology in schools. This report, including 176 studies from 1990 to 1995, concluded that

> "educational technology has demonstrated a significant positive effect on achievement. Positive effects have been found for all major subject areas, in preschool through higher education, and for both regular education and special needs students."

Introducing technology into the learning environment is important to make learning more student-centered, to encourage cooperative learning, and to stimulate increased teacher/student interaction. It is stated that many students who seldom participate in face-to-face class discussions became more active participants online.

Coley and his colleagues (1997) summarized other effects of technology on students. They stated that

> "The use of technology in the classroom improves students' motivation and attitudes about themselves and about learning. Technology-rich schools report higher attendance rates and lower dropout rates than in the past. Students are

found to be challenged, engaged, and more independent when using technology. By encouraging experimentation and exploration of new frontiers of knowledge on their own through the use of technology, students gain a greater sense of responsibility for their work- producing higher-quality assignments that reflect the increased depth and breadth of their knowledge and talent. And technology energizes students, because they often know more about its operation than do their teachers."

Peck and Dorricot (1994) outlined ten reasons that computers should be used in schools:

- Since technology enables teachers to individualize instruction, students learn and develop at their own pace
- Students need to be proficient at accessing, evaluating and communicating information. By problem solving and critical thinking activities, technology can encourage students to question, debate, and form opinions.
- Technology can increase the quantity and quality of students' thinking and writing through the use of Word Processors.
- Students need to be able to solve complex problems. Higher order thinking cannot be transferred from teacher to learner. Students need to develop higher order thinking skills on their own. Computer applications such as database, Spreadsheets, graphics, and multimedia programs can make this process possible by allowing students to organize, analyze, interpret, develop and evaluate their own work.
- Technology can encourage students' artistic expression.
- Technology enables students to access resources outside the school.
- Computers can bring new and exciting learning experiences to students such as simulations, CD-ROMS, etc.
- Students need to feel comfortable using computers, since they will become an increasingly important part of students' world.
- Technology creates opportunities for students to do meaningful work. Technology can provide an audience for students' work, resulting in increased motivation and self-esteem.

- Schools need to increase their productivity and efficiency. Computers can be used to perform some of routine tasks, providing teachers with more time to do other things.

Computer- assisted instruction (CAI) has different formats including drill and practice, tutorial, simulations, games, and problem solving. Advantages and disadvantages of CAI summarized Samojeden (cited in Bayraktar, 2000). The advantages of CAI are:

- The CAI lesson may run outside of the class time. It gives teacher free time for individual instruction;
- Students can proceed at their own pace;
- CAI provides immediate feedback to student responses. Students can monitor their own progress, and prevents reinforcement of errors;
- CAI can provide an alternate instructional format. It provides variety of the course presentation and reinforcement;
- Practice in particular skills can be personalized; and
- CAI provides teachers to monitor student progress. In this monitoring system teacher can provide individual assistance to the student who has difficulties.

All these reasons can motivate teachers and administrators to use computers in school. Teachers and administrators should be conscious of the reasons for their adoption of computer technology.

In addition to the advantages, lack of quality software, the difficulties in developing new software, computer anxiety, and the high cost of CAI are some of the disadvantages that affect the use of CAI.

Factors Affecting Computer Use

Rogers (1995) states that the process for adoption and diffusion of an innovation, in this case computer technology, is influenced by the relative advantage of the innovation to the adopter, the compatibility of the innovation with the adopter's existing values, the adopter's previous experiences and current needs, the level of complexity of the innovation, the ability of the innovation to be tested, and the direct observation of the results of the use of the innovation. There are numerous studies about the factors that influence the extent to which teachers use computers in education (Almusalam, 2001; Hester, 2002; Lancaster, 2000; Mathew, 2001).

Nous (1992) categorized the factors related to the technology environment into ten groups. These are:

- *Room and atmosphere factors* such as classroom layout, class size, air condition,
- *Software Factors* such as information on software, availability of software, ability to purchase, availability of copies, technical support, location, availability of updates,
- *Hardware factors* such as computer types, hardware familiarity, printer access, overhead projection, peripherals, technical support, maintenance, number of computers, security, location, ability to purchase and updates,
- *Student factors* such as students' interest level, enjoyment, motivation, socioeconomic status, home use, student per computers ratio, age, computer knowledge,
- *Teacher factors* such as computer knowledge, confidence-comfort level, attitude, use in classroom instruction, frustration level, knowledge of applications, setting realistic goals, collegial experiences,
- *Instruction factors* such as curricular infusion, courseware use, application to classroom, instruction per student ratio, lesson planning, curriculum objectives, curriculum coordinator, task related behavior,
- *Instructional management factors* such as class management sharing of facility, and resources, classroom organizations, ease of teacher tasks,
- *Administrative factors* such as students, teacher training, community support, equipment supply and variety, equipment access, funding, English proficiency,
- *District factors* such as funding, long-range planning, professional organizations,
- *Consultation factors* such as resource center support and access, technology consultant, workshops, proven software applications, feedback (p.5).

Researchers studied variables such as gender, teacher's undergraduate major, years of experience, age, home computer ownership, teacher perception, administrative support, colleague support, size of school, grade level, and education level of teachers (Burke, 2001; Hester, 2002; Lemire, 1998).

Almusalam (2001) stated that teacher perceptions, teacher perceived proficiency, administrative support, colleague support, and access to computer technologies are the important factors that affect teacher computer use. The researcher tried to identify the factors related to the use of computer technologies for professional tasks by business and administration teachers at Saudi technical colleges. Almussalam found that there was a positive correlation between the level of use and perceived proficiency, computer experience, and administrative support. In contrast, there were no significant correlations between the level of use and perception of computer technologies, access to computers, colleague support, number of years teaching, and age. The researcher mentioned that the instructors who have access to computers in the classroom and at home and who have higher academic degrees are more likely to have a higher level of computer use than those who do not.

Mills (1999) examined the concerns of elementary school teachers integrating computer technology in the classroom. Data were collected by administering the Stages of Concern Questionnaire to teachers at four elementary schools in an urban school district. In 1999 Mills also stated that consideration of teachers' instructional concerns and practices are very important for the integration of computer technology.

In another study, Hester (2002) examined the influence of select variables on the instructional use of computers. Hester stated that teachers' concerns about technology are also important for the use of computer for instructional purposes. It is mentioned that teachers' concerns may prevent them from integrating innovation. In addition to teacher concerns, Hester also examined demographic variables; the environment for teacher engagement, the availability and accessibility of resources, the degree of community involvement, and the community involvement, and the level of administrative leadership and support. It is stated that teachers may have difficulties with integrating an innovation because of their own limitations or lack of knowledge. The persistent nature of the educational establishment also causes resistance to change. It is mentioned that since the lack of teachers' skills with computer was the major barrier to the use of computers, teacher training becomes more important for the integration of technology in education.

Hester (2002) also pointed to the importance of availability and accessibility of resources. While adequate funding for computer hardware is necessary for integration, it is not sufficient to guarantee the integration of computer technologies. On-site technical support, teacher training, access to computers and time dedicated for professional development are other factors that affect integration.

Administrative support and community involvement were also indicated as the factors that are important for successful integration of computer technologies. The effective leaders may provide vision, advocate the vision effectively, and support technology integration. Studies supported that administrators are successful when they lead by example and act as role models. In addition to the ability and willingness of school administrators and teachers, the support of the community such as parents and other key community leader is also critical. It is mentioned that collaborative partnerships formed between schools and corporations, universities or offices of education can help overcome the problems related to integration of computer technologies.

Hester (2002) examined the factors that affect the extent of computer use in classrooms and found the following:

- The number of available computers in the classroom positively affects the use of computer technologies;
- The use of computers was greater in classrooms of teachers with a Master's degree than in classrooms of teachers with just a Bachelor's degree.
- The amount of computer technology training has a positive affect on the use of computers in classroom.

- There is no difference in the extent of computer use by students or in the type of instructional activities for which computers were used.
- The use of computers was greater in classrooms of teachers 31-35 years old and 41-45 years old than in those of teachers 21-25.
- Small positive significant relationships existed between the use of instructional computer activities requiring moderate to extensive critical thinking skills and respondents' perceptions concerning both the adequacy of training provided by the district and the availability of sufficient and reliable hardware and software (p.96).

Lancaster (2000) categorized the factors that influence the extent to which teachers use computers in educational settings in two main subgroups. These are *systemic factors* such as time, training, access to computers or to other support resources, funding, leadership and *personal factors* such as teachers' attitudes toward computers, self-efficacy with regard to computers, computer anxiety, personal beliefs about teaching and computers, willingness to change, and perceptions of the relevance of computers to instruction. In this study, Lancaster examined the use of computer technologies in business classes in Saskatchewan high schools. The study showed that teaching skills needed for the workplace was the most common reason for using computers. To motivate students and to allow students to discover concepts in the course of doing their activities was second. These reasons may be acceptable for science education. Lancaster asked respondents to identify the barriers in using computers. The study found that although computer-using teachers disagreed that the barriers listed were important barriers, non users were more likely to be negative and they agreed that the barriers listed were important. The major barriers that a majority of teachers disagreed on were insufficient support from school administrators, hardware limitations, and insufficient rewards or incentives to use computers.

The lack of training opportunities was selected as the greatest of barriers by computer users. The study found that computer users believed they have enough computers; they know enough about computers; and they have sufficient administrative support. In contrast, the greatest barrier for non-users appeared to be lack of access to computers when needed. The other main barriers for nonusers were insufficient funds to purchase equipment or software, insufficient time to use computers, lack of knowledge, lack of training opportunities, and lack of knowledge on how to integrate computers into the curriculum. Moreover, the attitude scores and self-efficacy scores of computer-using teachers were higher than non-users and a slight positive correlation was found between these scores and the levels of computer use. (Lancaster, 2000).

Morse (1991) mentioned that the use of computers by science teachers was limited because of insufficient hardware and software. It is stated that "a relatively small number of science teachers use computers for computer assisted instruction and lab applications because there isn't enough hardware and because lab applications require both specialized hardware and software".

Summary

We definitely need to understand the factors that influence computer technology use in education if improved educational outcomes are to be achieved. Study of the literature identified a number of factors that seem to affect computer usage in educational settings. These included access to computers, time to develop computer skills, training in computer skills and in how to integrate computers into teaching, leadership and support from administrators, teachers' attitudes and beliefs and their self-efficacy with computers.

All studies agree that teachers need time to learn how to use computers in the classroom and to have experience (Lancaster, 2000; Meltzer & Sherman, 1997; Petty, 2002). Studies supported that training and experience were important for successful implementation of computer use in the classroom (Ahmad, 2000; Lancaster, 2000). The type of training for teachers is also important. Identifying teachers' needs regarding computer technology would be helpful to modify training programs. The lack of teachers' computer skills was the major barrier to implementing technology in education (Almusalam, 2001). Therefore, providing teachers with professional development is highly recommended.

The professional development programs may help teachers to increase their computer knowledge, computer experience and self-confidence. According to Rogers (1995), people with self-confidence about technology are more likely to use the technology and to enjoy finding new uses for the technology.

Insufficient access to computer technologies can be a serious barrier to computer implementation. Access to computers refers to the availability, location, capacity and maintenance of computers (Lancaster, 2000). The availability of computers, software and peripherals in schools is one of the most important issues for the use of computers. Lack of funding is another important factor. School budgets for computer technologies should be appropriately spent for hardware, software, and for training. Office of Technology Assessment (1995) reported that school districts in the U.S. only allocated about 15% of their technology budgets to professional development.

The location of the computers is also important. Studies supported that most of the computers used for instruction were located in computer labs (Office of Technology Assessment, 1995). Having computers located in classrooms makes it easier for teachers to have access to them more often.

Administrators and teachers play a key role in successful computer implementation (Almusalam, 2001; Office of Technology Assessment, 1995). Administrators' attitudes toward computers, their vision, their computer knowledge and experience may affect the level of support from the administration. Although researchers agreed on the importance of the administrative support for the use of computer technologies in school, some studies found that lack of support from administrators was not a barrier for using computers in school (Hester 2002; Lancaster, 2000).

This study focused on the use of computer technology including Internet in secondary school science classes. Computer technology can be used effectively to develop higher order thinking skills, such as problem solving and critical thinking, thus, the potential for computer use in science area seems very high (Batey, 1985). Since the factors that influence the use of computers has been changing over time and the characteristics of society may also change these factors, the effective factors should be identified for Turkish science classroom at the present time.

CHAPTER III

METHODOLOGY AND PROCEDURES

The main purpose of this study is to identify the factors related to the use of computer and Internet technology in the secondary schools in Turkey. The related purposes are to determine the status of current use of computers and Internet technologies in secondary school science classrooms and to identify the issues regarding these technologies.

This chapter presents the research methods and the methodological procedures used in the study. The methods and procedures utilized to conduct this study include the following sections: (a) Population and sample; (b) Research design and procedures; (c) Survey development; (d) Pilot study; (e) Translation of the surveys; (f) Validity and reliability; (g) Data collection; (h) Research questions; (i) Dependent variables; (j) Independent variables; (k) Data analysis.

Population and Sample

According to the Turkish MONE statistics, there are 7,770 secondary schools in Turkey. The secondary schools are under the following general directorates:

- General Directorate for Secondary Education
- General Directorate for Technical Education for Boys
- General Directorate for Technical Education for Girls
- General Directorate for Trade and Tourism Education
- General Directorate for Religious Education
- General Directorate for Teacher Training and Education

Of the 7,770 schools, there are 2,571 secondary schools that have computer labs in Turkey. The target population for this study was the entire population of Turkish secondary schools that have a computer lab. The sample was selected from this population, which includes the secondary schools that have a computer lab. The updated list of 2,571 schools obtained from The General Directorate for Educational Technologies (2002) was used in this study.

There are 81 cities in Turkey, and each city has a different number of schools that have a computer lab. In this study, the sample was selected through a cluster sampling procedure. Since one of the purposes of this study is generally to describe the status of computer and Internet use in science classrooms in Turkey, the population was partitioned into 81 clusters. A total of 250 out of 2,571 secondary schools (9.72 percent of the population) were sampled for this study. The sample was selected from all clusters (cities). Since each city differs in size, *proportional allocation* was used (Thompson, 2002). So all schools in the cities are represented in the sample in the same proportions they are in the population. It is important to maximize the accuracy of the estimate of the population. The following equation was used to calculate the sample size for each cluster. If cluster h has N_h units, the sample size allocated to it would be

$$n_h = \frac{n N_h}{N}$$

nh = The number of schools in a city in the sample
n = Sample size
Nh = The number of units in a city
N = Population size

The list of the cities, the number of schools that have computer labs; and the sample size for each city are presented in Table A.1 (see Appendix A). The schools from each city were then selected randomly.

Since the study determined the factors related to the use of computer and Internet technologies in schools, the point of view of the administrators and teachers, who were working at the same schools, were also taken into account. One administrator and two science teachers from the selected schools served as participants in this study. The surveys were distributed to the 250 school administrators and approximately 500 science teachers. Since each school has one administrator, the selection of the schools follows the same procedure of the selection of administrators. The Turkish Ministry of National Education, General Directorate of Educational Technologies granted permission for this study, surveys were distributed to selected schools by the General Directorate of Educational Technologies. As the researcher was unable to have the list of teachers at the selected schools, the surveys for science teachers were sent to the administrators who then distributed these surveys to the two teachers who taught science in their school. To make generalizations about the population requires that the administrator selects the teachers randomly. It was suggested that the administrator alphabetize the last name of the science teachers and select first two. This only needs to be done in schools where there are three or more science teachers.

Research Design and Procedures

Because the main purposes of this study were to identify the factors affecting the use of computers and the Internet in science class, and to investigate the current status of computer and the Internet use, the study was a type of descriptive study. A mail-out survey was used for data collection because the subjects were located over a wide geographical area.

Surveys were distributed to obtain data about demographic variables, the extent to which computer and Internet technologies were used, perceptions regarding the availability of resources, professional development programs, technology support, etc., and the issues that affect the use of computers.

Survey Development

"Computer and Internet Use: School Survey" and "Science Teacher Computer and Internet Use" surveys were constructed as a result of the review of literature by this researcher for this study. The surveys were used to identify current computer and Internet use and the factors that affect the use only. It does not attempt to identify the appropriateness or inappropriateness. From the responses, we hope to identify variables and factors that assist us in developing or formulating an ideal model of computer and Internet use in Turkish schools. The full surveys are found in appendixes B and C. The estimated time required to answer the surveys was approximately 40-45 minutes.

The "Computer and Internet Use: School Survey" was constructed to gather data reflecting general information about schools, professional development in technology, demographic information, administrative support, and administrators' attitudes toward the computer technology. The participants for this survey were school administrators. In addition, the "Computer and Internet Use: School Survey" gave an opportunity to get a perspective on the administrator's point of view regarding the issues about the use of computer technologies. The survey included 48 items. The survey consisted of six sections:

1. *School Information*, which had 8 items related to school information such as the location of school, the number of students, teachers, the number of computers in school;
2. *Technology Planning*, which included 3 items related to technology planning;
3. *Technical Support and Professional Development*, which had some questions (8 items) about the effectiveness of the types of professional development programs and the perception of administrators about teachers needs regarding professional development;
4. *Technology and Instruction*, which had 9 items pertaining to the availability of the technological resources and the administrative support to teachers, and school policies;
5. *Evaluation of the Technology Plan*, which consisted of 3 items about the evaluation of previous technology initiatives, and current issues regarding computer and the Internet technologies;
6. *Respondent Background and Final Thoughts*, which included 17 items related to the administrator's computer knowledge and experience, their perceptions/ beliefs and attitudes toward computer technology and personal characteristics

included participant's age, gender, the highest degree earned, and work experience, etc.

The "Science Teacher Computer and Internet Use" survey was constructed to obtain information about secondary school science teachers' use of computer and Internet technologies in the classroom, the factors related to the use of these technologies, demographic information, teacher attitude toward computer technology, and issues regarding computer and the Internet use. The participants for this survey were science teachers at the selected schools. The survey included 44 items. The survey consisted of four major parts.

1. *School Information*, which included 14 items related to school information such as the location of school, the number of students, the number of computers, technical support, available computer and Internet technology resources, and school support for the use of computer technologies in school;
2. *Personal Technology Background and Views*, which had 14 items about science teacher's technology background and their attitudes toward computers. This part had some questions about teachers' knowledge and experience, professional development programs regarding the use of computers in education, and their attitudes toward computers. The attitude toward computers includes computer liking, computer usefulness, computer confidence, and computer anxiety subscales;
3. *Computer and the Internet Use in Science Teaching*, which consisted of 8 items about the access to computer technologies, and how they were using computers for educational purposes, etc. This part also had some items about the issues teachers encountered and the factors that might influence the use of computers in education;
4. *Demographics*, which included 8 items asking for demographic information about the science teacher. These personal characteristics were participant's age, gender, educational background, the highest degree earned, and teaching experiences, etc.

Pilot Study

The pilot study was conducted in Turkey. The surveys were given to administrators and science teachers selected randomly. Respondents were asked to point out whether the instructions and items were clear, and whether the questions obtained the answers the respondents and the researcher expected, so that the items could be modified for the final survey. The participants of the pilot study were selected from the secondary schools that have a computer lab. But science teachers and administrators who participated in pilot study did not participate in the main research study. Based upon the responses of the two administrators and six science teachers, revisions were made until the final versions of the questionnaires were achieved.

Translation of the surveys

Since the teachers and administrators in Turkey were not proficient in English, the surveys were translated into Turkish. To make sure the translated Turkish surveys were valid, they were reviewed by one professor and three doctoral students, who are Turkish-English language speakers. Also, the Turkish version of the surveys was translated into English and compared with the original version of the surveys to ensure backward translation. The Turkish version of the "Computer and Internet Use: School Survey" and "Science Teacher Computer and Internet Use" surveys are available in appendix D and E.

Validity and Reliability

Rudestan and Newton (1992) defined that validity is the degree to which we are measuring what we think we are intending to measure. In other words, the content validity shows how appropriate the items were (Litwin, 1995). To test these instruments for content validity, the surveys were evaluated by the research advisor and the MONE.

Reliability is defined as the degree to which a measure produces consistent results (Rudestan & Newton, 1992). In other words, internal consistency determines if all the questions are measuring the same construct, consistently. The instruments' internal reliability was assessed using the Cronbach's Alpha Reliability Coefficient. Table 3.1 and Table 3.2 indicate the Cronbach's Alpha reliability coefficients for both surveys (see Appendix F).

In general, the questions had high Cronbach's Alpha reliability coefficients. Item 35, which discusses the methods on learning how to use computers, and item 47, which discusses the barriers with regard to computer use, in the School Survey, have reported a lower value of Cronbach's alpha, compared to other items. It was assumed that the reason for lower consistency in item 35 might be related to the little variability on the item related to personal interest. Most administrators (87.3%) chose the response of "very significant" for item 35. Because of the limited variability on this item, the value of Cronbach's alpha is lowered.

Item 47 in the School Survey, which is about the barriers with regard to computer use, is same as Item 35 in the Science Teacher Survey. The reason for getting low value of Cronbach's alpha for these questions might be related with the content of the question. The items in the question do not all have high correlations with each other, since each item is related to different types of issues. Some inconsistency in responses would be expected.

Data Collection

The study was approved by the University of Pittsburgh Institutional Review Board (IRB) on July 16, 2003 (Appendix G). The researcher sought the permission to conduct the study at 250 secondary schools that have computer labs in Turkey. Generally, the study supported by the MONE has high response rates (approximately 90%) (Cinar, 2002). Since the subjects were located over a wide geographical area, the support of the MONE was important to provide a high response rate.

Table 3.1. Reliability Coefficients for "Computer and Internet Use: School Survey"

Item	Cronbach's Alpha Reliability Coefficient	Number of items	Number of subjects
Subject teachers' participation in technology-related professional development programs (Item # 14)	0.93	4	163
Methods school used to provide technology-related professional development (Item # 15)	0.82	6	144
Contributions to professional development programs (Item # 17)	0.66	8	144
Forms of technology-related professional development (Item # 18)	0.80	10	156
Formal	0.77	6	160
Informal	0.70	4	168
Teachers' technology-related professional development needs (Item # 19)	0.94	18	168
Administrative support (Item # 26)	0.86	11	180
Methods to learn how to use computer (Item # 35)	0.55	5	127
Computer knowledge (Item # 36)	0.95	14	165
Barriers with regard to computer use (Item # 47)	0.52	13	188
Attitude toward computers (Item # 48)	0.84	19	172
Liking	0.67	6	184
Usefulness	0.48	6	183
Confidence	0.64	3	201
Anxiety	0.69	4	202

Table 3.2. Reliability Coefficients for "Science Teacher Computer and Internet Use"

Item	Cronbach's Alpha Reliability Coefficient	Number of items	Number of subjects
Administrative support (Item # 14)	0.88	11	264
Methods to learn how to use computer (Item # 19)	0.65	5	217
Computer knowledge (Item # 21)	0.95	14	249
Forms of technology-related professional development (Item # 25)	0.76	10	296
Formal	0.76	6	307
Informal	0.66	4	337
Topics in professional development programs (Item # 26)	0.95	14	171
Teachers' technology-related professional development needs (Item # 27)	0.96	18	284
Attitude toward computers (Item # 28)	0.84	20	257
Liking	0.64	6	307
Usefulness	0.51	7	292
Confidence	0.66	3	342
Anxiety	0.79	4	341
Computer use (Item # 29)	0.88	8	320
Internet use (Item # 30)	0.94	19	286
Use of computer applications (Item # 32)	0.93	15	313
Learning activities with computer (Item # 33)	0.63	3	331
Barriers with regard to computer use (Item # 35)	0.59	13	298
Reasons why teachers do not use computer (Item # 36)	0.88	26	249

The General Directorate of Educational Technologies agreed to send instruments to the participants and return them to the researcher. A package of materials with an official cover letter for each of the selected schools was sent to the Provincial Directorate of National Education in each city. The package included the following: (a) the official letter of General Directorate of Educational Technologies (Appendix H) and instruction sheet to explain how to select the science teachers (Appendix I), (b) the list of the selected schools in each city (c) "Computer and Internet Use: School Survey" in Turkish (d) "Science Teacher Computer and Internet Use Survey" in Turkish (e) Informed consent form.

The official letter of General Directorate of Educational Technologies briefly introduced the researcher and the research project. In addition, the letter encouraged the Provincial Directorate of National Education to send the surveys to the selected schools and then return the surveys within a week to the General Directorate of Educational Technologies. In addition, the informed consent document briefly explained the research project and guaranteed respondents of confidentiality. The English and Turkish versions of informed consent documents are in Appendix J.

The documents were sent to the 250 selected schools' administrators by the Provincial Directorate of National Education in each city. Administrators were asked to complete "Computer and Internet Use: School Survey", to distribute "Science Teacher Computer and Internet Use" surveys to two science teachers, and then return the surveys to the General Directorate of Educational Technologies. Twenty days after surveys are mailed; the General Directorate of Educational Technologies got in contact with the Provincial Directorate of National Education and asked them to urge the non-respondent schools. The follow-ups were made by phone.

Research Questions

The following research questions guided this study:

1. What is the current situation of computer and Internet use in science classrooms in Turkish secondary schools?
    a) To what extent do science teachers use computers and the Internet for instructional and related professional tasks?
    b) For what purposes do science teachers use computers and the Internet?

2. What are the issues that affect the use of computer and Internet technologies?
    a) What are the issues observed by school administrators in using computer and the Internet for science education?
    b) What are the reasons teachers do not use computers and the Internet for educational purposes?

3. What is the relationship between computer and the Internet use and following variables?
    a) Access to computer and Internet technologies;
    b) Administrative support;
    c) Professional development;
    d) Personal characteristics of science teachers including
        i. gender
        ii. age
        iii. highest degree earned
        iv. academic major
        v. teaching field
        vi. teaching experience and teaching experience at the current school
    e) Computer knowledge
    f) Student-to-computer ratio
    g) Attitude toward computer use

h) Availability of resources including hardware, software, peripherals, and the Internet.

Dependent Variables

The dependent variables were the use of computer technology and the use of the Internet by science teachers. Computer and Internet uses were measured by asking respondents items 29 (computer use) and 30 (Internet use) in "Science Teacher Computer and Internet Use" survey. A Likert scale was used to determine how frequently science teachers use computers and Internet technologies for instructional and related professional tasks. These items were rated by respondents from 1 ("do not use") and 5 ("almost everyday or daily"). The responses were analyzed to obtain a mean score of computer and Internet use by science teachers in classroom instruction and other related professional tasks.

Independent Variables

The study included the following independent variables for the "Science Teacher Computer and Internet Use survey:"

- Access to computer and Internet technologies: access to computers in school was measured by asking respondents item 31 in the "Science Teacher Computer and Internet Use" survey. Item 12 was used to measure the Internet access from school, and item 18 was used for computer and Internet access at home. The access to the computer and Internet technologies received a rating of 1, and a negative response received a 0.
- Administrative support: item 14 was used to measure administrative support.
- Professional development: technology-related professional development was measured by asking respondents item 20. Attending the programs received a rating of 1, and a negative response received a 0.
- Personal characteristics of the teachers: the demographic information included gender (item 38), age (item 39), highest degree earned, (item 40), academic major

(item 41), teaching field (item 2), teaching experience (item 42), teaching experience at the current school (item 43).

- Computer knowledge: it was measured by asking respondents item 21.
- Student-to-computer ratio: the ratio was calculated by using items 3-8.
- Attitude toward computer: Item 28 was used to measure the attitude toward computers. Item 28 had twenty items that used a four-point Likert scale. The items were scored as strongly disagree=1, disagree=2, agree=3 and strongly agree=4. Item 28 is coded so that the higher the score, the more positive attitude. Since some items have negative statements, these items were reverse coded.
- Availability of resources including hardware, software, peripherals, and the Internet: the available hardware, Internet, and peripheral resources were measured by item 11. The availability of software on science was identified by item 12.

The issues regarding the computer and Internet technologies in school were determined by items 34, 35, and 36. Item 34 used a rating of 1 for the positive response "yes", and a negative response "no" received a 0. Item 35 was scored as strongly disagree=1, disagree=2, agree=3 and strongly agree=4. The respondents rated the level of agreement with statements related to the issues about computer and Internet technologies. The higher scores showed the respondents agreed that the statement was an issue regarding the computer and Internet technologies. Since some items have negative statements, these items were reverse-coded. Item 36 was about the reasons teachers do not use the computer technology for educational purposes. The question had a four-point Likert scale with 1 being "not important", 2 being "slightly important", 3 being "important" and 4 being "very important".

Data Analysis

The data was analyzed using the Statistical Packages for the Social Sciences (SPSS, version 11.0). The 0.05 alpha levels were used as the criterion for statistical significance. In this study, descriptive statistics like percentage, frequency, and mean were used to describe data. Responses on each item were analyzed and presented as means and standard deviations (*SD*) or frequencies and percentages.

The Pearson Product-Moment correlation, the t- test, and the analysis of variance (ANOVA) were employed to analyze the data collected. For the ANOVA, further analyses were conducted namely Post Hoc Analysis followed by Tukey test.

Moreover, after answering research questions, the affect of independent variables on the dependent variables was determined by Stepwise multiple regressions. The Stepwise technique allowed learning more about the relationship between several independent variables and a dependent variable. This technique was selected to develop a basic statistical model defining the use of computers and Internet in science class (Stat Soft, 2002).

CHAPTER IV

RESULTS

This chapter details the analysis of the data gathered from the "Computer and the Internet Use: School Survey" and the "Science Teacher Computer and Internet Use" survey. The primary purpose of this study was to determine the factors related to the use of computers and the Internet and identify the current situation of computer use by science teachers in Turkish secondary schools.

The surveys were distributed to two hundred fifty administrators and five hundred science teachers in secondary schools that have a computer lab. A total of 227 administrator surveys were returned, yielding a response rate of 90.8%.

After a preliminary examination of administrator responses it was decided to eliminate some schools from data analysis. Seven school administrators mentioned that they did not have computer lab in their schools. Fifteen schools were eliminated for one of the following three reasons: (a) they did not have a computer lab; (b) they did not have any science teachers; (c) either the administrator or a teacher from the school responded, but not both. Therefore, the useable response rate was 212/250 or 86.0%.

A total of 420 Science Teacher Surveys were returned. The response rate for teachers is more difficult to define than the response rate for administrators. It did not seem appropriate to consider a response rate based on 500 teachers, since some schools had only one science teacher. A total of 398 Science Teacher Surveys were used from the 212 schools that had useable administrator responses.

For the purpose of this study, the principal investigator takes into account two hundred twelve School Surveys and three hundred ninety-eight Science Teacher Surveys (see Appendix K, Table K.1).

The number of valid and missing responses is indicated, as well as where respondents failed to answer a question or gave an invalid response. In general, percentages are based on the number of valid responses.

After descriptive information about the respondents and their responses for School Survey and Science Teacher Survey were discussed in this section, the research questions were then analyzed separately.

Description of Responses to "Computer and Internet Use: School Survey"

In this section, the data collected from "Computer and Internet Use: School Survey" was described. The section included descriptive information on the school; technology planning; technology support; professional development; technology considering type, intensity, and use; as well as individualized data. In addition, the issues related to computer and Internet technology use in classroom from the school administrator point of view was reported in this section.

Demographic Information

The School Survey provides for demographic information and other background data about administrators in participating schools. The gender and age distribution for the participants is shown in Table K.2 (see Appendix K). With respect to gender, most school administrators (90.4%, n= 189) were male. Moreover, approximately half of school administrators (49%, n=103) were between the ages 40 and 49. The percentage of the administrators aged between 30 and 39 was 34.3% (n=72).

School administrators were asked to identify their highest earned degree. The majority had bachelor's degree (87%, n=181). Thirteen administrators (6.3%) reported a master's degree as their highest level of education. The number of administrators who graduated from teacher preparation high school and had a pre-bachelor's degrees was 12 (5.8%) and

1 (1%), respectively. There was only one administrator who held a doctorate degree (Table K.3, Appendix K).

Administrators were asked how long they had been teaching. The responses showed that most of the school administrators (80.5%, n=169) had more than 9 years of teaching experience. The next largest group was (10.5%, n=22) school administrators with 7-9 years of experience. Respondents also answered that how long they had been teaching at the current school. The largest group was (33.3%, n=70) school administrators with more than 9 years of experience. The next group was (25.2%, n=53) administrators with 4-6 years of experience, followed by administrators with 7-9 years of experience (20.0%, n=42), and administrators with 1-3 years of experience (19.0%, n=40). There were only 5 (2.4%) administrators with less than one year of experience at their current schools (Table K.4, see Appendix K).

The School Survey included some questions to determine participants' awareness of computer and Internet technologies. The first of those questions asked of school administrators was "in what years they first used a personal computer" (Table K.5, Appendix K). The responses showed that the year was ranged from 1983 to 2003 and the year 1996 was the most frequently reported year. The years at the 50th and 75th percentiles were 1995 and 1998. In other words, half of the school administrators first used a computer between 1983 and 1995. In average, first usage of a computer by school administrators was in 1994.

Secondly, school administrators were asked how many years they have been using a personal computer and the Internet for stated purposes. Results indicated that computers were used for "individual purposes" for more than 6.6 years, on average, followed by "administrative use" (5.7 years), "preparing instructional materials" (around 4 years), "instructional use" and "communication with students and parents" (on average 2.3 years). In other words, computers were used for longer time period for individual use by administrators (Table K.6, Appendix K). The responses showed that the Internet, compared with computer use, was used for a shorter time period by administrators. The

Internet was used for individual purposes for an average of 3.4 years, with a standard deviation of 2.61. It was used for administrative purposes and preparing instructional materials for around 2.7 years (Table K.7, Appendix K). The results indicated that the use of the Internet for instructional purpose, communication with students and parents, and class management had only lately come into use in schools.

Thirdly, school administrators were asked what methods were used in helping them learn to use the computer. 87.3% of the respondents stated that "personal interest" was very significant to learn how to use the computer. "Technology-related professional development programs" and "family, friends, students or teachers" were also other significant methods helping them how to learn the computer. Most school administrators considered "courses offered in undergraduate education" as non significant because they mentioned that they did not have any course about educational technology during their undergraduate education (Table K.8, Appendix K).

Fourthly, school administrators were asked whether they had attended any training programs. A total of 117 school administrators reported that they had attended some training programs focused on the use of computers in teaching. Only 24 (15.9%) administrators attended the training programs about integrating technology into curriculum. There were only a few school administrators (4.7%, n=7) who participated in training programs about distance learning (Table K.9, see Appendix K).

Finally, the level of computer skills was also considered. Administrators were asked to identify their computer skill level. The question included not familiar with, beginner, intermediate and advanced levels. The results indicated that most school administrators had a skill level of beginner to intermediate for most of the listed computer-related topics (Table K.10, see Appendix K). More than 75% of administrators (n=152) were at intermediate to advanced level regarding "Internet browsing". In addition, 62.7% of respondents (n=121) categorized their skills intermediate to advance for Spreadsheet applications, followed by Operating Systems (59.2%, n=119) and Word Processing applications (57.9%, n=110). In other words, Internet browsing, Spreadsheet applications, Operating Systems and Word Processing were the topics about which administrators were most familiar. As shown in the table, school administrators were novices in some topics such as database, web page creation, and File Transfer Protocols (FTP).

Computer attitudes and beliefs of school administrators were also assessed in the School Survey. Most school administrators (99%, n=205) believed that technology can provide practical benefits for teaching in some or most cases (Table K.11, see Appendix K). In addition, 97.6% of the administrators (n=205) thought that educational technology had a positive impact on student academic performance, whereas 1.9% (n=4) of school administrators thought that educational technology had no impact on students academic performance. Only one administrator thought that educational technology had a negative impact on students' performance (Table K.12, Appendix K).

Administrators' attitudes toward computers were measured with item 48 in the School Survey. In this question, respondents asked to identify their level of agreement with positive and negative statements, which are computer related. A four-point Likert scale (strongly disagree, disagree, agree, strongly agree) was used. For positive statements, the items were scored as 1=strongly disagree, 2=disagree, 3=agree, 4=strongly agree, while the negative statements were scored 1= strongly agree, 2= agree, 3=disagree, 4=strongly disagree. The high scores in the question mean a positive attitude, while low scores mean a negative attitude toward computers. Responses for the individual items have been shown in Table K.13 (see Appendix K). The mean score for all respondents was 3.27, with a standard deviation of .36. Since the mean score was higher than the mid-point of scale, it can be reported that school administrators had a positive attitude toward computers.

In this attitude question, there were four subscales: computer liking, computer usefulness, computer confidence, and computer anxiety. The mean scores for computer liking, computer usefulness, computer confidence, and computer anxiety were 3.44 (SD=.60), 2.98 (SD=.85), 3.23 (SD=.64), and 3.58 (SD=.56), respectively. These scores for each subscales again showed that administrators had positive attitudes toward computers.

To sum up, survey results showed that computers were used for individual and administrative purposes. The Internet, compared with computer use, was recently used by administrators. The use of computers and the Internet for instructional purpose, communication with students and parents, and class management had lately come into use in Turkish schools.

Some school administrators had attended some kind of training programs about computer technology. They were most familiar with the topics about Internet browsing, Spreadsheet, Operating Systems and Word Processing. In addition to these, survey results showed that school administrators had a positive attitude toward computers.

School Information

The study included 212 secondary schools that have a computer lab. Secondary education includes general and vocational and technical education institutions. The sample included general high schools, Anatolian high schools, vocational and technical high schools, Anatolian vocational and technical high schools, and Anatolian teacher preparation high schools. The description of the school types were as follows:

General high school: These schools offer at least a three-year program following primary education and prepare students for higher education.

Anatolian high school and science high schools: Anatolian high schools are selective institutions. These schools offer a one-year language preparatory program and three-year high school education. Usually English is used as an instruction language in certain subjects such as science and mathematics. Students are chosen through a very competitive national entrance examination. The aim of science high schools is to provide education to especially gifted mathematics and science students (Council of Higher Education, n.d).

Vocational and technical high school: "Vocational and technical high schools offer three-year programs (vocational schools) or four-year programs (technical schools). They prepare students for employment in various occupations or for higher education" (Council of Higher Education, n.d).

Vocational and technical secondary education includes technical schools for boys, technical schools for girls, commerce and tourism schools, religious education schools, multi-program high schools, special education schools, and private education schools, and health education schools. Multi-program high schools consist of general and vocational-technical secondary education programs under a single management. There are also Anatolian technical high schools, Anatolian vocational high schools, and industrial vocational high schools under the vocational and technical secondary education.

Anatolian teacher preparation high school: "These schools were established with the aim of providing a source of student intake for teacher education programs at institutions of higher education. In addition to the courses offered at general state high schools, students take courses in educational theory and methodology as well as in the history of education. The period of study these schools is 4 years, including a one year intensive English-language preparatory program" (Council of Higher Education, n.d).

The distribution of participating schools by type has been shown in Table K.14 (see Appendix K). Table K.14 indicated that there were 49 (23.1%) vocational and technical high schools, 48 (22.6%) Anatolian vocational and technical high schools, 44 (20.8%) general high schools, 36 (17.0%) multi-program high schools, 28 (13.2%) Anatolian high schools, 4 (1.9%) religious education schools, and 3 (1.4%) Anatolian teacher preparation high schools in the sample. In addition, the data indicated that 128 (60.4%) of the participating schools in the sample were in towns, while 84 of the participating schools (39.6%) were in the cities.

School Survey items 2, 3, and 4 were used to provide information about the number of students, teachers, and science teachers in the participating schools. Table K.15 (see Appendix K) showed that the average number of students in the participating schools was 742.79, with a standard deviation of 719.43, and with a range of 4,506 students. The average number of teachers was 45.87, with a standard deviation of 36.38, and with a range of 235 teachers. The data indicated that the average number of science teachers was 5.73, with a standard deviation of 4.72, and with a range of 29 science teachers.

In the School Survey, administrators were also asked to report their schools' budget for computer and the Internet technologies. Some administrators stated that they did not have specific budget for those technologies. As shown in Table K.16 (see Appendix K), the reported average school budget was $1570 per year (2.35 million Turkish Liras), with a standard deviation of $667 (5.29 million Turkish Liras). Additionally, most school administrators (94%) stated that their school budget per year for computer and Internet technologies did not meet their schools' needs.

Technology Planning

School administrators were asked whether they have a written plan for the purchase and use of educational technology or not. Table K.17 indicated that only 47% (95 out of 202) of participating schools have a written plan. 41 of those schools with a written plan (20.3%) have used a plan developed by the MONE, and 31 of those (15.3%) schools have a modified plan developed by the Ministry. The remaining 23 (11.4%) had a school-specific technology plan.

In addition to a school technology plan, school administrators were asked whether they had technology standards for the administrator, teachers, and students, while considering proficiencies, training, and use of technology. Technology standards for administrators and teachers are necessary to identify their knowledge and their skills about using technology effectively in schools (Technology Standards for School Administrators Collaborative, 2001). The data showed that 51.0% of the participating school administrators (105 out of 206) reported they did not have any technology standards developed for administrators. Additionally, 62.1% of the schools did not have any technology standards for their teachers, and 72.1% of schools did not have any technology standards developed for their students.

Item 10 in the School Survey was used to gather data about the major goals for the use of educational technology resources. Among the stated goals for item 10, "improving students' technology proficiency" (75.7%) was the most frequently chosen goal, followed by "improving administrative efficiency" (69.8%), "providing professional development for teachers on using technology" (59.9%), "increasing connectivity to the Internet" (58.3%), and "supporting parental involvement" (55.8%) (see Appendix K, Table K.18)

The school administrators' thoughts about the evaluation of technology by the Ministry were also asked. Interestingly, more than half of the school administrators (61.0%) thought that the MONE did not do through evaluation of its past educational technology initiatives.

Technology Resources

The number of computers in participating schools was determined by items 5, 6, 7 and 8 in the School Survey. The distribution of computers in schools was shown in Table K.19 (see Appendix K). The average number of computers in a computer lab in participating schools was 22.09, with a standard deviation of 15.15. The mean for the number of computers in classrooms was only 4.23, with a standard deviation of 11.46. The average number of computers for administrative use was 4.92, with a standard deviation of 3.19, ranging from 0 to 19. Among the participating schools, 75% of them reported that they had no computer in their classrooms. Most of the computers were located in computer labs.

Table K.20 (see Appendix K) showed the technology resources that the school had. Most participating school administrators (96%) reported that they have Internet access in their schools. Most school administrators (114 out of 194, 58.8%) stated that less than 25% of the computers were connected to the Internet (see Appendix K, Table K.21). Only, 15.5% of school administrators stated that more than 75% of the computers in participating schools had Internet access. The number of schools that have their own web site was 91 (45.5%). However, this percentage decreased dramatically to less than 20% while considering video teleconference equipment and educational science software as technology resources in participating schools (see Appendix K, Table K.20).

Table K.22 (see Appendix K) showed the available computer technology resources to teachers in participating schools. Data indicated that most of the computers in the schools usually were in the computer labs. In other words, the access to the computers in the classroom was not common in participating schools. Some school administrators stated that some of the technology recourses were in the office of the administrator or the office of the teachers. As shown in Table K.22, the more frequently chosen technology resources in computer labs were CD-ROM drive (88.8%), computer speakers (87.4%), desktop computer (84.5%), printer (78.3%), computer microphones (77.1%), and Internet access (73.8%), CD-ROM read/ writes drive (55.3%), and scanner (51.5%).

Participating school administrators were also asked whether they have written policies for teachers and students considering the appropriate use of computers and Internet. The data indicated that majority of participating schools had no written policies about appropriate use of computers and the Internet. Additionally, most school administrators mentioned that classroom management techniques, instructing students (69.2%, n=83), and related professional development for teachers (49.6%, n=60) were the most frequently used procedures that school used to ensure appropriate use of computers (see Appendix K, Table K.23).

Technology Support

The participating schools' administrators were asked to report what kind of technology support they had. Among the stated supports, "selecting and purchasing computer related hardware, software and support materials" (68.2%, *n*=131) was the most frequently chosen support, followed by "installing equipment and networks" (59.7%, *n*=117), and "installing Operating Systems and software" (58.7%, *n*=115). The data indicated that support for integration of computers into the curriculum was the least frequently chosen support (37.5%, *n*=72) (see Appendix K, Table K.24).

The results of technology support sources are tabulated in Table K.25, in Appendix K. Types of technology support were categorized into four groups: "computer, peripheral devices, or software", "wiring or Internet connections", "technical support or training", and "educational technology planning". The data showed that the MONE (51.4%, *n*=107) was first in the list of sources for computer, peripherals and software, followed by school administrators (42.0%, *n*=86), business (30.8%, *n*=64), teachers (24.4%, *n*=50), and parents (15.5%, *n*=32). The support for wiring and Internet connection were mostly provided by school administrators (40.0%, *n*=82), followed by teachers (19.5%, *n*=40), the MONE (17.3%, *n*=36), and business (11.5%, *n*=24). In addition, the MONE or other government agencies (34.1%, *n*=71) was the most frequently chosen source for technical support and training, followed by the school administrator (30.7%, *n*=63), and teachers (28.3%, *n*=58). The data indicated that administrators (19.5%, *n*=40) and teachers (19.0%, *n*=39) were the main source of support for technology planning.

In addition, participating school administrators stated that their schools received funding for computer technology including hardware, software, etc. primarily from the MONE (75.1%, *n*=154), followed by school sources (51.2%, *n*=105), and parents (46.3%, *n*=95) (see Appendix K, Table K.26).

School administrators pointed out that teachers or other school staffs were generally responsible for educational technology as their formal responsibilities at participating schools (59.4%, *n*=123), followed by volunteers such as teachers, school staff, or community members (13.5%, *n*=28). A total of 50 school administrators (24.2%) reported that there was no person responsible to support educational technology (see Table K.27, Appendix K).

School administrators were asked to identify the extent to which their school promoted teachers' computer use. Responses were shown in Table K.28 (see Appendix K). Statements appear in order of mean score from highest "A great deal=3" to lowest "Not at all=1". Table K.28 shows that "providing technical assistance" (80%, *n*=156), "recommending computer use during professional development activities" (78.5%, *n*=154), "including computer use in the curriculum" (75%, *n*=144), "offering educational technology training" (74.2%, *n*=144), and "providing appropriate software" (66.3%, *n*=142) were the most mentioned methods to promote teachers' computer use. "Partnering with institutions of higher education" (19%, *n*=36) was the least selected method.

Professional Development

The School Survey had some items to gather information on technology-related professional development. Subject teachers' participation in technology-related professional development programs were identified by school administrators. As shown in Table K.29 (see Appendix K), science teachers' participation in technology-related professional development program (73.2%, *n*=139) was higher than other subject teachers, followed by mathematics (60%, *n*=105), language and literature (57.7%, *n*=101), and social studies teachers (52.7%, *n*=89). The responses indicated that only some of the subject teachers had participated in professional development programs, but not most or all.

Table K.30 (see Appendix K) showed the administrators' responses about the methods for professional development regarding technology. As shown in the Table 30, "sending teachers or technology leaders to technology-related training provided by the MONE" was first in the list of the most frequently used methods, followed by "sending teachers to workshops or conferences." School administrators stated that expert teachers and school administrators usually play important roles in the contribution to the professional development in participating schools (See Appendix, Table K.31).

School administrators were asked how significant the role of some forms of technology-related professional development was (see Appendix K, Table K.32). Responses showed that 69.5% of respondents (*n*=141) agreed that the role of in-service training programs implemented by the MONE was very significant. Among the formal professional development methods, "in-service training programs implemented by the MONE" "workshops or institutes", and "conferences" were the most frequently chosen significant methods. In the list of informal professional development methods, "individual learning" and "working with peers, family, and friends" were the most considered significant methods, followed by "teacher collaborative and networks."

School administrators were asked whether they are able to meet teachers and other school staff needs for technology-related professional development. While 37 administrators (18.2%) believed that they were not meeting teachers' needs for professional development, 23 (11.3%) school administrators believed they were good at meeting teachers' needs. The remaining school administrators (70.4%) stated that they had met teachers' need for technology-related professional development fairly. Moreover, school administrators were asked whether the school evaluated technology-related professional development activities. One hundred forty three school administrators (70.1%) reported they did not evaluate the professional development programs.

In the School Survey, school administrators were asked to state their opinion about the level of technology-related professional development needs of teachers working in their schools. The level of need was measured using a three-point Likert scale. Scale values ranged from "no need" (1) to "definitely need" (3). The means for the items ranged from 2.48 (*SD*=.64) to 2.70 (*SD*=.53). It was interesting to note that most school administrators generally thought that teachers definitely needed technology-related professional development on the stated topics. For example, 73.6% of school administrators mentioned that teachers definitely need professional development programs about integrating technology into the curriculum (*Mean*=2.70, *SD*= .53). School administrators also reported the need for training to use technology to assess students (Table K. 33, Appendix K).

Issues

The issues that affect the use of computers for instructional purposes were also taken into consideration. To identify the issues that affect computer use, two questions (items 31 and 47 in the School Survey) were asked to school administrators. Item 31 in the School Survey provided information about the barriers in relation to hardware, the Internet, software; staff resources and infrastructure of school building. In the School Survey, item 47 included some barriers about time, training, technical support, hardware, and software. The responses for these questions have been shown in Table K.34 and Table K.35 (see Appendix K).

As shown in Table K.34, the six top barriers that were chosen by over half of the respondents were "insufficient number of computers" (78.9%, *n*=165), "slow or unreliable Internet connection" (73.7%, *n*=154), "insufficient number of peripheral devices" (65.4%, *n*=136), "lack of training opportunities for school staff" (62.8%, *n*=130), "lack of trained technical staff available for equipment maintenance" (54.6%, *n*=113), and "lack of adequately trained teachers or other instructional staff" (51.5%, *n*=106).

Some issues that affect computer use in schools were measured with item 47 in the School Survey. In this question, respondents were asked to identify their level of agreement with positive and negative statements. A four-point Likert scale (strongly disagree, disagree, agree, strongly agree) was used. For negative statements, the items were scored as 1=strongly disagree, 2=disagree, 3=agree, 4=strongly agree, while for positive statements the items were scored 1= strongly agree, 2= agree, 3=disagree, 4=strongly disagree. The high scores in the question mean that the statement was considered as an important issue by the school administrator, however low scores showed that those statements were not considered at all. Responses for the individual items have been shown in Table K.35 (see Appendix K). The mean score for all respondents was 2.95, with a standard deviation of .30.

The results indicated that 79.4% of the respondents agreed that teachers had enough time to prepare lessons including technology (*Mean*=1.92, *SD*=.82). Also, 67.2% of school administrators thought that there was enough time in class to include technology in instruction (*Mean*=2.26, *SD*=.81). In sum, administrators believe that time is not a big issue that affects the use of computers for instructional use.

Regarding training, the majority of school administrators strongly believed that teachers should be encouraged to participate in technology training and 37.7% of them strongly agreed that a stipend would encourage teachers to participate in those trainings. Also, 61.2% of respondents selected "strongly agree" option for the "more in-service training in technology should be made available for teachers" statement. A total of 98.6% of administrators agreed that teachers need more in-service training in technology (*Mean*= 3.60, *SD*=.52). In addition to training in technology, school administrators (97.6%) also agreed that teachers needed more training about integrating technology into the curriculum (*Mean*=3.53, *SD*=.56).

Item 47 in the School Survey also had some issues about hardware, software, and peripherals. The results indicated that more than 80% of the administrators reported that their schools have neither age-appropriate, educationally relevant software (*Mean*= 3.22, *SD*=.75), nor software aligned with current science curriculum (*Mean*=3.25, *SD*=.75). Moreover, 92.7% of respondents agreed that their school needed more software for science classes (*Mean*= 3.39, *SD*= .71). The shortage of hardware and peripherals was also counted as an important issue. More than 80% of school administrators reported that there were neither enough computers (*Mean*= 3.31, *SD*= .95) nor enough projection devices for class use in their schools (*Mean*=3.43, *SD*= .85).

The administrators were also asked to identify their opinions about whether having computers at a learning site where teachers teach would encourage teachers to use computers for educational purposes. The responses showed that administrators agreed with this statement (*Mean*=3.29, *SD*=.83, 86.7%). In other words, administrators believed that not having computers at learning site was other important issue that might affect teachers' computer use in the classroom.

However, school administrators stated that teachers had enough time to prepare lessons including technology and to teach with computer technology in class. Also, school administrators mentioned that the computers in their schools were repaired in a timely manner, and it was not considered an issue. Furthermore, administrative support regarding use of computers was counted as an unimportant issue.

To sum up, school administrators reported that their schools need more computers and projection devices. Lack of age-appropriate and educationally relevant software and a slow Internet connection were also mentioned as major issues. In addition to those, school administrators pointed out there is no trained technical staff in their schools. School administrators also agreed that teachers do not have enough computer knowledge and they need more training programs about computer technology and integrating technology into the curriculum.

Description of Responses to "Science Teacher Computer and Internet Use Survey"

In this section, science teachers' responses collected from Science Teacher Computer and Internet Use Survey were described. The section included descriptive information on the school, technology support, professional development, technology type considerations, intensity, and use, as well as individualized data. In addition, the issues related to computer and Internet technology use in classrooms from the science teachers' point of view were reported in this section.

Demographic Information

The Science Teacher Survey had some questions that inquired about demographic information and other background data. The gender and age distribution for the participants is shown in Table K.36 (see Appendix K). With respect to gender, 57.3% of respondents (*n*= 224) were male, and 42.7% of them were female (*n*=167). The sample was representative of the teacher population in Turkish secondary schools in terms of gender. According to the MONE statistics there are 89,176 (60%) male and 59,387 (40%) female teachers in secondary education. (Ministry of National Education, 2003). Moreover, the majority of science teachers (53.5%, *n*=209) were between the ages 30 and 39, followed by science teachers aged between 40 and 49 (25.1%, *n*=98).

The distribution of science teachers by subject has been shown in Figure 1. The sample included an even distribution of biology, chemistry and physics teachers. There were 128 physics (32.3%), 126 chemistry (31.8%) and 122 biology (30.8%) teachers in the sample. Also, there were 20 science teachers (5.1%) who reported that they were teaching more than one discipline.

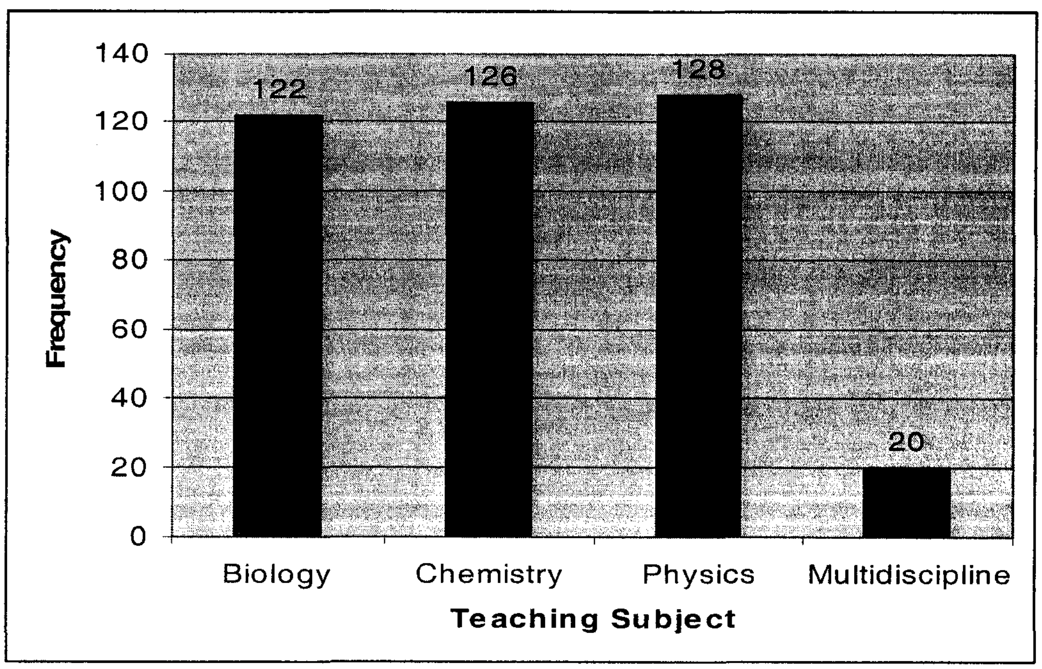

Figure 1. Teaching subjects reported by science teachers

The survey had a question to identify how many hours teachers teach per week. The teaching hours per week ranged from 2 to 44 hours. Teachers' average number of weekly teaching hours was 20.43 hours, with a standard deviation of 6.85. Seventy-five percent of the science teachers were teaching less than 25 hours per week. In addition, respondents were asked how many hours they teach science per week. The responses showed that the average for science teaching was 17.63 hours per week (*SD*=7.59), which is less than total weekly teaching hours (see Table K.37, see Appendix K).

Science teachers were asked to identify their highest degree earned. The majority had a bachelor's degree (88.1%, *n*=342). Twenty-eight science teachers (7.2%) reported a master's degree as their highest level of education. The number of teachers who graduated from teacher preparation high schools was 16 (4.1%). There were only two science teachers who held a doctorate's degree (Table K.38, Appendix K). With regard to academic background, most teachers reported that they had a background focusing on biology (28.97%), chemistry (31.20%) or physics (36.49%). While 10 teachers considered their background as a general science (2.79%), two science teachers did not have academic background related to science (see Table K. 39, Appendix K).

Science teachers were asked how long they had been teaching. The responses showed that teaching experience ranged from less than a year to 30 years. The average teaching experience of science teachers was 11.79 years, with a standard deviation of 6.27. The results indicated that 75% of the science teachers had less than 16-year teaching experience. Moreover, regarding teaching experience at the current school, half of the science teachers were working at their schools for 4 years, or less (Table K.40, Appendix K).

The Science Teacher Survey included some questions to determine participants' awareness of computer and Internet technologies. The first of those questions was "in what years they first used a personal computer". The responses showed that the year ranged from 1980 to 2003, and the most frequently reported year was 1998 (see

Figure 2). The descriptive statistics showed that half of the science teachers had started using a computer within the last seven years.

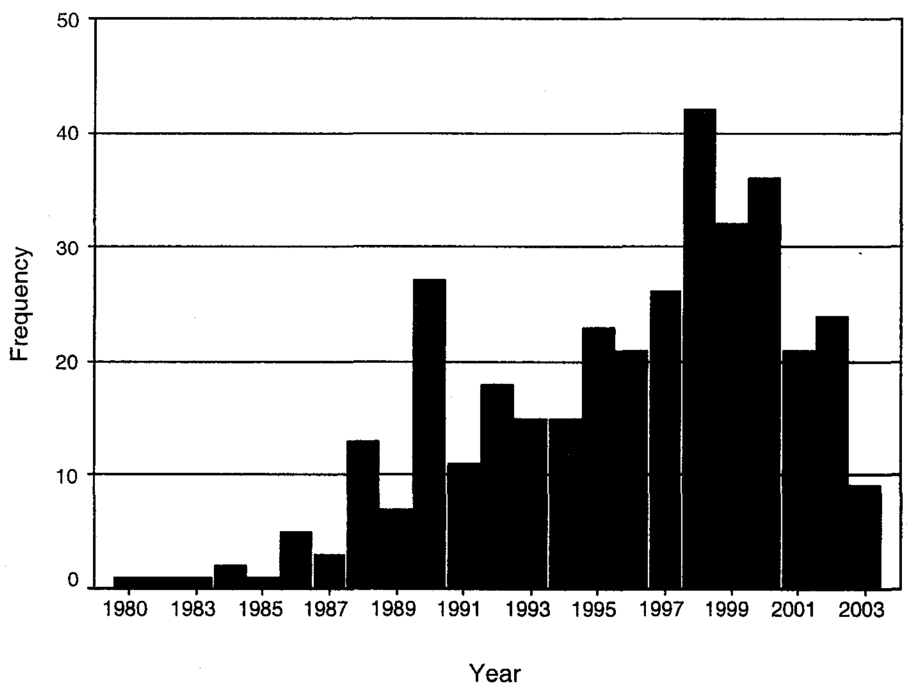

Figure 2. The year science teachers first used a personal computer

Secondly, science teachers were asked how many years they have been using a personal computer and the Internet for stated purposes. Results indicated that computers were used for "individual purposes" for more than 4.6 years (*SD*=3.81) on average, followed by "preparing instructional materials", (*Mean*= 2.5, *SD*=2.39). The data showed that using computers for "instructional use", "communication with students and parents", and "class management" were new applications for science teachers. Like school administrators, computers were used earliest for individual use by science teachers (Table K.41, Appendix K).

The responses showed that the Internet use, compared with computer use, was used for a more recently by science teachers. Science teachers were using the Internet for individual purposes for 2.5 years, with a standard deviation of 2.37 (Table K.42, Appendix K). The results indicated that the use of the Internet for instructional purpose, communication with students and parents, and class management had only lately come into use in schools.

Thirdly, science teachers were asked what the methods were in helping them learn to use the computer. The responses of science teachers and administrators revealed many close parallels. The responses showed that 82.6% of respondents stated that "personal interest" was very significant to learn how to use the computer. "Technology-related professional development programs" and "family, friends, students or teachers" were also other significant methods helping science teachers learn the use of the computer. Like administrators, some science teachers also mentioned they did not have any course about educational technology during their undergraduate education (Table K.43, Appendix K).

Finally, the science teachers' computer skills were also considered. Teachers were asked to identify their computer skill level. The question included not familiar with, beginner, intermediate and advanced levels. The results indicated that the skill level of science teachers ranged from "not familiar with" to "beginner" for most of the listed computer-related topics (Table K.44, see Appendix K). Most science teachers reported they were not familiar with the listed topics. The data indicated that school administrators' computer skills were higher than science teachers'. As shown in Table K.44, science teachers were more familiar with Internet browsers (*Mean*=2.35, *SD*=.92) and Spreadsheet (*Mean*=2.01, *SD*=.95) applications than other listed computer related topics.

Science teachers' computer attitudes were also measured with item 28 in the Science Teacher Survey. In this question, respondents were asked to identify their level of agreement with positive and negative statements. A four-point Likert scale (strongly disagree, disagree, agree, strongly agree) was used. For positive statements, the items were scored as 1=strongly disagree, 2=disagree, 3=agree, 4=strongly agree, while negative statements were scored 1= strongly agree, 2= agree, 3=disagree, 4=strongly disagree. The high scores in the question mean a positive attitude, while low scores mean a negative attitude toward computers. Responses for the individual items have been shown in Table K.45 (see Appendix K). As shown in the Table K.45, 95.7% of science teachers (*n*=354) considered the computer a valuable tool that could be used to improve the quality of education. In addition, 95.3% of respondents (*n*=349) believed that it was important to know how to use a computer. The mean score for all respondents was 3.12, with a standard deviation of .39. Since the mean score for all respondents (3.12) was greater than mid-point of the scale which was 2.5, it would be said that science teachers had positive attitudes toward computers.

The question related to the attitude toward computers had four subscales: computer liking, computer usefulness, computer confidence, and computer anxiety. The mean scores for these subscales were: 3.13 (*SD*=.49), 3.05 (*SD*=.41), 3.03 (*SD*=.60), and 3.27 (*SD*=.59), respectively. The mean score for each subscale again showed that science teachers had positive attitudes toward computers. In other words, they had higher scores on computer liking, usefulness, and confidence, but they had lower scores on computer anxiety.

Technology Resources

In the Science Teacher Survey, items 6, 7, and 8 were asked to provide information about the number of computers in school. The distribution of computers in schools has been shown in Table K.46 (see Appendix K). The reported average number of computers in a computer lab was 20.31. The data showed that 90.8% of the science teachers noted they had no computers in the classroom in their schools. Moreover, half of the science teachers reported that there were less than 18 computers in their lab, while only twenty-five percent had more than 25 computers in the computer lab.

Table K.47 (see Appendix K) showed the available computer technology resources for teachers in participating schools. Data indicated that most of the computers in the schools usually had been in computer lab. Like school administrators, some science teachers also stated that some technology resources were in either an administrator or teachers' office. As shown Table K.47, the most frequently chosen technology resources in computer labs were a desktop computer (86.4%), CD-ROM drive (75.7%), computer speakers (71.5%), printer (71.2%), and Internet access (61.2%).

Most science teachers (91.5%, *n*=324) reported that their school had Internet access. Only 145 science teachers (41.0%) mentioned that their schools had their own web sites. However, this percentage decreased dramatically while considering video teleconference equipment (16.9%, *n*=60) and educational science software (12.6%, *n*=44) as technology resources in participating schools (Table K.48, see Appendix K). Unfortunately, the number of educational science software that schools had was limited. The mentioned science software were *"Akademedia 1-6"*, which is also known as *"Akademedya"* or "*Vitamin*", "*Elit software*", which was sent to the schools by the General Directorate of Educational Technology, and some science software for high schools such as *"Chemwindow"*, *"Sisdraw"*, *"Periodic Table"*, *"Chemlab, Cells"*, *"Systems"*, *"Substances and Their Properties"*, *"Electric"*, *"Vectors"*, *"Optic"*, *"Energy"*, and *"Simple Machines"*. Most of this software was on video CD and prepared for open education high schools. The teachers' responses showed that the software sources were limited.

In addition to the technology resources the school has, science teachers were also asked which technology resources they had at home. The percentage of science teachers who had a computer at home was 68.6% (*n*=221), while 52.8% of the science teachers (*n*=170) had Internet access (Table K.49, see Appendix K).

Technology Support

Participating science teachers were asked to identify the extent to which their school promoted teachers' computer use. Responses were shown in Table K.50 (see Appendix K). Statements appear in order of mean score from highest "A great deal=3" to lowest

"Not at all=1". Table K.50 showed that "recommending the computer use during the professional development activities", "providing technical assistance" and "offering educational technology training" were the most mentioned methods to promote teachers' computer use.

Science teachers pointed out that when they had a problem regarding the use of the computer and the Internet, they mostly received help from other teachers (63.1%, n=233), followed by family members or friends (41.9%, n=155), and school's computing support staff (35.2%, n=130). Science teachers reported that the Internet (20.3%, n=75) and a representative from a hardware or software vendor (15.2%, n=56) were other sources of assistance for teachers (see Table K.51, Appendix K). The teachers' responses showed that it took 4.5 days, on average, to fix any problems regarding computer technology in participating schools. It ranged from 1 day to 60 days. Half of the science teachers reported fixing these problems took less than 2 days (see Table K.52, Appendix K).

Professional Development

Science teachers were asked whether they had attended any training programs. A total of 163 out of 398 science teachers reported that they had attended some training programs that focused on the use of computers in teaching. In addition, only 39 science teachers attended the training programs about integrating technology into the curriculum (Table K.53, see Appendix K).

There was a question in the Science Teacher Survey that asked to identify how significant the role of some forms of technology-related professional development was. Responses showed that 74.9% of respondents (n=283) agreed that the role of in-service training programs implemented by the MONE was very significant. Among the formal professional development methods, "in-service training programs implemented by the MONE" (96.3%, n=364) "workshops or institutes" (93.0%, n=348), and "committees focusing on technology and curriculum" (90.8%, n=317) were the most frequently chosen methods. In the list of informal professional development methods, "individual learning"

(96.1%, *n*=347) and "working with peers, family, and friends" (95.0%, *n*=343) were mostly considered significant methods, followed by "teacher collaborative and networks" (Table K.54, see Appendix K).

In the Science Teacher Survey, the level of technology-related professional development needs of teachers was also taken into consideration. The level of need was measured using a three-point Likert scale. Scale values ranged from "no need" (1) to "definitely need" (3). The overall mean for the question was 2.60 with a standard deviation of .47. The means for the items ranged from 2.45 (*SD*=.67) to 2.75 (*SD*=.52). Most science teachers mentioned that they definitely need professional development on the stated topics (Table K.55, Appendix K). Like the School Survey, the item that had the highest mean was "integrating technology into the curriculum" (*Mean*=2.75, *SD*= .52). In other words, 78.5% of science teachers (*n*=270) stated that they need training on integrating technology into curriculum. In addition, science teachers reported that they need professional development for "using available classroom software or technology activities" (*Mean*=2.72, *SD*=.53), "managing classroom activities that integrate technology" (*Mean*=2.72, *SD*=.51), "use of technology to assess students" (*Mean*=2.71, *SD*=.55), and "web page creation" (*Mean*=2.70, *SD*=.60). It is important to note that science teachers certainly agree with school administrators that teachers need more training opportunities.

The science teachers were asked whether there are sufficient technology-related professional development opportunities for teachers. While 331 science teachers (85.8%) believed that there were no sufficient technology-related professional development opportunities for them, 55 (14.2%) science teachers believed there are enough opportunities regarding professional development. In addition, more than three-fourth of respondents (79.3%, *n*=307) stated that they could not easily access to technology-related professional development opportunities.

To sum up, the Science Teacher Survey results showed that the majority of science teachers in participating schools did not attend any training programs about computer technology. Although science teachers agreed that the training programs implemented by the MONE were very significant, they stated that they could not easily access those programs. Moreover, science teachers pointed out that they need professional development for computer technology and integrating computers into the curriculum.

Computer and Internet Use

Science teachers are using computers and the Internet mostly for individual use and preparing instructional materials. The data showed that computers were used by teachers for an average of 4.6 years, while the Internet was used for an average of 2.5 years. The Science Teacher Survey had questions to gather more detailed data about computer and Internet use.

The frequency of computer use was measured with item 29 in the Science Teachers Survey. In this question, respondents were asked to identify how frequently they currently use computers for the listed tasks. A five-point Likert scale (1=do not use, 2= less than a month, 3= a few times a month, 4=a few times a week, 5=almost everyday or daily) was used. Responses for the individual items have been shown in Table K.56 (see Appendix K). The mean score for all respondents was 1.04, with a standard deviation of .92, which meant that science teachers were using computers less than once a month. The responses showed that 27.2% of the science teachers (*n*=103) use the computer for personal purposes a few times a month, while only 22.5% of them (*n*=85) were using computers almost everyday or daily. Regarding preparing instructional materials, 22.4% of science teachers (*n*=82) were using computers a few times a month, while 23.0% of them (*n*=84) were using computers a few times a week. Respondents reported that they rarely used computers for class management, assessment activities, and communication with students, parents, and other colleagues (Table K.56, see Appendix K).

Science teachers were asked to identify how frequently they used or took part in the listed computer applications. Responses were shown in Table K.57 (see Appendix K). More than 40 percent of science teachers reported that they did not use these applications. Word Processing and Spreadsheet programs were the most frequently used applications, but use of these programs was still limited. Only 9.2% of the teachers (n=33) were using Word Processing programs almost everyday, while 15.6% of them (n=56) chose the "a few times a week" option to show their usage. Regarding Spreadsheet programs, 6.4% of science teachers (n=23) reported that they were using these programs almost everyday or daily, while 55 science teachers (15.3%) were using these programs a few times a month.

The frequency of Internet use was also measured in the survey. Responses were shown in Table K.58 (see Appendix K). The mean score for all respondents was .66, with a standard deviation of .78. The responses showed that the Internet was rarely used by science teachers. "Personal use", "looking for educational sites on the Internet", "preparing instructional materials", and "using search engines to search for specific educational information" were most frequently chosen purposes. The data indicated that 21.4% of respondents were using the Internet a few times a week for personal use. Only 52 science teachers (14.1%) reported they were using the Internet almost everyday for personal purposes. Moreover, less than 5% of science teachers were connecting Internet almost everyday to look for educational sites or to prepare instructional materials.

The science teachers were asked to identify how frequently they accessed computers at listed locations including the classroom, school, and home. The responses showed that the most frequented locations were reported as the school (but not classroom) and at home. The results indicated that 20.5% of teachers accessed computers in their schools almost everyday. In addition, one hundred twenty-four science teachers (34.6%) had almost daily access from home (see Table K.59, Appendix K).

Findings by Research Questions

This section focuses on the results and findings of research questions. Each research question was analyzed separately.

Research Question 1: What is the current situation of computer and Internet use in science classrooms in Turkish secondary schools?

The first goal of the study was to identify the current situation of computer and Internet technology use in science classrooms in Turkish secondary schools. For the purpose of that, the following questions were taken into the consideration:

a) To what extent do science teachers use the computer and Internet for instructional and related professional tasks?
b) For what purposes do science teachers use computers and the Internet?

Since these issues were discussed in more detail on "Descriptive of Responses to Science Teacher Computer and Internet Use Survey" section, major findings related to these research questions were summarized as follows:

- On average, science teachers first used personal computers in 1995. The reported years ranged from 1980 to 2003 and the year 1998 was the most frequently reported year (see Figure 2);
- Computers were mostly used for individual purposes and preparing instructional materials. The data showed that computers were used earlier for individual purposes than for preparing instructional materials. Using computers for instructional use, communication with students and parents, and class management were newer uses for science teachers. Computers were used for these purposes for less than a year (Table K.41, Appendix K);
- The responses showed that the Internet, compared with computer use, was used for a shorter time period by science teachers. Mostly, the Internet was used for individual use and for preparing instructional materials. Science teachers were using the Internet for individual purposes for 2.5 years. The results indicated that the use of the Internet for instructional purpose, communication with students and parents, and class management had only lately come into use in schools (Table K.42, Appendix K);
- Science teachers categorized their computer skills as "not familiar with" and "beginner" for most of the listed computer-related topics. Science teachers were

more familiar with Internet browsers, Spreadsheets, Operating Systems, and Word Processing applications than other listed computer related applications (Table K.44, see Appendix K);

- The vast majority of science teachers (95.7%, n=354) considered the computer as a valuable tool that can be used to improve the quality of education. In addition, most science teachers (95.3%, n=349) were aware of the importance of knowing how to use a computer. The responses showed that science teachers had positive attitudes toward computers. In other words, they had higher scores on liking and usefulness, computer confidence, and less anxiety (Table K.45, see Appendix K);
- Science teachers (90.8%) reported that they had no computers in their classrooms. The computers were mostly kept in computer labs. It was reported that, on average, there were 20 computers in a computer lab (Table K.46, see Appendix K);
- Most science teachers (91.5%, n=324) reported that their school had Internet access, while only 41.0% of teachers (n=145) mentioned that their schools had their own web sites. The percentage of science teachers who had video teleconferencing equipment and educational science software was less than 20% (Table K.48, see Appendix K);
- Over half of the science teachers had their own computers (68.6%, n=221) and access to the Internet (52.8%, n=170) at home (Table K.49, see Appendix K);
- Most science teachers reported that a desktop computer (86.4%, n=331), a CD-ROM drive (75.7%, n=287), computer speakers (71.5%, n=271), printer (71.2%, n=272), and Internet access (61.2%, n=232) were the most available technology resources in their computer labs (Table K.47, see Appendix K);
- Most science teachers (62.7%, n=205) stated that "recommending computer use during the professional development activities" was the major method used by schools to promote teachers' computer use, followed by "providing technical assistance" (57.9%, n=191) and "offering educational technology training" (55.4%, n=181) (Table K.50, see Appendix K);
- When science teachers had any problems regarding the use of the computer and Internet, they mostly got help from other teachers (63.1%, n=233), family

members or friends (41.9%, n=155), and school's computing support staff (35.2%, n=130) (Table K.51, Appendix K);

- It took 4.5 days, on average, to fix any problems regarding computer technology in participating schools. It ranged from 1 day to 60 days. Half of the science teachers reported that it took less than 2 days to fix these problems (see Table K.52, Appendix K).
- A total of 163 science teachers had attended some training programs focused on the use of computers in teaching. Moreover, only 33 science teachers participated in training programs addressing the integration of technology (Table K.53, see Appendix K). Most science teachers (74.9%, n=283) agreed that in-service training programs, which were implemented by the MONE, were the most significant formal method. "Individual learning" (66.5%, n=240) and "working with peers, family, and friends" (62.9%, n=227) were the most significant informal professional development methods (Table K.54, see Appendix K);
- The majority of science teachers (more than 90%) mentioned they need technology-related professional development programs on all topics. The "integrating technology into the curriculum", "using available classroom software or technology activities", "managing classroom activities that integrate technology and "use of technology to assess students" were the major topics that science teachers thought they needed professional development programs for (Table K.55, Appendix K);
- Most science teachers believed that there were no sufficient technology-related professional development opportunities for them. In addition, they stated they could not easily access those training opportunities;
- On average, science teachers were using computers less than once a month for the listed tasks (see Appendix K, Table K.56). The data showed that 27.2% (n=100) of the science teachers use the computer for personal purposes a few times a month, while only 22.5% of them (n=85) were using computers almost everyday or daily. Regarding preparing instructional materials, 6.3% of science teachers (n=23) were using computers almost everyday or daily, while 23.0% of them (n=84) were using computers a few times a week. Science teachers reported that

they rarely use computers for class management, assessment activities, and communication with students, parents, and other colleagues (Table K.56, see Appendix K);

- The majority of science teachers stated that they did not use the listed computer applications. Word Processing and Spreadsheet programs were the most frequently used applications, but use of these programs was still limited. Only 9.2% of the teachers (*n*=33) were using Word Processing programs almost everyday, while 15.6% of them (*n*=56) chose the "a few times a week" option to show their usage. Regarding Spreadsheet programs, 6.4% of science teachers (*n*=23) reported that they were using those programs almost everyday, while 15.3% of science teachers (*n*=55) were using these programs a few times a month (Table K.57, see Appendix K);
- Regarding the frequency of Internet use, the responses showed that the Internet was rarely used by science teachers. "Personal use", "looking for educational sites on the Internet", "preparing instructional materials", and "using search engines to search for specific educational information" were the most frequently chosen purposes. The data indicated that 14.1% of science teachers (*n*=52) said they were using the Internet almost everyday for personal purposes (Table K.58, see Appendix K);
- Fifty-seven percent of science teachers (*n*=199) stated they were using the Internet to search for educational sites. Only 4.6% of the science teachers (*n*=16) were connecting to the Internet almost everyday to search for educational sites, while 16.6% of them (*n*=58) were using Internet a few times a week for that purpose;
- The data indicated that 3.1% of science teachers (*n*=11) were using the Internet almost everyday or daily to prepare instructional materials, and 24.4% of teachers (*n*=87) were using the Internet less than once a month for that reason;
- Science teachers access computers most frequently at school (but not in the classroom), and at home. The results indicated that 20.5% of teachers (*n*=70) accessed computers at their schools almost everyday. In addition, 34.6% of

science teachers (n=124) had almost daily access at home (Table K.59, Appendix K).

Although the MONE has given a financial and educational commitment to technology since 1984, the data showed that there was a limited use of computers and Internet in the teaching and learning environment by science teachers. In this study, the principal researcher also desired to determine what the issues related to computer use were.

Research Question 2: What are the issues that affect the use of computer and Internet technologies?

The second goal of the study was to identify the issues that affect the use of computer and Internet technologies in secondary schools. The point of view of the administrators and science teachers, who were working at the same schools, were taken into account.

Issues observed by school administrators

In the School Survey, items 31 and 47 were used to identify the issues related to the use of computer and Internet technologies. In item 31, the issues were categorized into five sections; hardware, the Internet, software, staff resources and infrastructure. Since the issues observed by school administrators were discussed in more detail in the "Descriptive of Responses to Computer and Internet use: School Survey" section, major findings related to the research question were below:

- The top six barriers that were chosen by over half of the school administrators were "insufficient number of computers" (78.9%, n=165), "slow or unreliable Internet connection" (73.7%, n=154), "insufficient number of peripheral devices" (65.4%, n=136), "lack of training opportunities for school staff' (62.8%, n=130), "lack of trained technical staff available for equipment maintenance" (54.6%, n=113), and "lack of adequately trained teachers or other instructional staff" (51.5%, n=106) (Table K.34, see Appendix K);

- Most school administrators believed that the barriers related to the infrastructure were not important regarding the use of computers and the Internet (Table K.34, see Appendix K);
- The vast majority of school administrators (91.8%, *n*=190) mentioned that teachers did not have any problems related to administrative support considering computer and Internet use (Table K.34, see Appendix K);
- Only 30% of administrators (*n*=62) considered "lack of age appropriate or educationally relevant web sites for students" as a barrier. In addition, around one-third of administrators (*n*=65) reported that "lack of Turkish educationally relevant websites for students" was one of the barriers (Table K.34, see Appendix K);
- Regarding software resources, "lack of software products aligned with standards" (47.6%, *n*=98) and "lack of age-appropriate or educationally relevant software resources" (37.4%, *n*=77) were the barriers mentioned by school administrators (Table K.34, see Appendix K);
- Regarding time, around 80% of the administrators (*n*=162) disagreed with the "teachers do not have time to prepare lessons that include technology" statement. Administrators believed that teachers had enough time to prepare lessons that included technology (Table K.35, see Appendix K). In addition, most school administrators (67.2%, *n*=139) thought that there was enough time in class to include technology in instruction (Table K.35, see Appendix K);
- Regarding the professional development issue; around 90% of administrators believed that a stipend would encourage teacher participation in technology training. Almost all school administrators agreed that more in-service training should be made available for teachers. Moreover, the vast majority of school administrators reported that teachers needed more training about computer and Internet technology and integrating technology into the curriculum (Table K.35, see Appendix K);
- Regarding software resources, more than 85% of administrators (*n*=176) reported that their schools have neither the age-appropriate, educationally relevant

software nor software aligned with current science curriculum (Table K.35, see Appendix K);

- The greater part of administrators (92.7%, n=188) agreed that their school needed more science software (Table K.35, see Appendix K);
- Regarding hardware resources, school administrators reported that there were neither enough computers nor enough projection devices for class use in the schools (Table K.35, see Appendix K);
- The majority administrators (86.7%, n=177) agreed with the statement that having computers at learning sites would encourage teachers to use computers for educational purposes.
- Over half of the administrators (n=143) stated that the computers in their schools were repaired in a timely manner, and it was not considered as a major issue.

Issues reported by science teachers

The issues that are perceived by teachers as preventing the use of computers and the Internet for educational purposes were described in this section. Three questions (items 34, 35, 36) in the Science Teachers Survey asked science teachers to identify their perspectives on these issues related to the use of computer and Internet technologies.

Item 34 in the survey provided information about the barriers related to hardware, Internet, software; staff resources, and the infrastructure of school building. The responses for this question were shown in Table K.60 (see Appendix K). As shown in the table, "insufficient number of computers", "slow or unreliable Internet connection", "insufficient number of peripheral devices", and "lack of training opportunities for school staff" were the most frequently chosen barriers related to the use of computers and the Internet. It is very important to state that school administrators also reported these barriers in the same order.

Regarding hardware resources, most science teachers reported that they did not have enough computers in their school (79.7%, n=287). In addition, the shortage of peripheral devices and software were also reported by science teachers.

Concerning Internet resources, 65.2% of science teachers (n=234) agreed that the Internet connection is not fast or reliable enough for use during instruction. Around one-third of science teachers mentioned that the "lack of age-appropriate or educationally relevant websites for students" (36.5%, n=131) and the "lack of Turkish websites for students" (37.4%, n=134) were the barriers that affect the use of computer and Internet technologies at school.

The majority of science teachers (62.1%, n=223) believed the school staff needed more adequate training. Around 45 percent of science teachers agreed that they need trained technical staff available for product and service acquisition, installation, and maintenance in their schools. Moreover, the results indicated that most science teachers felt they did not have any problems with infrastructure and administrative support.

In Science Teachers Survey, some issues that affect computer use in school were measured with item 35. The question included some barriers about time, training, administrative and technical support, hardware, and software. Respondents were asked to identify their level of agreement with the statements. A four-point Likert scale (strongly disagree, disagree, agree, strongly agree) was used. For some statements, the items were scored as 1=strongly disagree, 2=disagree, 3=agree, 4=strongly agree, while some items were scored 1= strongly agree, 2= agree, 3=disagree, 4=strongly disagree. High scores to the question means that the statement was considered as an important issue by science teachers, however low scores showed that those statements were not considered at all. Responses for the individual items have been shown in Table K.61 (see Appendix K). The mean score for all respondents was 2.60, with a standard deviation of .35.

The results indicated that teachers were in need of more technology training (*Mean=3.49, SD=.63*), having computers at the learning site (*Mean*=3.44, *SD=.73),* more training in integrating technology into the curriculum (*Mean*=3.36, *SD=.66*), and more software in science areas (*Mean*=3.31, *SD=.76*).

Most science teachers believed that they had enough time to prepare lessons that included technology (*Mean*=2.32, *SD*=.84) and thought that there was enough time in class to include technology in instruction (*Mean*=2.36, *SD*=.84). In other words, they believed that time is not a big factor that affects the use of computers for instructional use.

The responses showed that science teachers agreed that training related to technology was one of the most important issues. Moreover, 55.5% of science teachers (*n*=206) strongly agreed that more in-service training in technology should be made available for teachers. A total of 94.6% of science teachers (*n*=351) agreed that teachers need more in-service training in technology (*Mean*= 3.49, *SD*=.63). In addition to training in technology, it was reported that teachers needed more training about integrating technology into the curriculum (*Mean*=3.36, *SD*=.66). Also, teachers stated that a stipend would encourage teacher to participate in training programs.

In addition to the lack of training, teachers felt they needed more science software, computer access in the classroom, and more administrative and technical support. Regarding technical support, most science teachers (60.9%, *n*=209) stated that the computers were not repaired in a timely manner (Table K. 61, see Appendix K).

In the Science Teachers Survey, the item 36 measured the reasons why teachers do not use computer for educational purposes. Some possible reasons were listed in this question and science teachers were asked to identify the importance of each reason. The responses for this question had been shown in Table K.62 (see Appendix K).

Science teachers stated that not having a computer in the classroom was an important reason for not using them (*Mean*=3.37, *SD*=.84) (Table K.62).The majority of science teachers (93.2%, *n*=341) thought that having computer at learning site would encourage them to use computers more (Table K.61). In addition, science teachers mentioned they did not have an overhead or computer projector, enough equipment and supplies, and available science software. The majority of science teachers reported that they did not know how to integrate computers into the science curriculum and they were in need of more computer training (Table K.62, see Appendix K).

To sum up, science teachers, like school administrators, mentioned that the insufficient number of computers, slow Internet connection, and lack of training opportunities for the school staff were the major barriers that prevent the use of computers and Internet for educational purposes. Most science teachers also agreed that they do not have age-appropriate and educationally relevant software and web sites. Moreover, science teachers believed that they were in need of more training related to technology and integrating computers into the science curriculum. The majority of science teachers considered not knowing how to use a computer and how to integrate computers into curriculum as other important reasons. In addition to those, most science teachers agreed that having a computer in the classroom and computer ownership were also encourage teachers to use computers in teaching. Most science teachers (79.2%, n=287) reported they cannot afford to buy a computer.

Research Question 3: What is the relationship between computer and Internet use and selected variables?

In addition to the reasons teachers do not use the computer and Internet for educational purposes, the study also tried to identify the factors that affect teachers' computer and Internet use. The dependent variables were the use of computer technology and the use of the Internet by science teachers. The dependent variables were measured by asking respondents items 29 and 30 in the Science Teachers Survey.

The relationships between computer and Internet use and the following variables were investigated in the study.

a. Access to computer and Internet technologies

b. Administrative support
c. Professional development
d. Personal characteristics of science teachers including
    i. gender
    ii. age
    iii. highest degree earned
    iv. academic major
    v. teaching field
    vi. teaching experience
    vii. teaching experience at the current school
e. Computer knowledge
f. Computer to student ratio
g. Attitude toward computer use
h. Availability of resources including hardware, software, peripherals, and the Internet.

One of the objectives of the study was to learn which other variables were related to computer and Internet use. This required forming total scores from some items that had multiple parts. A decision needed to be made whether or not it was appropriate to include all parts of these items in cases where some options were very rarely chosen. Considering availability of technology resources (item 11), for example, only 5.5% of the teachers reported that a laptop computer was available to them. The researcher felt that eliminating such selections would result in total scores that were a more valid measure and thus would be more likely to reflect the true relationship between these variables and computer usage. For the purpose of that, some cutoff points were selected.

For computer use (item 29) a cutoff point of .5 was chosen. In other words, selections under the item whose means were less than .5 were not included in the total score. In these items, the response scale is a five-point scale with the values 0=do not use, 1= less than once/month, 2=a few times/month, 3=a few times/week, 4=almost every day or daily. Since .5 is the midpoint between 0=do not use and 1=less than once/month, a mean less than .5 suggests that on the whole teachers almost never use a computer or the Internet for this purposes. For instance, based on this cutoff point (.5), the selections "to communicate with students" and "to communicate with students' parents" under item 29 were eliminated. The cutoff point of .5 was also applied to item 30 related to Internet use because of similar reasons. Based on this cutoff point, some parts under item 30 whose means were less than .5 were eliminated.

Computer Access

Science teachers' access to the computer was measured by item 31 in the Science Teacher Survey. The descriptive statistics for this item have been shown in Table K.59, Appendix K. For item 31 a cutoff point of 1.5 was chosen. Selections under the item whose means were less than 1.5 were not included in the total score. Based on this cutoff point, the selection "the site where you teach" (*Mean*=.43) was eliminated. The grand mean for computer access was 2.53 (*SD*=1.59).

Pearson Product-Moment correlations were used to determine the relationship between computer use and computer access. The correlation analysis revealed a significant correlation between computer use and computer access (see Table 4.1). The correlation between computer use and computer access at a site managed by the school, but not a classroom, was .400. Also, the correlation between computer use and computer access at home was .479. All correlations were moderate at the .01 level (2-tailed).

Item 12 was used to measure the Internet access from school, and item 18 was used for the Internet access at home. The Pearson Product-Moment correlation showed that there was a significant relationship between Internet use and computer access (Table 4.1). The correlation was moderate at level .01. The Pearson Product-Moment revealed significant correlations regarding computer access at a site managed by the school, but not in the classroom, and regarding computer access at home.

The Pearson Product-Moment correlation also revealed a significant correlation in respect to Internet access at home. The correlation between Internet use and Internet access at home was .387, which was low to moderate at the .01 level.

Table 4.1. Correlations between Computer and Internet Use and Computer Access

Variables	Computer use	Internet use
Computer access	.561**	.572**
Computer access at a site managed by the school	.400**	.321**
Computer access at home	.479**	.559**

*p<.05, **p<.01 (two-tailed)

In conclusion, teachers who have an access to the computer at school and/or home were much more likely to be frequent computer and Internet users. In other words, greater computer access at school and/or home is associated with more frequent computer and Internet use.

Administrative Support

Item 14 was used to measure administrative support. For item 14, a cutoff point of 1.5 was chosen. In other words, selections under the item whose means were less than 1.5 were not included in the total score. In item 14, the response scale is a four-point scale with the values 1=not at all, 2=somewhat, and 3=a great deal (see Table K.50, Appendix K). Since 1.5 is the midpoint between 1=not at all and 2=somewhat, a mean less than 1.5 suggests that on the whole, teachers almost never receive this kind of support. Based on this cutoff point, some of the selections, such as "provide online support", "partner with institutions of higher education" were eliminated.

Table 4.2 shows correlations between computer and Internet use and administrative support. The Pearson Product-Moment correlation showed that there was a very significant correlation between computer use and administrative support. Contrary to computer use, no relationship existed between Internet use and administrative support (p>.05).

Table 4.2. Correlation between Computer and Internet Use and Administrative Support

Variable	Computer use	Internet use
Administrative support	.194**	.104
Provide appropriate software to schools	.233**	.098
Recommend computer use during the professional development activities	.177**	.073
Include computer use in the curriculum	.164**	.093
Provide technical assistance at all schools	.185**	.095
Offer optional educational technology training	.085	.074
Provide mentor follow-ups to training	.188**	.096
Provide trainers	.179**	.090

*p<.05, **p<.01 (two-tailed)

In sum, administrative support in terms of providing appropriate software, recommending computer use, including computer use in the curriculum, providing technical assistance, and providing training programs has a positive effect on computer use. In other words, greater administrative support is associated with more frequent computer use by teachers.

Professional Development

Technology-related professional development was measured by asking respondents item 20. The Pearson Product-Moment was used to investigate the relationship between computer and Internet use and professional development. The results revealed very significant relationships between computer use and professional development as shown in Table 4.3. There was a low to moderate correlation between computer use and attending professional development programs related to technology (r=.241, p<.01). Also, there was a very significant relationship between computer use and attending professional development programs related to integrating technology into curriculum. There was a low to moderate correlation between them (r=.227) at the .01 level.

Table 4.3. Correlation between Computer and Internet Use and Professional Development

Variable	Computer use	Internet use
Professional development	.241**	.200**
The use of computers in teaching	.150*	.119*
How to integrate technology into curriculum	.227**	.185**
Distance learning	.149*	.142*

*p<.05, **p<.01 (two-tailed)

The results showed that there was a low correlation between Internet use and attending professional development programs related to technology (r=.200) at the .01 level. Also, the results revealed that there were weak relationships between Internet use and attending professional development programs related to computer use (r=.119, p=.046), and related to distance learning (r=.142, p=.018) at the .05 level. Regarding integrating technology into the curriculum, there was a very significant relationship between Internet use and professional development. The result showed that there was a significant correlation between Internet use and attending professional development programs related to integrating technology into curriculum (r=.185) at the .01 level.

In addition, regarding computer and Internet use, the analysis of variance (ANOVA) was applied if the means for science teachers who attended one or more professional development deviates significantly from one or more of the other means. The result of ANOVA showed that the differences between means were significant ($p<.05$) (Table 4.4)

Table 4.4. Differences in Computer and Internet Use Based on Training Programs Attended

	Sum of Squares	df	Mean Square	F	P
Computer use					
Between Groups	19.505	3	6.502	6.928	.000
Within groups	269.358	287	.939		
Total	288.863	290			
Internet Use					
Between Groups	13.203	3	4.401	4.354	.005
Within groups	279.985	277	1.011		
Total	293.188	280			

Post Hoc Tests showed the mean level of computer use for teachers who attended two or three kinds of training is significantly greater than that of teachers who did not attend any training at the .05 level. However, the mean for computer usage for teachers who attended one kind of training is significantly smaller than the mean for teachers who attended all three kinds of training.

Regarding Internet use, significant differences at the .05 level were found between the mean for Internet use for teachers who attended all three kinds of training and teachers who did not attend any training.

Regarding computer use, a t-test was used to determine if there was a significant difference between teachers who did not attend training programs related usage of computers in teaching and those who did attend. The result of the t-test was -2.585, which was significant for a two-tailed test with a degree of freedom at 289. Regarding Internet use, the result of the t-test was -2.009, which was significant for a two-tailed test with a degree of freedom at 279. The results showed that the mean for computer usage for teachers who did not attend training programs related usage of computers in teaching was smaller than the mean for teachers who did attend.

With respect to computer and Internet use, the t-test results showed that there was a significant difference between teachers who did not attend training programs related to integrating technology into the curriculum and those who attended this kind of training. The results of the t-test scores were -3.418 (df=46.369, p=.001) and -3.126 (df=277, p=.002), respectively.

Regarding Internet use, the t-test results showed that there was a significant difference between teachers who did not attend training programs related to distance learning and those who did attend (df=276, p=.018). Considering computer use, there was no significant difference between teachers who attended training programs about distance learning and those who did not.

To sum up, teachers who attend professional development programs related to computer technology and integrating technology into curriculum were much more likely to use the computer and Internet.

Selected Demographics

Gender

A t-test was done to investigate if there were significant differences between female and male teachers regarding computer and Internet use. For computer use, the result of the t-test was a score of -2.685, which was significant for a two-tailed test with a 362.859 degree of freedom (p=.008). In other words, there were significant differences between female and male teachers regarding computer use. Male teachers were using computers more than females.

Regarding Internet use, the result of t-test was -1.552, which was not significant for a two-tailed test with a 366 degree of freedom. In other words, no significant differences were found between female and male science teachers regarding Internet use.

Age

ANOVA was applied to measure any differences in computer use, in regard to science teacher's age. No significant differences were found between computer use and age groups. Meanwhile there were significant differences in Internet use among teachers at different age levels (Table 4.5).

Table 4.5. Differences in Computer and Internet Use Based on Teachers' Age

	Sum of Squares	df	Mean Square	F	p
Computer use					
Between Groups	6.177	3	2.059	2.145	.094
Within groups	358.094	373	.960		
Total	364.271	376			
Internet Use					
Between Groups	13.134	3	4.378	4.376	.005
Within groups	364.180	364	1.000		
Total	377.314	367			

The Post Hoc Analysis showed that there were significant differences between Internet use by teachers aged between 20 and 29 and those aged between 40 and 49 at the .05

level (p=.009). The means showed those teachers aged between 20 and 29 were using the Internet more than teachers aged between 40 and 49.

Highest degree earned

The ANOVA was applied to determine if there was a significant difference in computer and Internet use by science teachers based on the highest degree earned. The results showed that there were no significant differences between computer use of science teachers who had a Bachelor's, a Master's, a Doctorate, or those who graduated from a teacher preparation high school (Table 4.6). However, there were significant differences between Internet use of science teachers who had a Bachelor's, a Master's, a Doctorate degree or graduated from a teacher preparation high school.

Table 4.6. Differences in Computer and Internet Use Based on Teachers' Highest Degree

	Sum of Squares	df	Mean Square	F	P
Computer use					
Between Groups	3.376	3	1.125	1.162	.324
Within groups	359.379	371	.969		
Total	362.755	374			
Internet Use					
Between Groups	15.840	3	5.280	5.304	.001
Within groups	360.384	362	.996		
Total	376.224	365			

The Post Hoc analysis indicated that there were significant differences at the .05 level between the Internet use scores of teachers who had a Master degree and those who had a Bachelor's degree (*p*=.010). In addition, significant differences were found at the .05 level between the Internet use scores of teachers who had a Master degree and those who graduated from a teacher preparation high school (p=.006). The mean differences showed that teachers who had a Master degree were using the Internet more than those who had a Bachelor degree or graduated from teacher preparation high schools.

Academic major

The ANOVA was applied to measure any differences in computer and Internet use based on academic major of science teachers; biology, chemistry, physics, science and other. The results indicated there were no significant differences between the computer use and Internet use scores of teachers who had different backgrounds (Table 4.7).

Table 4.7. Differences in Computer and Internet Use Based on Academic Major

	Sum of Squares	df	Mean Square	F	p
Computer use					
Between Groups	2.164	4	.541	.576	.680
Within groups	319.208	340	.939		
Total	321.372	344			
Internet Use					
Between Groups	7.803	4	1.951	1.915	.108
Within groups	341.330	335	1.019		
Total	349.133	339			

Teaching field

The ANOVA was applied to measure any differences in computer and Internet use based on science teachers' teaching field. The results indicated there were no significant differences between the computer use and Internet use scores of teachers who teach different fields including biology, chemistry, physics, and multidiscipline (Table 4.8)

Table 4.8. Differences in Computer and Internet Use Based on Teaching Field

	Sum of Squares	df	Mean Square	F	p
Computer use					
Between Groups	.216	3	.072	.072	.975
Within groups	374.206	375	.998		
Total	374.422	378			
Internet Use					
Between Groups	.530	3	.177	.170	.917
Within groups	379.239	365	1.039		
Total	379.769	368			

Teaching experience and teaching experience at current school

Teaching experience and teaching experience at current school were measured by asking respondents items 42 and 43 in the Science Teacher Survey. The Pearson Product-Moment was used to investigate the relationship between computer and Internet use and teaching experience.

The results revealed a negative significant relationship between computer and Internet use and teaching experience as shown in Table 4.9. At the .05 level, there was a low correlation between computer use and teaching experience (r=-.126, p=.015). Also, there was a significant negative relationship between Internet use and teaching experience. At the .01 level, there was a low negative correlation between Internet use and teaching experience (r=-.182, Table 4.9). However, there was no relationship found between computer and Internet use and teaching experience at current school.

The ANOVA was done to investigate if there were significant differences between computer and Internet use scores of teachers who had 5 or fewer years teaching experience and those who had 6 to10 years teaching experience, 11 to 15 years, 16 to 20 years, and more than 20 years teaching experience.

Table 4.9. Correlation between Computer and Internet Use and Teaching Experience

Variable	Computer use	Internet use
Teaching experience	-.126*	-.182**
Teaching experience at current school	-.084	-.094

*p<.05, **p<.01 (two-tailed)

The results showed that there were no significant differences between the use of computer scores of teachers who had 5 or fewer years teaching experience and those who had 6 to10 years teaching experience, 11 to 15 years, 16 to 20, and more than 20 years teaching experience. However, it was found that the Internet use of teachers with 5 or fewer years teaching experience was significantly higher than the Internet use of teachers who had 11 to 15 years teaching experience and those who had more than 20 years teaching experience.

To sum up, while teachers who had less teaching experience, in other words young teachers, were much more likely to use computer and Internet, there was no relationship found between computer and Internet use and teaching experience at current school.

Computer Knowledge

In the Science Teachers Survey, teachers were asked to identify their computer skill level. With this item, teachers' individual judgments about their capabilities/ beliefs to complete the computer related tasks were measured. In other words, teachers' computer self-efficacy levels were measured. The descriptive statistics for teachers' computer skills (item 21 in the Science Teachers Survey) has been shown in Table K.44, Appendix K. For item 21 a cutoff point of 1.5 was chosen. Selections under the item whose means were less than 1.5 were not included in the total score. Based on this cutoff point, the selections "web page creation" (*Mean*=1.28) and "File Transfer Protocols, FTP) were eliminated.

The Pearson Product-Moment correlations were used to determine the relationship between computer use and teachers' computer skill level. The analysis revealed a very significant relationship between computer use and teachers' computer skill level (see Table 4.10). The correlation between computer use and teachers' computer skill level was moderate at level .01 (r=.533).

The Pearson Product-Moment correlation showed that there was a very significant relationship between Internet use and teachers' computer skill level (Table 4.10). The correlation between Internet use and teachers' computer skill level was .615, a moderate to high correlation at the .01 level.

Table 4.10. Correlation between Computer and Internet Use and Computer Skill Level

Variables	Computer use	Internet use
Computer skill level	.533**	.615**

*p<.05, **p<.01 (two-tailed)

In sum, the results showed that there is a significant relationship between teachers' computer self-efficacy and their computer and Internet use. Teachers in the study with high computer self-efficacy, in other words teachers with a high level of previous computer experience, used the computer and Internet more.

Student-to-Computer Ratio

The Science Teacher Survey had some questions to discuss information about the number of students in the classroom and the number of computers. Table K.63 and Table K.64 (see Appendix K) showed the descriptive statistics for the number of students and the student-to-computer ratio for the smallest and largest classrooms on average.

The Pearson Product-Moment correlations were used to determine the relationship between computer and Internet use and the student-to-computer ratio. The analysis revealed no significant relationship between computer and Internet use and the student-to-computer ratio (see Table 4.11).

Table 4.11. Correlation between Computer and Internet Use and Student-to-Computer Ratio

Variables	Computer use	Internet use
Student-to-computer ratio for smallest class	.094	.055
Student-to-computer ratio for largest class	-.021	-.005

*p<.05, **p<.01 (two-tailed)

Attitude toward Computer

Table K.45 displays descriptive statistics for teachers' computer attitudes. As shown in the table, science teachers had a positive attitude toward computers. The question related to attitude toward computers had four subscales: computer liking, computer usefulness, computer confidence, and computer anxiety. The mean score for all respondents and subscales (liking, usefulness, confidence and anxiety) were 3.12 (*SD*=.39), 3.13 (*SD*=.49), 3.05 (*SD*=.41), 3.03 (*SD*=.60), and 3.27 (*SD*=.59), respectively. The mean score for each subscale again showed that science teachers had positive attitudes toward computers.

The Pearson correlation was used to investigate the relationship between computer and Internet use and teachers' attitudes toward computers. Table 4.12 shows the correlations between computer and Internet use and computer attitude. The results revealed that there was a very significant relationship between computer use and computer attitude. The correlation between computer use and teachers' computer attitude was .262, which is low to moderate at level .01.

Moreover, there were very significant relationships between computer use and computer liking and computer confidence. The correlations between computer use and computer liking and confidence were .246 and .244, respectively.

Table 4.12. Correlation between Computer and Internet Use and Teachers' Computer Attitudes

Variables	Computer use	Internet use
Computer Attitude	.262**	.303**
computer liking	.246**	.297**
computer usefulness	.123*	.160**
computer confidence	.244**	.293**
computer anxiety	-.222**	-.221**

*p<.05, **p<.01 (two-tailed)

All correlations were low to moderate at the .01 level. The correlation between computer use and computer usefulness was found to be .123, low at the .05 level. However, there was a significant negative relationship between computer use and computer anxiety. The correlation between computer use and computer anxiety was -.222, low to moderate at the .01 level.

The results revealed that there was a very significant relationship between Internet use and computer attitude. The correlation between Internet use and teachers' computer attitudes was .303, low to moderate at level .01.

There were very significant relationships between Internet use and computer liking and computer confidence. The correlations between Internet use and computer liking and confidence were .297 and .293, respectively. All correlations were low to moderate at the .01 level. The correlation between Internet use and computer usefulness was found to be .160, low at the .01 level. However, there was a significant negative relationship between Internet use and computer anxiety. The correlation between Internet use and computer anxiety was -.221, low to moderate at the .01 level.

In conclusion, teachers who had positive attitudes toward computers were much more likely to use the computer and Internet. In other words, teachers enjoy computer work, perceive that learning about and/or using computers is useful, and have confidence in computer skills use the computer and Internet more; on the other hand, the feelings of anxiety toward computers and computer use affect teachers' computer and Internet use in negative ways.

Availability of Computer Resources

On the survey, respondents indicated whether each resource was not available at all, available in the computer lab, or available in classrooms. However, very few teachers reported that any resources were available in classrooms.

Therefore, in computing a total score, each resource was considered either not available or available (in either the computer lab or classroom). Less than 10% of the teachers indicated that the following three resources were available: laptop computer, digital video camera, and digital camera. Therefore, these selections were not included when computing the total score for availability.

The result of the Pearson Product-Moment correlation has been shown in Table 4.13. The results indicated that there was a weak relationship between computer use and available computer resources including hardware, software, peripherals and the Internet (r=.145, p=.005). No relationship was found between Internet use and availability of computer resources. (r=.071, p=.180)

Table 4.13. Correlation between Computer and Internet Use and Availability of Computer Resources

Variables	Computer use	Internet use
Availability of computer resources including hardware, software, peripherals,	.145**	.071

*p<.05, **p<.01 (two-tailed)

The Prediction of Computer and Internet Use

Stepwise multiple regressions were used to determine the affect of independent variables on the dependent variables. For the Stepwise regression, all independent variables including computer access, administrative support, attending professional development programs, gender, age, highest degree earned, academic major, teaching filed, teaching experience, computer knowledge, student-to-computer ratio, attitude toward computers, and availability of computer resources were regressed to the computer and Internet usage.

In order to check that the assumptions of multiple regressions were tenable, the following diagnostic procedures were conducted. A plot of standardized residuals against standardized predicted scores was examined for evidence of violations of the assumptions of linearity and homoscedasticity. A histogram of residuals was examined for evidence of violation of the assumption of normality. There was no evidence of marked departure from any of these assumptions. In addition, there was no cause for concern about multicollinearity since the highest correlation among predictor variables in the model was .5. Although two outliers were identified in the regression model predicting Internet use, the values of Cook's distance indicated that the two cases were not unduly influential.

Computer access, computer knowledge, gender, and professional development related to distance learning variables were found to be significant predictors of computer use (Table 4.14). These four predictors additively accounted for approximately 40% of the variance of the computer use (R square $_{\text{model 4}}$= .400). The extent of the unique contribution of computer access to the variance of the computer use was 28.4% of the variance in computer use by science teachers (R square=.284, p=.000). After controlling for computer access, computer knowledge uniquely explained an additional 5.5% of the variance in computer use. After controlling for computer access and computer knowledge, the unique contribution of gender to the variance of the computer use was 3.7%.

Computer access and computer knowledge (continuous scales) both have a positive effect on computer use. In other words greater access and more knowledge are associated with more frequent use. The effects of gender and professional development were also positive. Based on how these variables coded, the regression results indicated that males used computers more often than females, and teachers who received training on distance learning used computers more than teachers who did not receive this training.

The result of regression analysis showed that computer knowledge, computer access, administrative support, and teaching experience at the current school were significant predictors of the Internet use (Table 4.15). As shown in the table, these four predictors additively accounted for approximately 47% of the variance of the Internet use (R square $_{\text{model 4}}$= .473). The extent of the unique contribution of computer knowledge to the variance of the Internet use was 36.4% of the variance in the Internet use by science teachers (R square=.364, p=.000). After controlling for computer knowledge, computer access uniquely explained an additional 7.6% of the variance in the Internet use. After controlling for computer knowledge and computer access, the unique contribution of administrative support to the variance of the Internet use was 1.9%.

Table 4.14. Standardized Beta Coefficient of the Independent Variables, Dependent Variable: Computer Use

Model	Variables	R Square	Standardized Beta	t	P
1	Computer access	.284	.533	8.405	.000
2	Computer access	.339	.396	5.590	.000
	Computer knowledge		.270	3.815	.000
3	Computer access	.376	.409	5.920	.000
	Computer knowledge		.272	3.946	.000
	Gender (female=1, male=2)		.194	3.242	.001
4	Computer access	.400	.396	5.809	.000
	Computer knowledge		.257	3.777	.000
	Gender		.180	3.061	.003
	Professional development related to distance learning *		.158	2.663	.008

* The variable was coded as did not receive training =0, received training=1

Computer knowledge and computer access both have a positive effect on Internet use. In other words greater access and more knowledge are associated with more frequent use. Without controlling for any other variables, the relationship between administrative support and Internet use is positive but not significant (r=.104, p=.053). However, after controlling for computer knowledge and computer access, the relationship between administrative support and Internet use negative and significant (r= - .185, p=.015). In words, this is saying that if computer knowledge and access are held constant, teachers with more administrative support tend to use the Internet less than teachers with not as much administrative support. Descriptive results indicated that teacher's most common reason for Internet use was for individual (rather than instructional) purposes. Also, descriptive results indicated that more than half of the science teachers had Internet access at home. Therefore, the lack of administrative support at school may be associated with more frequent Internet use at home.

Table 4.15. Standardized Beta Coefficient of the Independent Variables, Dependent Variable: Internet Use

Model	Variables	R Square	Standardized Beta	t	p
1	Computer knowledge	.364	.603	9.949	.000
2	Computer knowledge	.440	.436	6.531	.000
	Computer access		.322	4.830	.000
3	Computer knowledge	.459	.472	6.995	.000
	Computer access		.347	5.215	.000
	Administrative support		-.147	-2.428	.016
4	Computer knowledge	.473	.477	7.135	.000
	Computer access		.351	5.316	.000
	Administrative support		-.136	-2.272	.024
	Teaching experience at the current school		-.119	-2.128	.035

Without controlling for any other variables, the relationship between teaching experience at current school and Internet use is negative but not significant (r= -.094, p=.074).

However, after controlling for computer knowledge, computer access, and administrative support, the relationship between teaching experience at current school and Internet use is negative and significant. In words, this is saying that if computer access, knowledge and administrative support are held constant, teachers who are new at current school tend to use the Internet more than teachers with more teaching experience at current school.

CHAPTER V

SUMMARY, DISCUSSION, AND RECOMMENDATIONS

The main purposes of the study were to describe computer and Internet use by science (biology, chemistry and physics) teachers in Turkish secondary schools having access to computer labs and to identify the issues teachers encountered regarding computer and Internet technologies. A further purpose of this study included identifying the factors that affect the use of computer and Internet by science teachers in Turkish secondary schools. The factors examined in the study were: access to computer and Internet technologies; administrative support; professional development; personal characteristics of science teachers including gender, age, highest degree earned, academic major, teaching field, teaching experience and teaching experience at the current school; computer knowledge; computer to student ratio; attitude toward computers; and availability of resources including hardware, software, peripherals, and the Internet.

To meet the objectives of this study, a "Computer and Internet Use: School Survey" and "Science Teacher Computer and Internet Use Survey" were constructed. One administrator and two science teachers selected from two hundred fifty schools served as participants in this study. The surveys were mailed to the chosen school administrators by the Ministry of National Education (MONE), General Directorate of Educational Technologies. Two-hundred twenty seven school surveys and four-hundred twenty Science Teacher Surveys were returned. Of these, a total of two-hundred twelve School Surveys and three-hundred ninety eight Science Teacher Surveys were usable.

Summary of Research Questions and Findings

Three research questions guided this study. The major findings of the study are summarized below:

1. "What is the current situation of computer and Internet use in science classrooms in Turkish secondary schools?"

Regarding available technology resources for teachers, the study results show that computers in the schools are located in computer labs. The average number of computers in computer labs is 22. Although most participating schools have Internet access, only a very small number of computers (less than 25%) are connected to the Internet in most participating schools. Desktop computers, CD-ROM drives, computer speakers and printers are the most frequently chosen resources in computer labs in participating schools. Also, the science teachers' responses reveal, unfortunately, that the educational science software is really limited in the participating schools.

In order to examine the current situations of computer and Internet use, two questions were posed: "For what purposes do science teachers use computers and the Internet?" and "To what extent do science teachers use computers and the Internet?"

The data gathered from the Science Teacher Surveys indicate that computers are rarely used by science teachers. This result also supports Cakiroglu and his colleagues' (2001) statement that computer technology was not used frequently by elementary and secondary school teachers in Turkey. The study result showed that science teachers use computer and the Internet for individual purposes and for preparing instructional materials. Computers and the Internet were used by science teachers for individual purposes for around 4.5 years and 2.5 years, respectively. Using computers and the Internet for instruction, communication, and class management had only recently materialized in Turkish secondary schools. Harris (2000) and Ravitz, Wong, and Becker

(1999) also mentioned that using computers to prepare instructional materials/lessons by teachers was more common.

Regarding the frequency of computer and Internet use, the results show that only a few science teachers are using a computer daily for personal purposes (22.5%, *n*=85) as well as preparing instructional materials (6.3%, *n*=23). Like computer use, a small number of science teachers (14.1%, *n*=52) are more likely to make daily use of the Internet for personal purposes. Although the majority of science teachers (95.7%, *n*=354) reportedly that they believe computer technologies can be used to improve the teaching and learning environment, their use of those electronic resources (including basic computer applications such as word processing and spreadsheets) was still limited.

Considering teachers' computer skills, the study shows that the majority of science teachers are not familiar with the listed computer related topics. While Internet browsing, Spreadsheet applications, Operating Systems and Word Processing are the topics with which science teachers and administrators were most familiar, uses of these computer applications are still limited. For example, only 56 (15.6%) science teachers are using Word Processing programs a few times a week. Cinar (2002) studied elementary school teachers' computer competency in Turkey. This study also showed that Word Processing, Spreadsheet applications, Internet, and operating the computer were the topics with which teachers were more familiar.

In addition to computer skills, school administrators' and science teachers' computer attitudes and beliefs were assessed. Responses show that almost all school administrators believe that technology provides practical benefits for teaching and they think educational technology has a positive impact on students' academic performance. Like administrators, science teachers have positive attitudes toward computers. In other words, they consider the computer a valuable tool that can be used to improve the quality of education.

The results indicate that the MONE is the primary source of technology support. Participating schools are receiving funding for computer technology including hardware, software, etc., primarily from the MONE. Schools do not have a specific budget for computer and Internet technologies. Almost all school administrators agree that their budgets do not meet the schools' need regarding such technologies.

Considering professional development, more than half of the school administrators have attended some kind of computer training program. School administrators mentioned that the participation of science teachers in technology related training programs was higher than other subject teachers. This result agrees with the statement by Roth et al. (1996) that science educators have been "unabatedly enthusiastic about possibilities for learning with computers."

Despite higher participation by science teachers in training programs compared with other subject-matter teachers, only a total of 163 science teachers stated that they attended technical training programs on using computers in teaching. Study results indicate that sending science teachers or technology coordinators to in-service training programs implemented by the MONE is the most significant form of technology-related professional development. Regarding informal professional development methods, individual learning and working with peers, family and friends are also considered significant methods. This result agrees with finding by Cakiroglu et al. (2001) that more than half of the teachers who knew how to use computers participated in some training programs related to computers. Most school administrators believed teachers definitely need training in computer use and integrating computer technologies into the curriculum. Most school administrators believe they are not good at meeting teachers' needs for computer related training; meanwhile, the majority of science teachers state that they do not have sufficient technology related training opportunities as well as easy access to these opportunities.

Considering science teachers' computer skills and their needs for technical training in computer technology, it is not surprising that most science teachers in Turkish secondary schools do not use computers for instruction. These results are consistent with the study by Yedekcioglu (1996), who reported that "the use of computers in Turkey's high school education is still at very early stages." Today, the results show that computer and Internet use in Turkish secondary schools is still at an initial, but nascent stage. Although the number of computers and the Internet in secondary schools in Turkey has grown, these technologies are not being used frequently. This result is also consistent with the study reported by Cinar (2002).

2. "What are the issues that affect the use of computer and Internet technologies?"

With this question, the researcher tried to identify the issues regarding uses of computers and Internet technologies from the point of view of the administrators and teachers. The study included issues that teachers face in relation to the availability of technology resources such as hardware, software, peripherals and the Internet, technology support, training, technical support, administrative support, time, and infrastructure.

Technology resources

In general, school administrators and science teachers agreed that the availability of hardware, software and peripherals in Turkish secondary schools was limited. Most school administrators and science teachers mentioned that an insufficient number of computers and peripheral devices were the major issues negatively affecting the use of computer technology. These findings are consistent with studies reported by the U.S. Department of Education (2000) and Morse (1991). Interestingly, while administrators and science teachers agreed on the importance of the availability of technology resources, this study also documented a weak relationship between computer use and available computer resources (including hardware, software, peripherals and Internet access). There was no significant relationship found between Internet use and the availability of technology resources, nor was one found between computer and Internet use and the student-to-computer ratio. This contradictory result may be understood if we consider science teachers' computer knowledge. Cakiroglu et al. (2001) found that teacher's computer knowledge is the most important factor determining technology integration in education. Therefore, if science teachers do not know how to use computers, how to integrate these technologies into education, or even what they can do with a computer, the availability of technology resources and also student-to-computer ratio will be meaningless. Teachers and administrators may feel that availability is the most important limiting factor in integration simply because they have not yet addressed these other, more crucial, underlying constraints.

The results showed that most computers in secondary schools were located in computer labs. The vast majority of school administrators agreed that not having computers at the learning site was another important issue and predicted that having computers in the classroom would encourage teachers to use computers for educational purposes. Moreover, 85% of science teachers reported that they do not have a computer in the classroom, and considered this an important reason for not using a computer in instruction. This result was in agreement with Cakiroglu et al. (2001), who reported that teachers mentioned that at least one computer should be in every class for effective integration of technology into the curriculum. Moreover, U.S. Department of Education (2000) results showed that when teachers had the computer and Internet in their classroom, they generally used these technologies more.

Regarding software resources, school administrators and science teachers reported that their schools have neither age-appropriate, educationally relevant software nor software aligned with current science curricula. They stated that their schools definitely need more science software. This result was in agreement with the study reported by Yedekcioglu (1996). Yedekcioglu (1996) stated that lack of software in high schools in Turkey was one of the major problems regarding the use of computers in secondary education.

Moreover, one-third of school administrators agreed that slow or unreliable Internet connections, lack of age appropriate or educationally relevant web sites for students, and lack of Turkish websites were other issues of significance. These findings are also supported by Akkoyunlu (1999), who stated that the language of Internet resources (primarily English) and the quality of Internet access were the major issues regarding Internet use in the Turkish schools.

Technology support

School administrators reported that lack of training opportunities for school staff was one of the most important issues related to computer and Internet technology use. School administrators' views about training opportunities were also supported by science teachers. School administrators also mentioned that there were no trained technical staff or adequately trained teachers. In other words, administrators felt that there were no support personnel who had the ability to implement technology successfully. Implementing technology can improve the effectiveness of instruction and learning and should meet the needs of specific instructional objectives. Devising a strategy for using the technology in classroom instruction and learning activities forces consideration of when, where, and how the technology is to be implemented. The highly effective teacher identifies when the software packages would be appropriate for use in the lesson, determines where they are to be used, and decides how to implement them most effectively in a technology adapted learning environment.

Administrators and science teachers believed that science teachers were definitely in need of training about technology and also integrating technology into the curriculum. This result is consistent with the studies reported by Ozar and Askar (1997), Harris (2000), U.S. Department of Education (2000), and Cakiroglu et al. (2001). Considering teachers' computer and Internet competencies, these results are expected. A key policy maker in the MONE stated that teachers, in general, do not have necessary technical skills and are not ready to use information technology (Ozar & Askar, 1997). Unfortunately, results of this present study show that teachers still have limited technical and pedagogical skills in integrating computer and Internet technologies with curriculum and classroom practices. A majority of teachers feel inadequately trained to use computer-based technology. Most training for teachers involves lecturing about the skills, with limited hands-on experience. Training is heavily focused on how to operate computers, with little attention to implementation in the classroom (pedagogy). There is a lack of linkages between technology and the effectiveness of using technology in education.

Although school administrators reported that the computers in their schools were repaired in a timely manner, and it was not considered a large issue, science teachers disagreed with school administrators. A majority of science teachers stated that they did not have enough technical support. Science teachers also mentioned that they needed trained technical staff available for product and service acquisition, installation, and maintenance in their schools.

3. "What is the relationship between computer and the Internet use and selected variables?"

The study examined the relationship between computer and Internet use and some selected variables such as computer and Internet access, administrative support, professional development, personal characteristics, computer knowledge, student-to-computer ratio, attitude toward computer use, and available technology resources including hardware, software, peripherals and the Internet.

There was a significant positive correlation between computer use and administrative support. This finding is consistent with Almusalam (2001) and Hester (2002) studies. The U.S. Office of Technology Assessment (1995) reported that principal or other administrators' support for technology use encourages the use of technology. In other words, greater administrative support is associated with more frequent computer use by science teachers.

The results also revealed a significant relationship between computer and Internet use and professional development. This finding is consistent with the Office of Technology Assessment (1995) statement that "even when teachers have more equipment orchestrating its use, it often requires knowledge about how to really teach with it or how to organize learning activities to make optimal use of the technology" (p.135). There was a significant relationship between computer use and attending professional development programs related to computer technology. The results indicate that teachers who have not attended any training programs about computers like using computers less.

In this study the relationship between computer and Internet use and selected demographics such as gender, age, highest degree earned, academic major, teaching field, teaching experience and teaching experience at current school were investigated. The key findings are: male teachers are using computers more than females; teachers aged between 20 and 29 are using the Internet more than teachers aged between 40 and 49; teachers who had a Master's degree are using the Internet more than those who had a bachelor degree or graduated from teacher preparation high school; there was no significant relationship between the computer and Internet use and teacher's academic backgrounds or their teaching fields including Biology, Chemistry and Physics; teachers who have less experience are much more likely to use computers and the Internet.

The analysis revealed a significant relationship between computer and Internet use and teachers' individual judgments about their computer knowledge. Teachers with higher computer skill are using computers and Internet more. These results are consistent with Almusalam (2001), who found that there was a positive correlation between the level of use and perceived proficiency and computer experience. Also, Lancaster (2000) stated that teachers who use computers have higher self-efficacy scores than nonusers.

The study results show that science teachers had positive attitudes toward computers. These results are supported by Snelbecker and Bhote (1995) and Lancaster (2000). Cinar (2002) also reported that elementary school teachers in Turkey have positive attitudes toward computers. Moreover, the results revealed a significant relationship between computer use and computer attitude. A significant positive relationship was found between computer and Internet use and computer liking, usefulness and computer confidence. However, there was a significant negative relationship between computer use and computer anxiety.

Discussion

The main purpose of the Turkish education system is defined as "to raise highly skilful, productive and creative individuals of the Information Age who are committed to Atatürk's* principles and revolution, have advanced thinking, perception and problem-solving skills, are committed to democratic values and open to new ideas, have feelings of personal responsibility, have assimilated national culture, can interpret different cultures and contribute to modern civilization, and lean towards productive science and technology" (Ministry of National Education, 2001).

In order to achieve its goals and improve the Turkish education system, the major and fundamental reforms started in 1997. Since Turkey is a candidate member of the European Union (EU), the MONE also carried out some legislative conformance efforts related to education policy, organization and management structure, teacher training, and teaching programs, etc. Extending the period of compulsory education, restructuring the secondary education system with emphasis on vocational technical education, rearrangement of transition to higher education, restructuring teacher education programs, changing the concept and models of schools are some of the reforms instituted to increase the quality of Turkish education at all levels of education (Ministry of National Education, 2001). These reforms also have significance to aligning the quality of the Turkish education system with those of the EU and to meet the membership criteria of the EU. The measures of developed countries, particularly EU and the Organization for Economic Co-Operation and Development (OECD), the demands of business, parents, communities, students, and the needs of the 21^{st} century were taken into account in determining these reforms and the qualitative and quantitative objectives of the Turkish education system. These reforms include all subject areas in all levels of the Turkish education system (Ministry of National Education, 2001).

* The founder of the Turkish Republic

The MONE has also restructured science education in Turkish schools in the context of program development activities. Individual and the community needs, integration theory and practice, individualized education, teaching subject matters in depth, the interdisciplinary side of subject matters, the demand for higher level skills within Turkey and in Europe, and lifelong learning are considered in the new science education program (Ministry of National Education, 2001; World Bank, 2001). Using student-centered learning strategies in the science classroom and designing dynamic learning environments are essential to the program. Moreover, the new science education program is grounded in the philosophy that education begins with the curiosity of the learner. The new language in the science education program purports to value discovery, problem-based, collaborative, and inquiry learning (Ministry of National Education, 2002b).

Regarding these restructuring movements, the use of technology has also been encouraged in science education as well as other subjects in all levels of education (Ministry of National Education, 2001). Considering forming future members of society in today's schools, using computer and Internet technologies has significance in generating an information literate society. Promoting human and financial investment and stimulating the use of computer and Internet technologies in secondary schools, and other levels of education are also important for the criteria of EU and the objectives of the Turkish education system.

In terms of information and communication technologies, EU mentioned that the use of these technologies is still low. To increase the use of multimedia technologies and the Internet for learning in Europe, e-Europe Action Plan was developed. The main aims of the plan are summarized as "to speed up the deployment of a high-quality infrastructure at a reasonable cost; to step up training and overall digital literacy; and to strengthen cooperation and links at all levels - local, regional, national and European - between all sectors involved, from schools and training colleges to equipment, content and service providers." The targets of this plan include equipping schools with these technologies, teacher training in computers and Internet, developing educational services and software, networking of schools and teachers, and making students digitally literate. "Supporting the evolution of school curricula with the aim of integrating new learning methods, based on information and communication technologies" is another significant aim of the plan. The EU is expecting member and candidate states to begin actions to promote the use of Information and Communication Technologies (Commission of the European Communities, 2001).

The national goal and policy of Turkey concerning information technologies is summarized as "to catch up with the information era, to raise individuals thinking universally acting nationally in order to become an information and technology society, to support each stage of our education system with technology education in order to increase the competitive power of the society" (Ministry of National Education, 2000).

Despite the reforms in the education system and the goals of Turkish education, unfortunately, the implementation process from theory to practice is not easy and does not usually proceed as expected. Although the reforms are based mostly on a constructivist approach (learner–centered instructional models are encouraged), traditional teacher-centered models of teaching are still common in Turkish classrooms (Asan & Gunes, 2000).

Teachers are still implementing direct instruction, primarily grounded in behaviorist/ objectivist learning theory in Turkish schools. In the traditional Turkish classroom, teachers are the managers of learning and their role is to deliver information. They determine what students should learn and how they should learn it. In other words, in this approach, teachers deliver knowledge, while students receive it passively (Fulton, Couros, & Maeers, 2000). In the constructivist approach, learning is defined as the process where individuals construct knowledge based on prior knowledge and/or experience (Nickerson & Zodhiates, 1988; Sandholtz, Ringstaff, & Dwyer, 1997; Joyce, Weil, & Calhoun, 2004). Considering constructivism, learning how to learn, finding information and thinking critically about information are important. Individuals construct knowledge by working to solve realistic problems, often in groups. The reforms in the

Turkish education system are changing the model of teaching and learning from the traditional to dynamic schooling where teachers' roles are to explore students' current understanding, to provide students with problems that stimulate exploration, create group learning activities, and guide the construction of knowledge (Dimock & Boethel, 1999; Ministry of National Education, 2002b).

Some literature mentioned that integrating technology into the curriculum has become closely identified with the restructuring movement from behaviorist to constructivist models. Such literature indicates that with integrating technology in education, teaching becomes less teacher directed and more student-centered (Bruder, 1993; Knapp & Glenn, 1996; Owston, 1997; Pugalee & Robinson, 1998; Montgomery & Graduate students, 2000). Bruder (1993) also states "... the new emphasis in K-12 science--on inquiry-based, hands-on, project-based learning-- provides education an opportunity to take advantage of the power of technology to transform students from passive content-memorizers to lifelong, active, and scientifically literate learners." Technology can empower students to take responsibility for learning by placing "knowledge" in their hands rather than solely in the hands of a teacher.

Bruder (1993) and Mathew (2001) also mentioned the catalytic power of the technology in educational change from behaviorism to constructivism. Although computer and Internet technologies can be appropriate for implementing the new strategies such as inquiry, discovery, hands-on, etc. and they can be used to improve the quality of instruction and teaching and the learning environment, in general computers are not integrated into Turkish curriculum as expected.

The study results showed that even if computer technology is not a new concept for Turkish secondary schools, the use of computer and Internet technologies by science teachers is still at its early stages. Even if teachers have a positive attitude towards computers and they think that computers can improve the learning and teaching environment, teachers do not always use computers in their classroom in ways consistent with promoting student-centered learning. The question is why teachers do not integrate computer and Internet technologies into instruction. Knapp and Glenn (1996) stated the essentials for creating an environment for effective use of technology are availability, knowledge, and support. The effective use of technology includes students' engagement that results in their improved technical skills along with deeper understanding of science content and increased problem solving skills.

Regarding availability of technology resources, school administrators and science teachers agree that having computers in classrooms will encourage teachers to use computer technologies more. Having computers in computer labs causes some problems like insufficient number of computers and scheduling. Around 80% of the science teachers state insufficient numbers of computers. Considering the number of students in classrooms and computers in the lab, large class sizes may face the issue of insufficient computers and available seats for students in the computer lab.

Moving computers into the classroom or organizing training programs alone is insufficient for creating technology adapted learning environments. Formal courses may be adequate for developing minimal competence, but educators need continuous encouragement and support to transfer such training to the classroom where their computer skills can be used to improve student's science skills. Furthermore, school and university participants must be organized into subject and/or grade level teams, where they can work together on projects, share stories of success and frustration, and motivate each other to circumvent obstacles. Therefore a shift in purpose, as well as funding, must take place.

Solving the problems mentioned above requires funding. Almost all school administrators mentioned that they do not have specific school budget for computer and Internet technology and that their budget is not enough to meet teachers' needs regarding technology. In the 2002 budget, a total allocation of 7 quadrillion 461 trillion Turkish Liras (4.97 billion American Dollars) is given to the MONE. Comparing other OECD countries, because of the higher young population in Turkey, the resources allocated for the MONE should be increased. Unfortunately, while the OECD countries allocate an average of 5.7% for education from their GDP, this ratio of the MONE budget is only 2.65% (Ministry of National Education, 2001). Identifying existing computer technology resources including hardware, software, Internet access, and peripherals and using those resources efficiently are more important for Turkey, as a developing country.

Lack of available resources for instruction and learning and the desire to have at least one computer in each classroom was mentioned by school administrators and science teachers. The MONE first of all needs to know what resources schools already have and then evaluate them to make sure they meet learners' and teachers' needs. Until each classroom has at least one computer and a projection device, a smart cart- a portable system that includes a computer and desktop projector on a cart- can be available for the teachers who want to use it in their classrooms. Implementation of this system will help schools use their limited budgets more efficiently while increasing integration of computer technologies into the classrooms.

The MONE should collaborate with private sector and higher institutes to provide sufficient and updated computers and to develop and evaluate software aligned with the current science curriculum, as well as Internet sites. This study indicates that technology support from higher education institutions is not at the level expected.

Computer and Internet technologies can be used for science classrooms in different ways. Multimedia and hypermedia programs combine electronic media and provide the power to browse, access, and link information with the "click" of a button. Science teachers are familiar with different media text, pictures, chalkboard, overhead, film, video, and tapes and use these all the time. The computer gives individuals the power to combine text, graphics, sound, and animation in any sequence. Reports and presentations come alive as groups of students collaborate on the total project to combine all of their strengths, as well as all the resources available to them.

To facilitate the successful integration of these technologies into science instruction, science teachers should know how to teach science with these technologies. In other words, science teachers should know how to capitalize on these technologies to accomplish their teaching strategies based on constructivist models. For this, science teachers need training programs in pedagogy. The idea of these programs is to offer science teachers training to learn about pedagogical approaches of constructivism at both the theoretical and practical level. The programs should emphasize good pedagogical practices on constructivist teaching strategies such as problem-based learning, inquiry, and collaboration and show how technology can be used to teach science using these instructional models. Moreover, these training programs should highlight technology, the role of questioning, critical thinking, finding information and organizing and evaluating it. The training programs and the courses in teacher education should also highlight integrating strategies with group cooperative activities.

The philosophical underpinnings of the theories and practices to which pre-service teachers are exposed have a lasting impact on personal perceptions of the teaching role. Practicing teachers have a rich context in which to develop and apply newly emerging theories and methodologies. Both pre-service and in-service teacher education must promote teaching practices that mediate student construction of their own understanding; therefore, teacher education programs must themselves be constructivist-based. (Brooks & Brooks, 1993). This inclusion will give candidate teachers an illustration of computer and Internet use in instruction. Delcourt and Kinzie (1993) also stated that instructors in teacher education programs are important models for their students who will be future teachers.

In summary, the restructured education policies and programs emphasize the integration of technology. As a process of restructuring education systems, computer and Internet technology can be a catalyst for educational change from behaviorism to constructivism. Providing teachers and students with sufficient hardware, software facilities and Internet access and increasing the availability of these resources are some of the important steps in integrating computer technologies into the science curricula.

In addition to availability, focusing training programs is another important issue to show teachers how to use computer technologies and how to integrate them into science classrooms. The MONE is already implementing in-service training activities related to computers. But the availability of training activities in integrating computers in science is really limited. Increasing the training activities on how to integrate computers and Internet into the curriculum is significant in terms of restructuring education programs from traditional to constructivism. To plan training activities to improve computer use in schools, the MONE should collaborate with institutions of higher education. This collaboration should gather and prepare training activities that assure constructivist ideas fit in with current policies and programs. In other words, these training activities should be planned to move teachers from traditional learning toward restructured active learning in which students construct their own knowledge.

Teacher education programs should also include training regarding computer use. The training should be integrated throughout the courses. Instructors in teacher education programs should demonstrate how to use computers and the Internet in their own classes. They may also provide video or digital video examples in their classes. Doing so would help pre-service teachers to see how computer gives individuals the power to combine text, graphics, sound, and animation in any sequence. Furthermore, Council of Europe (2003) states "policymakers should encourage developments in the teaching professions by taking account of and certifying ICT-based teaching skills when recruiting new teachers." Establishing standards for teachers will be important in encouraging pre-service and in-service teachers to learn and use computer and Internet technologies. Periodic checks to see whether teachers meet these standards will compel all serving teachers to upgrade their knowledge and skills in integrating computer technologies in education and also new teaching techniques and practices.

To increase computer and Internet integration in class, cooperation among the MONE, provincial organizations and institutions of higher educations is very important. Furthermore, this cooperation is essential for making technology plans, implementing training activities based on constructivism, following-up on training activities, and evaluation of training programs, computer resources such as software, web site, etc., selecting technology resources especially software, and supporting educational research and development.

Directions for Future Research

The study collected data about the current computer and Internet use in secondary science classrooms. Also, the study identified the issues that teachers encountered and factors that can affect science teachers' use of these technologies. Future research in the following areas would contribute to the results of this study:

1. This study indicates that science teachers do not know how to integrate computer and Internet technologies into their classes. Future studies focusing on integration of these technologies into science curriculum need to be conducted.
2. In addition, this study found that science teachers use computers for personal purposes. The importance of personal computer use to school applications needs to be explored. Doing so would help workshop leaders to identify activities that "bridge the gap" between personal success stories and how they carried the teacher to the next step in learning.
3. Because of the significance of science teacher education programs to the encouragement of classroom computer and Internet use, science teacher education programs need to be examined. Since teacher education programs play in acquainting pre-service, as well as in-service, teachers with the real world of teaching, examining these programs would provide information on how well they represent this reality. Different case studies in terms of integrating computers into instruction may provide beneficial information to other instructors and candidate teachers.
4. This study points out the lack of appropriate software and web sites that science teachers can use in their classes. Future studies focusing on improvement in these resources need to be conducted.

5. Since computer skills, the levels of computer use, and the needs of science teachers is expected to change over time, this kind of study needs to be replicated periodically.
6. Regarding the standards for teachers considering educational technology, the MONE and researchers should cooperate and conduct studies to develop these standards.

APPENDIXES

A. Distribution of Total and Selected Schools According to City

Table A.1. Distribution of Total and Selected Schools According to City

	City	The number of school having computer lab	Sample
1	ADANA	52	5
2	ADIYAMAN	24	2
3	AFYON	47	5
4	AGRI	10	1
5	AKSARAY	24	2
6	AMASYA	21	2
7	ANKARA	149	15
8	ANTALYA	46	5
9	ARDAHAN	7	1
10	ARTVIN	16	2
11	AYDIN	48	5
12	BALIKESIR	56	5
13	BARTIN	18	2
14	BATMAN	8	1
15	BAYBURT	5	1
16	BILECIK	29	3
17	BINGOL	8	1
18	BITLIS	14	1
19	BOLU	23	2
20	BURDUR	20	2
21	BURSA	65	6
22	CANAKKALE	34	3
23	CANKIRI	20	2
24	CORUM	35	3
25	DENIZLI	44	4
26	DIYARBAKIR	19	2
27	DUZCE	14	1
28	EDIRNE	18	2
29	ELAZIG	19	2
30	ERZINCAN	21	2
31	ERZURUM	35	3
32	ESKISEHIR	32	3
33	GAZIANTEP	30	3
34	GIRESUN	24	2
35	GUMUSHANE	8	1
36	HAKKARI	7	1
37	HATAY	41	4
38	ICEL	59	6
39	IGDIR	6	1
40	ISPARTA	34	3
41	ISTANBUL	215	21

Table A.1 (cont'd)

	City	The number of school having computer lab	Sample
42	IZMIR	106	10
43	KAHRAMANMARAS	47	5
44	KARABUK	15	2
45	KARAMAN	12	1
46	KARS	10	1
47	KASTAMONU	24	2
48	KAYSERI	56	5
49	KILIS	10	1
50	KIRIKKALE	26	3
51	KIRKLARELI	22	2
52	KIRSEHIR	14	1
53	KOCAELI	42	4
54	KONYA	76	7
55	KUTAHYA	34	3
56	MALATYA	40	4
57	MANISA	44	4
58	MARDIN	16	2
59	MUGLA	33	3
60	MUS	12	1
61	NEVSEHIR	23	2
62	NIGDE	19	2
63	ORDU	33	3
64	OSMANIYE	22	2
65	RIZE	20	2
66	SAKARYA	31	3
67	SAMSUN	37	4
68	SANLIURFA	25	2
69	SIIRT	8	1
70	SINOP	23	2
71	SIRNAK	8	1
72	SIVAS	40	4
73	TEKIRDAG	34	3
74	TOKAT	36	4
75	TRABZON	38	4
76	TUNCELI	10	1
77	USAK	24	2
78	VAN	18	2
79	YALOVA	12	1
80	YOZGAT	34	3
81	ZONGULDAK	32	3
	TOTAL	2571	250

B. Computer and Internet Use: School Survey (in English)

COMPUTER & THE INTERNET USE: School survey

ear School Principal,

ım a graduate student at University of Pittsburgh. This questionnaire has been developed as a part of y doctoral dissertation. The purpose of this research is to identify the variables related to the use of ımputer and Internet technology in secondary school science subject areas in Turkey. This research ill also examine the current status of the use of computer and Internet technology in secondary hools in biology, chemistry, and physics. Your assistance in filling out the questionnaire will ıntribute to a better understanding of how computer and the Internet are currently used in secondary hools, as well as factors which encourage or prevent teachers from using the computer and the ternet in science education.

ease complete the questionnaire as directed to the best of your ability, regardless of whether or not ıu use currently a computer. If you are unsure about how to answer some of the questions on the closed questionnaire, or if you think one or more teachers could answer the questions more curately than you, please feel free to receive help for answering these questions.

ɔur identity and all responses to this questionnaire are strictly confidential, and results will be kept der lock and key. If you have any questions, you can reach me at meost11@pitt.edu. Moreover, all ıdy participants will be notified about the final report when it is completed. I thank you in advance r your cooperation.

ıcerely,

elike Ozer

The following questionnaires are modified to develop this instrument:

- School Survey (Integrated Studies of Educational Technology, 2000)
- Instructional Technology Use in Poultry Science Faculty Survey (Hogle,1999)
- Survey of Teachers' Attitudes toward Computers (Christensen & Knezek,1998)
- Survey of District Technology Coordinator (Integrated Studies of Educational Technology, 2001)

Definitions

Distance Learning/Education – The transmission of information from one geographic location to another via various modes of telecommunications technology for educational purposes, including professional development (Integrated Studies of Educational Technology, 2001).

Educational Technology– A variety of technologies used to support instruction such as computers, telecommunications (the Internet, Local networks, etc.), digital cameras, peripheral devices (printer, scanner, etc), graphing calculators, and software (Integrated Studies of Educational Technology, 2001).

"Educational technology" refers to computer and the Internet in this questionnaire.

Hardware – The physical components of the computer system, which includes the electronic components, monitor, disk drives, boards, wires, and peripherals, etc. (Sharp, 2002).

Internet – A worldwide system for linking smaller computer networks together, based on a packet system of information transfer using a common set of communication standards (Heinich et al, 1999). In other words, the Internet is a global network of computer networks (Botto, 1999).

Local Area Network (LAN) – A local system (typically within a building) connecting computers and peripherals devices into a network; may give access to external networks (Heinich et al, 1999).

Multimedia – Refers to a computer hardware and software system for the composition and display of presentations that incorporate text, audio, and still and motion images (Heinich et al, 1999).
Multimedia refers to communication of more than one media type such as text, audio, graphics, animated graphics, and full-motion video (Sharp, 2002).

Network – A communication system linking two or more computers (Heinich et al, 1999).

Peripheral – A device- such as a printer, mass storage unit, or keyboard- that is an accessory to microprocessor and transfers information to and from the microprocessor (Heinich et al, 1999).

Software – A program that instructs the computer to perform various tasks (Sharp, 2002).

Video-conferencing – A multi-user chat in which the live images of the users are displayed on each participant's computer screen (Sharp, 2002).

Wide Area Network (WAN) – A communications network that covers a large graphic area, such as state or county.

INSTRUCTIONS

- Place an "X" in or write your responses in appropriate boxes.

Example 1:

	Not significant	Somewhat significant	Very significant
Education in my life is			X

Example 2: The year is 2003

- Always enter one response, unless directed otherwise.

PART I: SCHOOL INFORMATION

1. What is the name of your school?

   Identify the location of your school (City / county / village).

2. The number of students in your school is

3. The number of teachers in your school is

4. The number of science teachers in your school is

5. The number of computers for educational use in computer laboratories is

6. The number of computers for educational use in classrooms is

7. The number of computers for educational use elsewhere in school is

8. The number of computers for administrative use is

PART II: TECHNOLOGY PLANNING

9. Does your school have a written plan for the purchase and use of educational technology? *Check one*

   ☐ Yes, we have developed a school-specific technology plan
   ☐ Yes, we used a plan developed by the Ministry of Education
   ☐ Yes, we adapted or modified a plan developed by the Ministry of Education
   ☐ No, we don't have a written plan

10. Identify the major goals for the use of educational technology resources in your school.

	Check here
Providing professional development for teachers on using technology	
Providing professional development for teachers on integrating technology into instruction	
Using technology to deliver professional development for teachers such as using distance learning opportunities to provide training	
Providing technical support for teachers such as providing support personnel with expertise in computer, video, or network technologies	
Increasing the availability of modern computers in the classroom	
Increasing connectivity to the Internet	
Providing software and online resources such as making available a large variety of drills, games and tutorial software for all subjects taught	
Improving students' educational technology proficiency	
Improving students' academic achievement	
Supporting parental involvement such as improving communication with parents, providing school calendars, test scores	
Improving administrative efficiency such as better record keeping and monitoring systems	
Other *(Please specify)*	

11. Does your school have technology standards for administrators, teachers and students (e.g., standards regarding proficiencies, training, uses of technology)?

	Yes	No
Administrators		
Teachers		
Students		

PART III: TECHNICAL SUPPORT AND PROFESSIONAL DEVELOPMENT

12. Check the technology support that your school has.

	Check here
We install equipment and networks	
We "troubleshoot" and maintain equipment and networks	
We install operating systems and software	
We "troubleshoot" and maintain operating systems and software	
We help teachers to integrate computer into curriculum	
We select and purchase computer-related hardware, software and support materials for schools	
Other *(Please specify)*	

13. What forms of technology support have been provided by the following sources? *Check all that apply for each item*

	None	Computer peripheral devices, or software	Wiring or Internet connections	Technical support or training	Educational technology planning	Other*
Businesses						
The Ministry of National Education, other government agencies						
Non-profit agencies						
Institutions of higher education						
Technology coordinator						
Parents						
School administrators						
Teachers						
Other school staff						
Students						
Other *(Please specify)*						

* If *you checked "Other", please indicate the educational support and the source for the support.*

Source	**What was provided?**
______________________	______________________
______________________	______________________
______________________	______________________
______________________	______________________

14. Identify how many of the teachers below, at your school, have participated in some form of technology-related professional development. *Answer for each group of teachers listed below.*

	None or almost none	Some	Most	All or almost all
Self-contained classroom teachers				
Math teachers				
Language and literature teachers				
Science teachers				
Social studies teachers				
Other *(Please specify)*				

15. For each particular method listed below, indicate how much of a factor it has been in the school's efforts to provide professional development specific to technology during the past school year.

Method	Not used	Minor factor	Major factor
Partnering with an institution of higher education			
Contracting with a software vendor or other for-profit company that provides training in the use of technology in instruction.			
Providing teachers with the opportunity to participate in courses about the use of technology in instruction via the Internet, videoconferencing, or other form of distance learning strategy			
Sending teachers or technology leaders to technology-related training which is provided by The Ministry of National Education			
Having teachers or teacher teams develop new curriculum units that incorporate technology			
Sending teachers to workshops, conferences or summer institutes			
Other *(Please specify)*			

16. In your opinion, how well is your school able to meet teacher and other school staff needs for technology-related professional development?

- ☐ Very well
- ☐ Fairly well
- ☐ Not well at all

17. What is your percent estimate regarding how much the following individuals or groups contributed to professional development programs?

	None (0%)	Some (1-25%)	A moderate amount (26-50%)	Most (51-75%)	All or almost all (76-100%)
The technology coordinator					
Expert teachers or school administrators from within or outside your school					
Faculty or staff from institutions of higher education					
Business partners					
For-profit vendors					
Representatives from a volunteer organization					
An online professional development community or other online resource					
Students					
Other *(Please specify)*					

18. How significant is the role of each following forms of technology-related professional development in order to increase teachers' computer and the Internet use? *Answer each item below*

	Not significant	**Somewhat significant**	**Very significant**
Formal			
Workshops or institutes			
Conferences			
Courses offered by colleges			
On-line course participation			
Committees focusing on technology and curriculum			
In-service training programs implemented by the Ministry of National Education			
Informal			
Teacher collaborative or networks			
Individual learning in which teachers read journals or other professional publications, browse the Internet, etc.			
Participating in on-line networks or chat-rooms			
Informally working with peers, family, friends and on skills related to technology in teaching			
Other forms of professional development *(Please specify)*			

19. Check the level of technology-related professional development need of teachers at your school.

	No Need	**Some Need**	**Definitely Need**
Basic operating systems			
Desktop publishing			
Word processing			
Spreadsheets			
Databases			
Presentation programs			
Multimedia			
Internet browsers			
Scanning			
E-mail programs			
Imaging			
Web page creation			
Integrating technology into the curriculum			
Distance learning			
New ways that use technology to assess student			
Selecting good software			
Using software or technology activities			
Managing classroom activities that integrate technology			
Other *(Please specify)*			

PART VI: TECHNOLOGY AND INSTRUCTION

20. Who has primary responsibility for supporting educational technology in your school? *Check one*

- ☐ Teacher or other staff as part of formal responsibilities
- ☐ Volunteers (including teachers, other school staff, and community members)
- ☐ Consultant/outside contractor
- ☐ No one
- ☐ Other *(Please specify)* ____________________

21. Did your school receive hardware, software, or funding for educational technology from any following sources? Check all that apply

- ☐ The Ministry of National Education
- ☐ The World Bank
- ☐ School's sources
- ☐ Parents
- ☐ Organizations/ business
- ☐ Other *(Please specify)* ____________________

22. How many total computers, by type, are available to teachers, students or other school staff to use during class time?

Type of computer	Number available
Power Mac or Pentium with multimedia capabilities	
Other Apple/Macintosh or Other PC	

23. Check which technology resource your school has.

	Check here
Internet access	
Distance-learning programs	
A web site	
Video teleconference equipment	
Educational science software	

24. Approximately what proportion of the computers in your school is connected in the following ways?

	None	1-25 %	26-50 %	51-75 %	76-100 %
Linked to a local area network (LAN)					
Linked to a wide area network (WAN)					
Connected to the Internet					

25. To what extent are the following computer technology resources available to teachers in your school for educational use? *Check all that apply*

	Not available at all	Available in computer laboratory	Available in a few classrooms	Available in most or all classrooms
Desktop computer				
Laptop computer				
Printers				
CD-ROM drive				
CD-ROM read/write drive				
Computer microphones				
Computer speakers				
DVD drive				
Scanner				
Zip or similar drive				
Digital video camera				
Digital camera				
Computer projector				
Internet access from school				
Other *(Please specify)*				

26. Check the extent to which your school promotes teachers' computer use.

	Not at all	Somewhat	A great deal
We provide appropriate software to schools			
We recommend the computer use during the course of professional development activities			
We include the computer use in the curriculum			
We provide technical assistance at all schools			
We require educational technology training			
We offer optional educational technology training			
We provide trainers			
We provide mentor follow-ups to training			
We provide online support			
We partner with institutions of higher education			
We offer demonstrations			
Other *(Please specify)*			

27. Are there written policies regarding the appropriate use of computers and the Internet for the individuals below?

	Yes	No*
Teachers		
Students		

* *If the answer to Question 27 was "NO" for* <u>*both*</u> *teachers and students, please go to Question 29.*

28. Check the types of policies and/or procedures your school uses to ensure appropriate use of computers.

	Check here
Students must sign a "contract" agreeing to use computers for appropriate purposes	
Teachers use classroom management techniques to monitor use and instruct students on appropriate use	
Teachers receive professional development on the appropriate use of computer and the Internet in their classrooms	
Filters are installed on computers to limit the Internet access to certain forms of information	
Other *(Please specify)*	

PART V: EVALUATION OF TECHNOLOGY PLAN

29. Has the Ministry of National Education evaluated its past educational technology initiatives?

- ☐ Yes
- ☐ No

30. Does your school evaluate its technology-related professional development activities?

- ☐ Yes, and the results of the evaluation are made available
- ☐ Yes, but the results of the evaluation are not made available
- ☐ No

31. Check the barriers, listed below, that affect your school's ability to effectively use educational technology.

	Check here
Hardware Resources	
Insufficient number of computers	
Insufficient number of peripheral devices	
Internet Resource Quality	
Internet connection isn't fast or reliable enough for use during instruction	
A lack of age-appropriate or educationally-relevant websites for students	
A lack of Turkish educationally-relevant websites for students	
Software Resources	
A lack of age-appropriate or educationally-relevant software resources	
A lack of software products aligned with state standards	
Staff Resources	
Lack of trained technical staff available for product and service acquisition	
Lack of trained technical staff available for installation	
Lack of trained technical staff available for equipment maintenance	
Lack of administrative support	
Lack of adequately trained teachers or other instructional staff	
Lack of training opportunities for school staff	
Infrastructure	
Inadequate school building space	
Inadequate school building electric power supply and/or wiring	
Inadequate school building HVAC (heating, ventilation, air conditioning)	
Inadequate school building security	
Other *(Please specify)*	

PART VI: RESPONDENT BACKGROUND AND FINAL THOUGHTS

32. In what year did you first use a personal computer? ☐

33. How many years have you been using a personal computer for

a) Individual use.. ☐
b) Preparing instructional materials .... ☐
c) Administrative purposes .... ☐
d) Instructional use .... ☐
e) Communication with students and parents ...... ☐
f) Class Management .... ☐

34. How many years have you been using the Internet for

a) Individual use.......................................
b) Preparing Instructional Materials ....
c) Administrative purposes ....
d) Instructional use ....
e) Communication with students and parents ....
f) Class management....................................

35. For each item, indicate the level of significance each method in helping you learn to use the computer.

	Not significant	Somewhat significant	Very significant
My personal interest			
Family/friends/ students or teachers in my school			
Courses offered in your undergraduate education			
Technology –related professional development			
Courses offered by other schools or organizations			
Other *(Please specify)*			

36. Characterize your skill level in each of the following.

	Not familiar with	Beginner	Intermediate	Advanced
Basic operating systems				
Desktop publishing				
Word processing				
Spreadsheets				
Databases				
Presentation programs				
Multimedia				
Internet browsers				
Scanning				
E-mail programs				
Imaging				
Web page creation				
File Transfer Protocol (FTP)				
Electronic bulletin boards, listserv, newsgroups, etc.				
Other *(Please specify)*				

37. Check the training programs you have attended.

	Check here
The use of computers in teaching	
How to integrate technology into curriculum	
Distance learning	

38. Identify your gender. ☐ Female ☐ Male

39. Identify your age level. ☐ 20-29 ☐ 30-39 ☐ 40-49 ☐ 50-59

40. Identify your highest earned degree.

☐ School for teaching ☐ Bachelor ☐ Master ☐ Doctorate

41. How long have you been in your current (or similar) position?

- ☐ Less than one year
- ☐ 1-3 years
- ☐ 4-6 years
- ☐ 7-9 years
- ☐ 10 years and more

42. How long have you been employed within your current school?

- ☐ Less than one year
- ☐ 1-3 years
- ☐ 4-6 years
- ☐ 7-9 years
- ☐ 10 years and more

43. Do you think technology can provide practical benefits for teaching in general?

- ☐ Don't know / I am not sure
- ☐ No benefits
- ☐ Yes, in some cases
- ☐ Yes, in most cases

44. What is your school's budget for computer & the Internet such as buying computer, software, computer peripherals, and providing the Internet access, etc.? ☐ Turkish Lira

45. Do you think the school budget for computer & the Internet technology is enough for your school needs? ☐ Yes ☐ No

46. In your opinion, how educational technology will affect student academic performance in your school?

- ☐ I think educational technology will have a <u>negative impact</u> on students in my school.
- ☐ I think educational technology will have a <u>no impact</u> on students in my school.
- ☐ I think educational technology will have a <u>positive impact</u> on students in my school.

47. Indicate your level of agreement with each statement.

	Strongly disagree	Disagree	Agree	Strongly agree
Teachers don't have time to prepare lessons that include technology				
There is enough time in class to include technology in instruction				
A stipend would encourage teacher to participate in technology training				
More in-service training in technology should be made available for teachers				
Teachers need more training with curriculum and teaching strategies that integrate technology				
The school has age-appropriate or educationally relevant software in my subject area				
The school has software aligned with current science curriculum				
The school needs more software in science subject area				
There are enough computers in classrooms				
The school has enough projection devices such as large monitors, LCD panels, or computer projectors for class use				
The computers in the school are repaired in a timely manner				
Having a computer at the learning site where teachers teach would encourage teachers to use computers for educational purposes				
The administration supports use of computer in education				
Other *(Please specify)*				

48. Indicate your level of agreement with each statement below.

	Strongly Disagree	Disagree	Agree	Strongly Agree
I enjoy doing things on a computer				
I am tired of using a computer				
I will be able to get a good job if I learn how to use a computer				
I concentrate on using a computer				
I enjoy computer games very much				
I would work harder if I could use computers more often				
I think that it takes a long time to finish when I use a computer				
I can learn many things when I use a computer				
I enjoy lessons on the computer				
I believe that it is important for me to learn how to use a computer				
I think that computers are easy to use				
I feel comfortable working with a computer				
I get a sinking feeling when I think of trying to use a computer				
Working with a computer makes me nervous				
Using a computer is frustrating				
I will do as little work with computers as possible				
Computers are difficult to use				
Computers do not scare me at all				
I can learn more from books than from a computer				

I AM VERY GRATEFUL FOR YOUR TIME CONTRIBUTION TO THIS PROJECT. *If you have any questions about this survey, please contact me at neostl1@pitt.edu. All study participants will be notified of the availability of the final report once it is completed. Please use the space below to share any comments or thoughts you have about this survey.*

C. Science Teacher Computer and Internet Use (in English)

SCIENCE TEACHER COMPUTER & THE INTERNET USE

Dear Science Teachers,

I am a graduate student at University of Pittsburgh. This questionnaire has been developed as a part of my doctoral dissertation. It is designed to determine the status of the use of computers and Internet technology in secondary school science subject areas in Turkey. Your assistance in filling out the questionnaire will contribute to a better understanding of how computer and the Internet are currently used in secondary schools, as well as factors which are important for computer and the Internet use in Biology, Chemistry and Physics education.

Please complete the questionnaire as directed to the best of your ability, regardless of whether or not you use currently a computer. If you are unsure about how to answer some of the questions on the enclosed questionnaire, or if you think one or more teachers could answer the questions more accurately than you, please feel free to receive help for answering these questions.

Your identity and all responses to this questionnaire are strictly confidential, and results will be kept under lock and key. If you have any questions, you can reach me at meost11@pitt.edu. Moreover, all study participants will be notified about the final report when it is completed. I thank you in advance for your cooperation.

Sincerely,

Melike Ozer

The following questionnaires are modified to develop this instrument:

- Teacher Survey (Integrated Studies of Educational Technology, 2001)
- Survey of Teachers' Attitudes toward Computers (Christensen & Knezek,1998)
- Utilization of Computer Technology by Teachers at Carl Schurz High School in Chicago, Illinois (Harris, 2000)

Definitions

Bulletin board system– A computer that serves as a center for exchange of information for various interest groups (Sharp, 2002).

Distance learning/education – The transmission of information from one geographic location to another via various modes of telecommunications technology for educational purposes, including professional development (Integrated Studies of Educational Technology, 2001).

Educational Technology– A variety of technologies used to support instruction such as computers, telecommunications (the Internet, Local networks, etc.), digital cameras, peripheral devices, graphing calculators, and software (Integrated Studies of Educational Technology, 2001).

"Educational technology" refers to computer and Internet technology in this questionnaire.

E-mail – A system of transmitting messages over a communication network via the computer (Sharp, 2002).

File Transfer Protocol (FTP) –The basic Internet function that lets files be transferred between computers (Sharp, 2002).

Hardware –The physical components of the computer system, which includes the electronic components, monitor, disk drives, boards, wires, and peripherals, etc. (Sharp, 2002).

Internet – A worldwide system for linking smaller computer networks together, based on a packet system of information transfer using a common set of communication standards (Heinich et al, 1999). In other words, the Internet is a global network of computer networks (Botto, 1999).

Multimedia – Refers to a computer hardware and software system for the composition and display of presentations that incorporate text, audio, and still and motion images (Heinich et al, 1999). Multimedia refers to communication of more than one media type such as text, audio, graphics, animated graphics, and full-motion video (Sharp, 2002).

Software – A program that instructs the computer to perform various tasks (Sharp, 2002).

Videoconferencing – A multi-user chat in which the live images of the users are displayed on each participant's computer screen (Sharp, 2002).

INSTRUCTIONS

- Place an "X" in or write your responses in appropriate boxes.

Example 1:

	Not significant	Somewhat significant	Very significant
Education in my life is			X

Example 2: The year is 2003

- Always enter one response, unless directed otherwise.

PART I: SCHOOL INFORMATION

1. What is the name of your school?

   Identify the location of your school (City / town / village).

2. What subject (s) do you teach? ☐ Biology ☐ Chemistry ☐ Physics
3. The number of students in your smallest class is
4. The number of students in your largest class is
5. How many hours do you teach science per week?
6. The number of computers in classrooms you use is
7. The number of computers in computer laboratories you use is
8. The number of computers for educational use elsewhere in school is
9. If you have any problems regarding the use of computer and the Internet, where or to whom do you primarily turn for help? *Check all that apply*

	Check here
The school's computing support staff	
Your school technology coordinator	
Technology specialist in the district that serves your school part time	
The internet (e.g., technical support web site or chat room)	
Representative from hardware or software vendor	
Family and friends	
Students	
Other teachers	
Other *(Please specify)*	

10. How many days, on average, does it take to fix any problems regarding the educational technology in your school? [ ]

11. To what extent are the following educational technology resources available to teachers in your school for educational use? *Check all that apply*

	Not available at all	**Available in computer laboratory**	**Available in a few classrooms**	**Available in most or all classrooms**
Desktop computer				
Laptop computer				
Printers				
CD-ROM drive				
CD-ROM read/write drive				
Computer microphones				
Computer speakers				
DVD drive				
Scanner				
Zip or similar drive				
Digital video camera				
Digital camera				
Computer projector				
Internet access from school				
Other *(Please specify)*				

12. Check which technology resource your school has. *Check all that apply*

	Check here
Internet access	
Distance-learning programs	
A web site	
Video teleconference equipment	
Educational science software *	

* If *you don't have any educational science software, go to Question 14.*

13. List and identify the type of science educational science software you use.

List software	**Check how used**						
	Inquiry	**Simulation & Modeling**	**Drill & Practice**	**Game**	**Problem solving**	**Evaluation**	**Tutorial**

(Continue on back of page if necessary)

14. To what extent does your school use the following strategies to promote teachers' use of computer and Internet?

The school:	**Not at all**	**Somewhat**	**A great deal**
Provides teachers with educationally-relevant software			
Recommends the use of technology during professional development activities for teachers			
Includes the use of technology in the curriculum			
Provides school-based technical assistance			
Requires educational technology			
Offers training related to educational technology			
Provides educational technology trainers			
Provides adviser follow-up			
Provides online support			
Partners with institutions of higher education			
Offers demonstrations			
Other *(Please specify)*			

PART II: PERSONAL TECHNOLOGY BACKGROUND AND VIEWS

15. In what year did you first use a personal computer? ☐

16. How many years have you been using a personal computer for

a) Individual use... ☐
b) Preparing instructional materials .... ☐
c) Instructional use .... ☐
d) Communication with students and parents .... ☐
e) Class management...................................... ☐

17. How many years have you been using the Internet for

a) Individual use.. ☐
b) Preparing Instructional Materials .... ☐
c) Instructional use .... ☐
d) Communication with students and parents .... ☐
e) Class management.................................. ☐

18. Check which technology resources you have at home.

	Check here
Computer (PC or laptop)	
Internet access	
A web site	
Video teleconference equipment	
Educational science software	

19. For each item, indicate the level of significance each method in helping you learn to use the computer.

	Not significant	Somewhat significant	Very significant
My personal interest			
Family/friends/ students or teachers in my school			
Courses offered in my undergraduate education			
Technology–related professional development			
Courses offered by other schools or organizations			
Other *(Please specify)*			

20. Check the training programs you have attended.

	Check here
The use of computers in teaching	
How to integrate technology into curriculum	
Distance learning	

21. Characterize your skill level in each of the following.

	Not familiar with	Beginner	Intermediate	Advanced
Basic operating systems				
Desktop publishing				
Word processing				
Spreadsheets				
Databases				
Presentation programs				
Multimedia				
Internet browsers				
Scanning				
E-mail programs				
Imaging				
Web page creation				
File Transfer Protocol (FTP)				
Electronic bulletin boards, listserv, newsgroups, discuss groups				
Other *(Please specify)*				

22. Are there sufficient technology-related professional development opportunities to meet the teachers' needs at your school?

☐ Yes ☐ No

23. Would you say that the technology-related professional development opportunities are easily accessible?

☐ Yes ☐ No

24. To meet your needs regarding computer and the Internet use, about how many hours of professional development would you need to participate in over the next year? ☐

25. How significant is the role of each following forms of technology-related professional development in order to increase teachers' computer and the Internet use? *Answer each item below*

	Not significant	**Somewhat significant**	**Very significant**
Formal			
Workshops or institutes			
Conferences			
Courses offered by colleges			
On-line course participation			
Committees focusing on technology and curriculum			
In-service training programs implemented by the Ministry of National Education			
Informal			
Teacher collaborative or networks			
Individual learning in which teachers read journals or other professional publications, browse the Internet, etc.			
Participating in on-line networks or chat-rooms			
Informally working with peers, family, friends and on skills related to technology in teaching			
Other forms of professional development *(Please specify)*			

26. Check the level of emphasis on topics during the professional development program you attended.

	Not covered	If covered, how much emphasis? Low	Moderate	High
Basic operating systems				
Desktop publishing				
Word processing				
Spreadsheets				
Databases				
Presentation programs				
Multimedia				
Internet browsers				
Scanning				
E-mail programs				
Imaging				
Web page creation				
File Transfer Protocol (FTP)				
Electronic bulletin boards, listserv, newsgroups, etc.				
Other, *(Please specify)*				

27. Check the level of your technology-related professional development need.

	No need	Some need	Definitely need
Basic operating systems			
Desktop publishing			
Word processing			
Spreadsheets			
Databases			
Presentation programs			
Multimedia			
Internet browsers			
Scanning			
E-mail programs			
Imaging			
Web page creation			
Integrating technology into the curriculum			
Distance learning			
New ways that use technology to assess student			
Selecting good software			
Using available classroom software or technology activities			
Managing classroom activities that integrate technology			
Other *(Please specify)*			

28. Indicate your level of agreement with each statement below.

	Strongly disagree	Disagree	Agree	Strongly agree
I enjoy doing things on a computer				
I am tired of using a computer				
I will be able to get a good job if I learn how to use a computer				
I concentrate on using a computer				
I enjoy computer games				
I would work harder if I could use computers more often				
I think that it takes a long time to finish when I use a computer				
I can learn many things when I use a computer				
I enjoy lessons on the computer				
I believe that it is important for me to learn how to use a computer				
I think that computers are easy to use				
I feel comfortable working with a computer				
I get a sinking feeling when I think of trying to use a computer				
Working with a computer makes me nervous				
Using a computer is frustrating				
I will do as little work with computers as possible				
Computers are difficult to use				
Computers are valuable tools that can be used to improve the quality of education				
Computers do not scare me at all				
I can learn more from books than from a computer				

PART III: COMPUTER & THE INTERNET USE IN SCIENCE TEACHING

29. How frequently do you currently use computers for the following tasks? *Choose one for each item*

	Do not use	Less than once a month	A few times a month	A few times a week	Almost everyday or Daily
Personal use					
Preparing instructional materials					
Class management					
Instructional activities for students					
Assessment activities					
To communicate with students					
To communicate with students' parents					
To communicate with colleagues and /or other professionals					
Other *(Please specify)*					

30. How frequently do you currently use the Internet for the following tasks? *Check one for each item*

	Do not use	Less than once a month	A few times a month	A few times a week	Almost everyday or daily
Personal use					
Preparing instructional materials					
Distance learning					
Instructional activities for students					
Using e-mail to communicate with students					
Using e-mail to communicate with parents					
Using e-mail to communicate with colleagues and /or other professionals					
Attach files to e-mail					
Looking for educational sites on the Internet					
Using search engines to search for specific educational information					
Browsing the World Wide Web					
Publishing or revising a Web Page					
Participating in educational discussions on newsgroups or bulletin board systems					
Downloading or uploading files to and from file transfer protocol sites					
Locate references at an Internet libraries					
Low-cost internet telephony					
Videoconferencing					
Radio broadcasting					
Television broadcasting					
Other *(Please specify)*					

31. How frequently do you access computers at .*Check one for each item*

	Not Applicable	Never	Less than once a month	A few times a month	A few times a week	Almost everyday or daily
The site where you teach						
A site managed by the school but not where you teach						
Home						

32. How frequently do you use or take part in the following tasks? *Check one for each item*

	Do not use	**Less than once a month**	**A few times a month**	**A few times a week**	**Almost everyday or daily**
Word processing software, such as MS Word, to create tests, class materials, letters, etc.					
Grading software to calculate grades					
Spreadsheet software, such as Excel, to calculate grades, school/class statistics, etc.					
Presentation software, such as Power Point, to prepare classroom presentations					
Test generating software to create tests					
Desktop publishing software, such as MS Publisher, to create flyers, brochures, etc.					
Print Shop or Print Artist to create banners, flyers, and brochures, etc					
Preview educational software					
Scanner to scan instructional materials					
Accessing information on a CD-ROM, floppy disk or zip drive					
Using graphics software to create pictures					
Copying deleting files					
Installing a program on a hard disk					
Digital camera					
Computer Projector or LCD Panel for presenting instruction					
Other *(Please specify)*					

33. Since the beginning of this school year, how much classroom computer learning activities have been done in the following ways? *Choose one for each item*

	None	**Some**	**Most**	**All**
Whole class looks at the computer activity via overhead/LCD, large monitor, or computer projector				
Student teams or small groups work with computers within a class for an assigned project				
Individual students use computers for an assignment or school project				

34. Check the barriers, listed below, that affect your school's ability to effectively use of computers in education.

	Check here
Hardware Resources	
Insufficient number of computers	
Insufficient number of peripheral devices	
Internet Resource Quality	
Internet connection isn't fast or reliable enough for use during instruction	
A lack of age-appropriate or educationally-relevant websites for students	
A lack of Turkish educationally-relevant websites for students	
Software Resources	
A lack of age-appropriate or educationally-relevant software resources	
A lack of software products aligned with state standards	
Staff Resources	
Lack of trained technical staff available for product and service acquisition	
Lack of trained technical staff available for installation	
Lack of trained technical staff available for equipment maintenance	
Lack of administrative support	
Lack of adequately trained teachers or other instructional staff	
Lack of training opportunities for school staff	
Infrastructure	
Inadequate school building space	
Inadequate school building electric power supply and/or wiring	
Inadequate school building HVAC (heating, ventilation, air conditioning)	
Inadequate school building security	
Other *(Please specify)*	

35. Indicate your level of agreement with each statement.

	Strongly disagree	Disagree	Agree	Strongly agree
There is enough free time to prepare lessons that include technology				
There is enough time in class to include technology in instruction				
A stipend would encourage me to participate in technology training during my own time				
More in-service training in technology should be made available for teachers				
I need more training with curriculum and teaching strategies that integrate technology				
My school has age-appropriate or educationally relevant software in my subject area				
The school has software which is aligned with current science curriculum				
The school needs more software in my subject area				
There are sufficient number of computers in classrooms				
The school has enough projection devices such as large monitors, LCD panels, or computer projectors for class use				
The computers in my classrooms are repaired in a timely manner				
Having a computer at the learning site where teachers teach would encourage teachers to use computers for educational purposes				
The administration supports use of computers in education				
Other *(Please specify)*				

36. This is a list of reasons why teachers do not use the computer for educational purposes. How important is each reason for you?

	Not important	Slightly important	Important	Very important
I don't know how to use a computer				
I have no desire to use a computer				
I have a fear of the computer				
I can prepare instructional materials/lessons without a computer				
I can teach more efficiently without a computer using the traditional methods (Textual materials, blackboard, etc.)				
I have no time to prepare instructional materials/lessons using a computer				
I have no time to learn how to prepare instructional materials/ lessons using computer				
I need more computer training				
I have no computer at home				
I can't afford to buy a computer				
I do not have easy access to a computer at school				
I do not have timely help for technical problems				
I do not have a computer in my classroom				
I do not have enough computers in my classroom				
I do not have enough equipment and supplies				
I do not have an overhead/LCD, large monitor, or computer projector for the whole class to look at a computer activity				
There is no support from administration and other teachers				
I teach in too many classrooms				
My students have no desire to use a computer				
I do not have available software in my subject area				
I do not think that my subject area is appropriate for using a computer				
I do not know how to integrate computers in my subject area				
Computer response time is too slow				
I don't have computers connected to Internet				
Computers are not up-to-dated				
There is no enough Turkish educationally-relevant websites				

PART IV: DEMOGRAPHICS

37. Indicate the grade level(s) you primarily teach science. *Check all that apply*

Grades	Prepatory	9	10	11	12

38. Identify your gender.

☐ Female ☐ Male

39. Identify your age level.

☐ 20-29 ☐ 30-39 ☐ 40-49 ☐ 50-59

40. Identify your highest earned degree.

☐ Teacher High Schools ☐ Bachelor ☐ Masters ☐ Doctorate

41. What is your educational background (What is your major)?

☐

42. In June of 2003, how many years of teaching will you have? ☐

43. How many years have you taught in your present school? ☐

44. How many hours do you teach per week? ☐

I AM VERY GRATEFUL FOR YOUR TIME CONTRIBUTIONS TO THIS PROJECT. *If you have any questions about this survey, please contact me at meostl1@pitt.edu. All study participants will be notified of the availability of the final report once it is completed. Please use the space below to share any comments or thoughts you have about this survey.*

____

____

____

____

D. Computer and Internet Use: School Survey (in Turkish)

BİLGİSAYAR VE İNTERNET KULLANIMI: Okul anketi

Sayın Yönetici,

Şu anda Pittsburgh Üniversitesi'nde doktora öğrenimime devam etmekteyim. Elinizdeki anket doktora tezi çalışmamın bir parçası olarak hazırlanmıştır. Bu çalışmanın amacı ortaöğretim okullarında okutulan fen bilimleri (biyoloji, kimya ve fizik) derslerinde bilgisayar ve İnternet teknolojisi kullanımıyla ilgili faktörleri belirlemektir. Araştırmada günümüzde okullarda biyoloji, kimya, fizik alanlarında bilgisayar ve İnternet kullanımı incelenecektir. Anketi tamamlama konusunda göstereceginiz yardım günümüzde bilgisayar ve İnternet'in eğitim amaçlı ortaöğretim kurumlarında nasıl kullanıldığını daha iyi anlamak ve okullarımızda fen bilimleri eğitiminde bilgisayar kullanımını etkileyen faktörleri belirlemek açısından oldukça önem taşımaktadır.

Şu anda bilgisayar ve İnternet kullanmıyor olsanız bile lütfen ekteki anketi elinizden geldiğince tamamlamaya çalışınız. Anketteki bazı soruların cevabından emin değilseniz ya da sorunun okulunuzda çalışan başka birisi tarafından daha doğru bir şekilde cevaplanacağını düşünüyorsanız bu tür soruları cevaplamada söz konusu kişi ya da kişilerden yardım almaktan lütfen çekinmeyiniz.

Kimlik bilgileriniz ve sorulara vereceğiniz cevaplar kesinlikle saklı tutulacak, anket çalışması kilitli bir odada ve kilitli bir dolapta muhafaza edilecektir. Herhangi bir sorunuz olduğunda meost11@pitt.edu adresinden bana ulaşabilirsiniz. Araştırma tamamlandıktan sonra araştırma sonucu tüm katılımcılara gönderilecektir. Şimdiden göstermiş olduğunuz işbirliği için teşekkür ediyorum.

Saygılarımla,

Melike Özer

Söz konusu anketi geliştirmede aşağıdaki çalışmalardan yararlanılmıştır.

- Okul anketi (Integrated Studies of Educational Technology, 2000)
- Ziraat Fakültelerinde eğitim teknolojilerinin kullanımı anketi (Hogle,1999)
- Öğretmenlerin bilgisayara karşı tutum anketi (Christensen & Knezek,1998)
- Bölge teknoloji koordinatör anketi (Integrated Studies of Educational Technology, 2001)

Tanımlar

Uzaktan Öğrenim/ Eğitim – Eğitim amaçlı bir bilginin bir bölgeden bir başka bölgeye çeşitli telekominikasyon teknolojilerinin kullanılarak aktarılması (Integrated Studies of Educational Technology, 2001).

Eğitim Teknolojisi– Eğitimi destekleme amaçlı kullanılan her türlü teknolojik alet ve ekipmanlar örneğin bilgisayar, telekominikasyon (İnternet, yerel ağ sistemleri (network), vs), dijital kameralar, yazıcı, grafikli hesap makinaları, ve yazılımlar, vs (Integrated Studies of Educational Technology, 2001).

Bu ankette "Eğitim teknolojisi" bilgisayar ve İnternet teknolojisi olarak kullanılmıştır.

Donanım – Elektronik parçalar, ekran, sürücü, vb bilgisayar sistemini oluşturan fiziksel parçaların tümü (Sharp, 2002).

İnternet – Bilgi aktarımında ortak kominikasyon standartlarını kullanarak küçük bilgisayar ağlarını bir araya getiren dünya çapındaki bir ağ sistemi (Heinich et al, 1999). Diğer bir deyişle, İnternet bilgisayar ağlarından oluşan küresel ağ sistemi olarak tanımlanabilir (Botto, 1999).

Yerel ağ (LAN) – Diğer ağlarlada bağlantısı olabilen, yerel bir sistem içindeki (genelikle aynı bina içinde) bilgisayarlar, ve bilgisayarla ilgili ekipmanlar arasında bağlantıyı sağlayan ağ sistemi (Heinich et al, 1999).

Çoklu ortam – Ses, video, görüntü ve yazılı metnin birlikte kullanıldığı bilgisayar donanım ve yazılım sistemi (Heinich et al, 1999). Diğer bir deyişle çoklu ortam uygulamaları, yazılı metin, ses, grafik, video, vb. ortamların birlikte kullanılmasını ifade eder (Sharp, 2002).

Bilgisayar ağı – İki ya da daha fazla bilgisayarın birbirine bağlanmasıyla oluşturulmuş kominikasyon sistemi (Heinich et al, 1999).

Bilgisayar çevre birimleri – Yazıcı, klavye, ve disket gibi mikroişlemciye bağlı olan ve diğer Mikroişlemcilerle bilgi alış-verişinde bulunan aksesuarlar (Heinich et al, 1999).

Yazılım – Bilgisayarın belirli işlevleri yerine getirmesi için özel olarak hazırlanmış program (Sharp, 2002).

Video-konferans – Birden fazla kullanıcının bilgisayar aracılığıyla görüşebildikleri ve kullanıcıların canlı görüntülerinin diğer kullanıcılar tarafından ekran üzerinde görülebildigi bir çeşit konferans (Sharp, 2002).

Geniş alanlı ağ sistemi (WAN) – Bir ülke gibi oldukça büyük coğrafi alanları kapsayan bir çeşit kominikasyon ağı

AÇIKLAMA

- Lütfen uygun olan seçeneği "X" ile işaretleyiniz veya gereken sorularda cevabınızı uygun kutucuklara yazınız.

Örnek 1:

	Önemli değildir	Önemlidir	Çok önemlidir
Hayatımda eğitimin yeri			X

Örnek 2: İçinde bulunduğumuz yıl [2003]

- Aksi belirtilmedikçe seçeneklerden sadece birisini seçiniz.

BÖLÜM I: OKUL İLE İLGİLİ BİLGİLER

1. Okulunuzun adı [ ]

   Okulunuzun bulunduğu yer (İl/ilçe/ köy) [ ]

2. Okulunuzdaki toplam öğrenci sayısı [ ]
3. Okulunuzdaki toplam öğretmen sayısı [ ]
4. Okulunuzdaki toplam fen bilimleri (biyoloji, kimya, fizik) öğretmeni sayısı [ ]
5. Okulunuzun bilgisayar laboratuvarlarında bulunan toplam bilgisayar sayısı [ ]
6. Okulunuzda sınıflarda bulunan ve eğitim amaçlı kullanılan toplam bilgisayar sayısı [ ]
7. Okulunuzda sınıfların ve bilgisayar laboratuvarların dışında bulunan ve eğitim amaçlı kullanılan bilgisayar sayısı [ ]
8. Okul idaresi tarafından kullanılan bilgisayar sayısı [ ]

BÖLÜM II: TEKNOLOJİ PLANLANMASI

9. Okulunuz eğitim teknolojilerinin satın alımı ve kullanımı ile ilgili yazılı bir plana sahip midir?
   Seçeneklerden birisini işaretleyiniz

   ☐ Evet, okulumuzda özel geliştirilmiş bir planımız mevcuttur
   ☐ Evet, okulumuzda Milli Eğitim Bakanlığı tarafından geliştirilen plan kullanılmaktadır
   ☐ Evet, Milli Eğitim Bakanlığı tarafından geliştirilen plan okulumuza uyarlanıp çeşitli değişiklikler yapılarak kullanılmaktadır
   ☐ Hayır, bu konuda geliştirilmiş yazılı bir planımız mevcut değildir

10. Okulunuzda eğitim teknolojilerinin kullanımı ile ilgili olarak ana hedefler nelerdir?

	"X"
Öğretmenlere teknoloji kullanımı konusunda hizmet içi eğitim sağlamak	
Öğretmenlere teknoloji ile mevcut müfredatlarını tümleştirme konusunda hizmet içi eğitim sağlamak	
Öğretmenlerin hizmet içi eğitiminde teknolojiden faydalanmak (örneğin uzaktan öğrenim metotlarını kullanarak öğretmenlere hizmet içi eğitim verilmesi)	
Öğretmenlere teknik destek sağlamak (örneğin bilgisayar, video veya ağ teknolojileri konusunda yardımcı olmak üzere uzman personel sağlamak)	
Sınıf içinde modern bilgisayar sayısını arttırmak	
İnternete bağlı bilgisayar sayısını arttırmak	
Eğitimin her alanında kullanılabilecek çeşitli yazılımlar ve online (çevrim içi) kaynaklar sağlamak (örneğin alıştırma, oyun ve anlatım yazılımları)	
Öğrencilerin eğitim teknolojileri konusundaki bilgi ve becerilerini arttırmak	
Öğrencilerin akademik başarısını arttırmak	
Okul aile işbirliğini desteklemek (örneğin ailelerle olan iletişimi arttırmak, okul takvimini ailelere göndermek, öğrencilerin sınav sonuçlarını ailelere bildirmek)	
Yönetimin etkinliğini arttırmak (örneğin kayıt tutma ve izleme sisteminde teknolojiden faydalanmak)	
Diğer *(Lütfen belirtiniz)*	

11. Okulunuz teknoloji konusunda uzmanlık, eğitim ve teknolojinin kullanımı ile ilgili konularda yönetici, öğretmen ve öğrenciler için hazırlanmış teknoloji standartlarına sahip midir?

	Evet	**Hayır**
Yöneticiler		
Öğretmenler		
Öğrenciler		

BÖLÜM III: TEKNİK DESTEK VE HİZMET İÇİ EĞİTİM

12. Okulunuz aşağıda belirtilen teknik desteklerden hangilerine sahiptir?

	"X"
Bilgisayar ağlarının, ekipmanlarının ve çevre birimlerinin kurulması konusunda	
Bilgisayar ağında, bilgisayarda ve çevre birimlerinde meydana gelen sorunların çözümü ve genel bakımı konusunda	
İşletim sistemlerinin ve yazılımların kurulması konusunda	
İşletim sistemi ve yazılımla ilgili sorunların çözümlenmesi konusunda	
Öğretmenlerin teknolojiyi mevcut müfredatlar ile tümleştirmelerine yardımcı olma konusunda	
Okul için gerekli donanım, yazılım ve destek malzemelerinin alınması ve seçimi konusunda	
Diğer *(Lütfen belirtiniz)*	

13. Aşağıda belirtilen kaynaklardan ne tür teknolojik destek almaktasınız? *Uygun olan tüm seçenekleri işaretleyiniz*

	Destek alınmıyor	**Bilgisayar donanım, çevre birimleri veya yazılımları**	**İnternet bağlantısı**	**Teknolojik destek veya eğitim**	**Eğitim teknolojisinin planlanması**	**Diğer***
Şirketler						
Milli Eğitim Bakanlığı, diğer resmi kuruluşlar						
Kar amaçlı olmayan kurumlar						
Üniversiteler						
Teknoloji koordinatörü						
Öğrenci aileleri						
Okul yönetimi						
Öğretmenler						
Diğer okul çalışanları						
Öğrenciler						
Diğer *(Lütfen belirtiniz)*						

* Eğer "Diğer" seçeneğini işaretlediyseniz *lütfen almış olduğunuz teknolojik desteğin türünü ve kaynağını belirtiniz.*

Kaynak	**Alınan teknolojik destek**
______________________	______________________
______________________	______________________
______________________	______________________
______________________	______________________
______________________	______________________
______________________	______________________

14. Konu alanlarına göre okulunuzdaki öğretmenlerin yaklaşık ne kadarı teknoloji ile ilgili herhangi bir hizmet içi eğitim programına katılmıştır? *Her öğretmen grubu için uygun olan seçeneği işaretleyiniz*

	Hiçbiri ya da hemen hemen hiçbiri	**Bir kısmı**	**Çoğu**	**Tümü ya da hemen hemen tümü**
Sınıf öğretmenleri				
Matematik öğretmenleri				
Türkçe/ edebiyat/ yabancı dil öğretmenleri				
Fen bilimleri öğretmenleri				
Sosyal bilimler öğretmenleri				
Diğer *(Lütfen belirtiniz)*				

15. Öğretmenlerinizin bilgisayar ve İnternet kullanımını arttırmak amacıyla geçen eğitim yılı içinde düzenlenen teknoloji ile ilgili hizmet içi eğitim metodlarının ne kadar etkili olduğunu belirtiniz.

Metod	Kullanılmıyor	Az etkili	Çok etkili
Üniversitelerle birlikte çalışmak			
Eğitimde teknolojinin kullanımı ile ilgili eğitim veren özel şirketlerle ya da yazılım şirketlerinin temsilcilikleriyle anlaşmak			
Öğretmenlere İnternet, video konferansı veya diğer uzaktan eğitim teknikleri yardımıyla eğitimde teknolojinin kullanımı ile ilgili kurslara katılma olanağını sağlamak			
Öğretmenleri veya teknoloji koordinatörlerini Milli Eğitim Bakanlığı'nın düzenlemiş olduğu teknoloji ile ilgili hizmet içi eğitim programlarına göndermek			
Öğretmenlerin teknoloji ile tümleştirilmiş yeni ders programları geliştirmelerini sağlamak			
Öğretmenleri teknoloji ile ilgili seminerlere konferanslara göndermek			
Diğer *(Lütfen belirtiniz)*			

16. Öğretmenlerinizin veya diğer okul personelinizin teknoloji ile ilgili eğitim ihtiyacını karşılamada okulunuzun çalışmalarını nasıl buluyorsunuz?

☐ Çok iyi

☐ İyi

☐ Kötü

17. Aşağıdaki birey yada grupların teknoloji ile ilgili hizmet içi eğitime katkıları yaklaşık olarak ne orandadır?

	Yardım alınmadı (0%)	Biraz (1-25%)	Orta seviyede (26-50%)	Çoğunlukla (51-75%)	Tümü ya da hemen hemen tümü (76-100%)
Teknoloji koordinatörü					
Okulunuzdan veya okul dışından uzman öğretmenler ya da okul idarecileri					
Yüksek eğitim kurumlarındaki kişiler					
Birlikte çalışılan şirketler					
Ticari firma temsilcileri					
Gönüllü örgütlerin temsilcileri					
İnternete bağlı hizmet içi eğitim grupları ya da diğer çevrim içi kaynaklar					
Öğrenciler					
Diğer *(Lütfen belirtiniz)*					

18. Öğretmenlerin bilgisayar ve İnternet kullanımını arttırmak amacıyla uygulanan teknoloji ile ilgili hizmet içi eğitim metodları ne derecede önemlidir?

	Önemli değil	Önemli	Çok önemli
Resmi			
Seminerler veya çalışma grupları			
Konferanslar			
Üniversiteler tarafından yürütlen dersler			
İnternet aracılığıyla alınan derslere katılım			
Teknoloji ve müfredat üzerinde çalışan komiteler			
Milli Eğitim Bakanlığı tarafından düzenlenen hizmet içi eğitim programları			
Resmi olmayan			
Öğretmen grupları			
Çeşitli yayınların okunması ya da İnternetten ilgili bilgilere ulaşma şeklindeki kişisel öğrenme			
Konu ile ilgili İnternet gruplarına veya sohbet odalarına katılmak			
Öğretimde teknolojinin kullanımıyla ilgili iş, aile veya arkadaş çevresinden kişilerle birlikte çalışma			
Diğer eğitim metodları *(Lütfen belirtiniz)*			

19. Okulunuzdaki öğretmenlerin aşağıdaki konularda bir eğitime ihtiyaçları olduğunu düşünüyormusunuz?

	İhtiyaçları yok	Bazı konularda eksiklikleri var	Bu konuda kesinlikle bir eğitime ihtiyaçları var
İşletim sistemi			
Masaüstü yayımcılık			
Kelime işlemcisi			
Çizelge işlemcisi			
Veritabanı			
Sunum programları			
Çoklu ortam			
İnternet tarayıcıları			
Tarama			
Elektronik-posta programları			
Görüntüleme			
Web sayfası tasarımı			
Mevcut müfredat ile teknolojinin tümleştirilmesi			
Uzaktan eğitim			
Öğrencilerin değerlendirilmesinde teknolojinin kullanıldığı yeni metodlar			
Uygun yazılımların seçimi			
Sınıf içi yazılımlarının ya da teknolojik etkinliklerin kullanımı			
Sınıf yönetimi etkinliklerinde teknoloji kullanımı			
Diğer *(Lütfen belirtiniz)*			

BÖLÜM VI: TEKNOLOJİ VE ÖĞRETİM

20. Okulunuzda eğitim teknolojisinden sorumlu kişi kimdir? *Uygun olan bir seçeneği işaretleyin*

- ☐ Görevlendirilmiş bir öğretmen ya da okul personeli
- ☐ Gönüllü bir kişi(öğretmen, okul personeli, veya halktan birisi)
- ☐ Danışman /dışarıdan hizmet veren kuruluş ya da kişiler
- ☐ Hiç kimse
- ☐ Diğer *(Lütfen belirtiniz)* ____________________

21. Okulunuz hangi kaynaklardan donanım, yazılım veya eğitim teknolojisi için parasal destek almıştır? *Uygun olan tüm seçenekleri işaretleyiniz*

- ☐ Milli Eğitim Bakanlığı
- ☐ Dünya Bankası
- ☐ Okul kaynakları
- ☐ Veliler
- ☐ Örgütler / şirketler
- ☐ Diğer *(Lütfen belirtiniz)* ____________________

22. Öğretmen, öğrenci veya diğer okul personeli tarafından öğretim amaçlı kullanılan bilgisayarların toplam sayısı ve türü nedir?

Bilgisayar türü	**Bilgisayar sayısı**
Çoklu ortam özelliklerine sahip Power Mac veya Pentium	
Apple/Macintosh veya diğer kişisel bilgisayarlar	

23. Okulunuz aşağıdakilerden hangisine sahiptir?

	"X"
İnternet bağlantısı	
Uzaktan eğitim programları	
Web sayfası	
Video-telekonferans ekipmanları	
Fen bilimleri ile ilgili yazılımlar	

24. Okulunuzda bulunan bilgisayarların yaklaşık yüzde kaçı aşağıda belirtilen şekilde bir ağ sistemine sahiptir?

	Hiçbiri	**% 1-25**	**% 26-50**	**% 51-75**	**% 76-100**
Yerel ağ sistemine (LAN) bağlı					
Geniş alanlı ağ sistemine (WAN) bağlı					
İnternete bağlı					

25. Aşağıdaki eğitim teknolojisi araçlarından hangileri öğretmenler tarafından kullanılmak üzere okulunuzda bulunmaktadır? *Uygun olan seçeneği işaretleyiniz*

	Bulunmuyor	**Bilgisayar laboratuvarında var**	**Bazı sınıflarda var**	**Çoğu sınıfta ya da tüm sınıflarda var**
Masaüstü bilgisayar				
Dizüstü bilgisayar				
Yazıcı				
CD-ROM sürücü				
CD-ROM yazıcı				
Bilgisayar mikrofonu				
Bilgisayar hoperlörü				
DVD sürücü				
Tarayıcı				
Zip veya benzer sürücüler (yedekleme üniteleri)				
Dijital video kamera				
Dijital kamera				
Bilgisayar projektörü				
İnternet bağlantısı				
Diğer *(Lütfen belirtiniz)*				

26. Öğretmenlerin bilgisayar kullanmalarını arttırmak için okulunuz aşağıdaki stratejileri ne oranda uygulamaktadır?

	Uygulanmıyor	**Bazen**	**Çoğunlukla**
Öğretmenlere eğitimle ilgili yazılımlar temin etmek			
Kariyer geliştirme etkinliklerinde öğretmenlere teknolojiyi kullanmalarını önermek			
Müfredata teknoloji kullanımını eklemek			
Teknik destek sağlamak			
Eğitim teknolojisini zorunlu tutmak			
Eğitim teknolojisi ile ilgili hizmet içi eğitim olanakları sunmak			
Eğitim teknolojisi ile ilgili uzman kişiler bulmak			
Uzman kişiler tarafından bilgisayar kullanımını takip etmek			
Online (çevrim içi) destek sağlamak			
Yüksek eğitim kurumları ile birlikte çalışmak			
Örnek gösterimler sunmak			
Diğer *(Lütfen belirtiniz)*			

27. Okulunuzda öğretmen ve/ veya öğrencilerin bilgisayar ve İnterneti uygun şekilde kullanmaları ile ilgili yazılı bir talimat var mıdır?

	Evet	**Hayır***
Öğretmen		
Öğrenci		

** Eğer 27. soruya öğretmenler ve öğrenciler için "HAYIR"cevabını vermişseniz lütfen 29. soruya geçiniz*

28. Bilgisayarın uygun şekilde kullanılmasını sağlamak amacıyla okulunuz ne tür yöntemler kullanmaktadır?

	"X"
Öğrencilere bilgisayarı uygun şekilde kullanacaklarına dair bir belge imzalatmak	
Öğretmenlerin sınıf yönetimi tekniklerini kullanarak öğrencilerin bilgisayarı uygun şekilde kullanıp kullanmadıklarını izlemek	
Öğretmenlere sınıf içinde bilgisayar ve İnternetin uygun şekilde kullanımı ile ilgili eğitim vermek	
Bilgisayara belirli sayfalara İnternet bağlantısını engelleyen filtreler koymak	
Diğer *(Lütfen belirtiniz)*	

BÖLÜM V: TEKNOLOJİ PLANININ DEĞERLENDİRİLMESİ

29. Milli Eğitim Bakanlığı tarafından eğitim teknolojisi ile ilgili programların değerlendirilmesi yapılıyor mu?

☐ Evet ☐ Hayır

30. Okulunuz tarafından teknoloji ile ilgili eğitim programlarının bir değerlendirmesi yapılıyor mu?

☐ Evet, değerlendirme sonuçları incelemeye açıktır

☐ Evet, fakat bu değerlendirme sonuçları incelemeye kapalıdır

☐ Hayır

31. Okulunuzda eğitim teknolojilerinin etkili bir biçimde kullanılmasında aşağıdaki hangi sorunlarla karşılaşılmıştır?

	"X"
Donanım	
Bilgisayarların sayıca yetersiz olması	
Çevre birimlerinin yetersiz olması	
İnternet	
İnternet bağlantısının öğretimde kullanmaya uygun hızda ve süreklilikte olmaması	
Öğrencilerin yaş düzeylerine uygun veya içerik olarak eğitimde kullanılabilecek web sayfalarının bulunmaması	
Eğitim amaçlı kullanılabilecek öğrenciler için uygun türkçe web sayfalarının bulunmaması	
Yazılım	
Öğrencilerin yaş düzeylerine uygun veya içerik olarak uygun yazılımların bulunmaması	
Milli Eğitm Bakanlığı standartlarına uygun yeterli yazılımın bulunmaması	
Personel	
Bilgisayar ve çevre birimlerinin alımı konusunda uzman personelin olmaması	
Bilgisayar ve çevre birimlerinin kurulması konusunda uzman personelin olmaması	
Bilgisayar ve çevre birimlerinin bakımı ve tamiri konusunda uzaman personelin olmaması	
Okul idaresi desteğinin olmaması	
Yeterli bilgi ve beceriye sahip öğretmen veya uzman personelin olmaması	
Okul personeli için yeterli hizmet içi eğitim olanaklarının olmaması	
Okul Binası	
Okul binasında bilgisayarlar için yeterli alanının bulunmaması	
Okul binasının elektirik kaynağının ve kablo sisteminin uygun olmaması	
Okul binasının ısıtma, havalandırma ve klima sisteminin uygun olmaması	
Okul binasının güvenliğinin yeterli olmaması	
Diğer *(Lütfen belirtiniz)*	

BÖLÜM VI: KİŞİSEL DENEYİMİNİZ VE GÖRÜŞLERİNİZ

32. Bilgisayarı ilk olarak hangi yılda kullandınız? [ ]

33. Aşağıda belirtilen amaçlar için bilgisayarı kaç yıldır kullanıyorsunuz?

a) Kişisel kullanım.. [ ]
b) Öğretim materyallerinin hazırlanması.............................. [ ]
c) İdari amaçlar.. [ ]
d) Sınıf içi öğretim... [ ]
e) Öğrenci ve velilerle iletişim... [ ]
f) Sınıf yönetimi.. [ ]

34. Aşağıda belirtilen amaçlar için İnterneti kaç yıldır kullanıyorsunuz?

a) Kişisel kullanım .... [ ]

b) Öğretim materyallerinin hazırlanması .... [ ]

c) İdari amaçlar .... [ ]

d) Sınıf içi öğretim .... [ ]

e) Öğrenci ve velilerle iletişim .... [ ]

f) Sınıf yönetimi .... [ ]

35. Bilgisayar kullanmayı öğrenmenizde aşağıda belirtilenler ne derece önemlidir?

	Önemli değil	**Biraz önemli**	**Çok önemli**
Kişisel ilgim			
Aile/arkadaş/öğrenciler veya okulumdaki diğer öğretmenler			
Lisans eğitimim sırasında almış olduğum dersler			
Teknoloji ile ilgili hizmet içi eğitim programları			
Başka okul veya örgütler tarafından yürütülen dersler			
Diğer *(Lütfen belirtiniz)*			

36. Aşağıda belirtilen konular hakkındaki bilgi düzeyiniz nedir?

	Bilmiyorum	**Başlangıç seviyesinde**	**Orta Seviyede**	**İleri seviyede**
İşletim sistemleri				
Masaüstü yayımcılık				
Kelime işlemcisi				
Çizelge işleme				
Veritabanı				
Sunum programları				
Çoklu ortam				
İnternet				
Tarama				
Elektronik posta programları				
Görüntüleme				
Web sayfası tasarımı				
Dosya Transfer Protokolleri (FTP)				
İnternet ortamında olan kısa haber panoları, haber grupları, tartışma grupları,vs.				
Diğer *(Lütfen belirtiniz)*				

37. Aşağıdaki konu/konular hakkında herhangi bir eğitim programına katıldınız mı?

	"X"
Öğretimde bilgisayar kullanımı	
Teknolojinin müfredatla tümleştirilmesi	
Uzaktan eğitim	

38. Cinsiyetiniz: ☐ Kadın ☐ Erkek

39. Yaşınız: ☐ 20-29 ☐ 30-39 ☐ 40-49 ☐ 50-59

40. Öğrenim durumunuz: ☐ Öğretmen okulu ☐ Lisans ☐ Yüksek Lisans ☐ Doktor

41. Hizmet süreniz:
- ☐ 1 yıldan az
- ☐ 1-3 yıl
- ☐ 4-6 yıl
- ☐ 7-9 yıl
- ☐ 10 yıl veya daha fazla

42. Bu okuldaki çalışma süreniz:
- ☐ 1 yıldan az
- ☐ 1-3 yıl
- ☐ 4-6 yıl
- ☐ 7-9 yıl
- ☐ 10 yıl veya daha fazla

43. Teknolojinin genel olarak öğretimde pratik yararlar sağlayacağını düşünüyor musunuz?
- ☐ Bilmiyorum / emin değilim
- ☐ Yarar sağlamaz
- ☐ Bazı durumlar da yarar sağlayacağını düşünüyorum
- ☐ Bir çok durum için yarar sağlayacağını düşünüyorum

44. Bilgisayar alımı, yazılım, çevre birimleri, İnternet bağlantısı gibi bilgisayar ve İnternet için ayrılan okul bütçeniz kaç liradır? ☐

45. Bilgisayar ve İnternet için ayrılan okul bütçesi okul ihtiyaçlarını karşılama bakımından yeterli midir?

☐ Evet ☐ Hayır

46. Eğitim teknolojisinin okulunuzdaki öğrencilerin başarısını nasıl etkileyeceğini düşünüyorsunuz?

- ☐ Öğrenciler üzerinde <u>olumsuz</u> bir etkisi olacağını düşünüyorum
- ☐ Öğrenciler üzerinde herhangi bir etkisi olacağını düşünmüyorum
- ☐ Öğrenciler üzerinde <u>olumlu</u> bir etkisi olacağını düşünüyorum.

47. Aşağıdaki cümleler hakkındaki görüşünüzü seçeneklerden uygun olanını işaretleyerek belirtiniz.

	Kesinlikle katılmıyorum	Katılmıyorum	Katılıyorum	Kesinlikle katılıyorum
Öğretmenlerin teknoloji içeren dersleri hazırlamak için yeterli zamanları yoktur				
Ders süresi öğretimde teknolojiyi kullanmak için yeterlidir				
Öğretmenlere verilecek mesai ücreti çalışma saatleri dışında teknoloji ile ilgili hizmet içi eğitimine katılmaları konusunda teşvik edici olacaktır				
Öğretmenlere yönelik teknoloji ile ilgili hizmet içi eğitim programları arttırılmalıdır				
Teknolojinin müfredat ve öğretim stratejileri ile tümleştirilmesi konusunda daha fazla hizmet içi eğitimine ihtiyaç vardır				
Okulumuz fen bilimleri alanında öğretim amaçlarımıza ve öğrencilerin yaş düzeyine uygun yeterli yazılıma sahiptir				
Okulumuz mevcut fen bilimleri müfredatı ile uyumlu yazılımlara sahiptir				
Okulumuz fen bilimleri alanında daha fazla yazılıma ihtiyaç duymaktadır				
Sınıflarımızda yeterli sayıda bilgisayar bulunmaktadır				
Okulumuzda sınıfta kullanmak üzere yeterli sayıda büyük ekran, LCD paneli veya bilgisayar projektörü gibi araçlar bulunmaktadır				
Okulda kullanılan bilgisayarlardaki sorunlar zamanında çözümlenmektedir				
Sınıf içerisinde bilgisayar olması öğretmenlerin öğretimde bilgisayar kullanmalarını teşvik edecektir				
Okul idaresi öğretimde bilgisayar kullanımı desteklemektedir				
Diğer *(Lütfen belirtiniz)*				

48. Aşağıda belirtilen görüşlere katılıp katılmadığınızı seçeneklerden uygun olanını işaretleyerek belirtiniz

	Kesinlikle katılmıyorum	Katılmıyorum	Katılıyorum	Kesinlikle katılıyorum
Bilgisayarda birşeyler yapmaktan zevk alıyorum				
Benim için bilgisayar kullanmak sıkıcı				
Bilgisayar kullanmayı öğrenirsem iyi bir iş bulabilirim				
Bilgisayar kullanmaya çaba gösteriyorum				
Bilgisayar oyunlarından zevk alıyorum				
Eğer bilgisayarı daha sık kullansaydım daha çok çalışmam gerekecekti				
Bilgisayar kullandığımda bir işi bitirmek daha çok zamanımı alıyor				
Bilgisayar kullandığımda bir çok şey öğrenebiliyorum				
Bilgisayar kullanılan dersleri seviyorum				
Bilgisayar kullanmayı öğrenmek benim için önemlidir				
Bilgisayar kullanmanın kolay olduğunu düşünüyorum				
Bilgisayarla çalışma konusunda kendimi rahat hissediyorum				
Bilgisayar kullanmayı düşündüğümde kendimi kötü hissediyorum				
Bilgisayarda çalışmak bana sıkıntı veriyor				
Bilgisayar kullanmak oldukça sinir bozucu				
Bilgisayarı mümkün olduğunca az kullanırım				
Bilgisayar kullanmak zordur				
Bilgisayarlar beni korkutmuyor				
Bilgisayara kıyasla, kitaplardan daha fazla öğrenebiliyorum				

PROJEYE ZAMAN AYIRDIĞINIZ İÇİN TEŞEKKÜRLER. *Bu anket hakkındaki her türlü sorularınız için neost11@pitt.edu adresinden Melike Özer'le görüşebilirsiniz.. Çalışma tamamlandıktan sonra çalışma sonucu tüm katılımcılara gönderilicektir. Anket hakkındaki eleştiri ve görüşlerinizi lütfen aşağıda belirtiniz*

E. Science Teacher Computer and Internet Use (in Turkish)

FEN BİLİMLERİ ÖĞRETMENLERİNİN BİLGİSAYAR VE İNTERNET KULLANIMI

ayın Fen Bilimleri Öğretmeni,

u anda Pittsburgh Üniversitesi'nde doktora öğrenimime devam etmekteyim. Elinizdeki anket doktora ·zi çalışmamın bir parçası olarak hazırlanmıştır. Anket Türkiye'deki ortaöğretim okullarında okutulan ·n bilimleri derslerinde bilgisayar ve İnternet kullanımını ortaya koymak üzere hazırlanmıştır. Anketi mamlama konusunda göstereceğiniz yardım, günümüzde bilgisayar ve İnternet'in ortaöğretim urumlarında kullanımını daha iyi anlamak ve okullarımızda biyoloji, kimya ve fizik derslerinin ğretiminde bilgisayar kullanımını etkileyen faktörleri belirlemek açısından oldukça önem şımaktadır.

u anda bilgisayar ve İnternet kullanmıyor olsanız bile lütfen ekteki anketi elinizden geldiğince mamlamaya çalışınız. Anketteki bazı soruların cevabından emin değilseniz ya da sorunun kulunuzda çalışan başka birisi tarafından daha doğru bir şekilde cevaplanacağını düşünüyorsanız bu r soruları cevaplamada söz konusu kişi ya da kişilerden yardım almaktan lütfen çekinmeyiniz.

imlik bilgileriniz ve sorulara vereceğiniz cevaplar kesinlikle saklı tutulacak, anket çalışması kilitli bir lada ve kilitli bir dolapta muhafaza edilecektir. Herhangi bir sorunuz olduğunda meost11@pitt.edu lresinden bana ulaşabilirsiniz. Araştırma tamamlandıktan sonra araştırma sonucu tüm katılımcılara önderilecektir. Şimdiden göstermiş olduğunuz işbirliği için teşekkür ediyorum.

ıygılarımla,

elike Özer

öz konusu anketi geliştirmede aşağıdaki çalışmalardan yararlanılmıştır.

- Öğretmen anketi (Integrated Studies of Educational Technology, 2001)
- Öğretmenlerin bilgisayara karşı tutum anketi (Christensen & Knezek,1998)
- Chicago Carl Schurz lisesinde çalışan öğretmenler tarafından bilgisayar teknolojisinin kullanımı (Harris, 2000)

'anımlar

ısa haber panoları– İlgi grupları arasında bilgi alışverişini sağlayan, bir merkez görevi gören bilgisayar sistemi (Sharp, 2002).

'zaktan Öğrenim/ Eğitim – Eğitim amaçlı bir bilginin bir bölgeden bir başka bölgeye çeşitli telekominikasyon teknolojilerinin kullanılarak aktarılması (Integrated Studies of Educational Technology, 2001).

ğitim Teknolojisi– Eğitimi destekleme amaçlı kullanılan her türlü teknolojik alet ve ekipmanlar örneğin bilgisayar, telekominikasyon (İnternet, yerel ağ sistemleri, vs), dijital kameralar, yazıcı, grafikli hesap makinaları, yazılımlar, vs. (Integrated Studies of Educational Technology, 2001).

Bu ankette "Eğitim teknolojisi" bilgisayar ve İnternet teknolojisi olarak kullanılmıştır.

lektronik posta (e-mail) – Bilgisayar aracılığıyla bir iletişim ağı üzerinden mesajların iletilebildiği bir sistem (Sharp, 2002).

osya Transfer Protokolü (FTP) –Bilgisayarlar arasında dosyaların transferine izin veren temel İnternet fonksiyonu (Sharp, 2002).

onanım – Elektronik parçalar, ekran, sürücü, vb. bilgisayar sistemini oluşturan fiziksel parçaların tümü (Sharp, 2002).

ıternet – Bilgi aktarımında ortak kominikasyon standartlarını kullanarak küçük bilgisayar ağlarını bir araya getiren dünya çapındaki bir ağ sistemi (Heinich et al, 1999). Diğer bir deyişle, internet bilgisayar ağlarından oluşan küresel bir ağ stemi olarak tanımlanabilir (Botto, 1999).

ıklu ortam – Ses, video, görüntü ve yazılı metnin birlikte kullanıldığı bilgisayar donanım ve yazılım sistemi (Heinich et al, 1999). Çoklu ortam uygulamaları, yazılı metin, ses, grafik, video, vb. ortamların birlikte kullanılmasını ifade eder (Sharp, 2002).

ızılım – Bilgisayarın belirli işlevleri yerine getirmesi için özel olarak hazırlanmış program (Sharp, 2002).

deo-konferans – Birden fazla kullanıcının bilgisayar aracılığıyla görüşebildikleri ve kullanıcıların canlı görüntülerinin diğer kullanıcılar tarafından görülebildigi bir çeşit konferans (Sharp, 2002).

AÇIKLAMA

- Lütfen uygun olan seçeneği "X" ile işaretleyiniz veya gereken sorularda cevabınızı uygun kutucuklara yazınız.

Örnek 1:

	Önemli değildir	**Önemlidir**	**Çok önemlidir**
Hayatımda eğitimin yeri			X

Örnek 2: İçinde bulunduğumuz yıl [2003]

- Aksi belirtilmedikçe seçeneklerden sadece birisini seçiniz.

BÖLÜM I: OKUL İLE İLGİLİ BİLGİLER

1. Okulunuzun adı [ ]

   Okulunuzun bulunduğu yer (İl/ilçe/ köy)

   [ ]

2. Hangi dersi/dersleri öğretiyorsunuz? [ ] Biyoloji [ ] Kimya [ ] Fizik

3. Ders verdiğiniz sınıflar arasında en az öğrenci bulunan sınıftaki toplam öğrenci sayısı [ ]

4. Ders verdiğiniz sınıflar arasında en fazla öğrenci bulunan sınıftaki toplam öğrenci sayısı [ ]

5. Haftada kaç saat fen bilimleri dersi veriyorsunuz? [ ]

6. Ders verdiğiniz sınıftaki bilgisayar sayısı [ ]

7. Okulunuzun bilgisayar laboratuvarında bulunan toplam bilgisayar sayısı [ ]

8. Okulunuzda bulunan ve eğitim amaçlı kullanılan bilgisayar sayısı (sınıflarda ve bilgisayar laboratuvarlarında bulunan bilgisayarlar hariç) [ ]

9. Bilgisayar ve İnternet kullanımıyla ilgili bir problemle karşılaştığınızda nereden ya da kimden yardım alıyorsunuz? *Uygun olan tüm seçenekleri işaretleyiniz*

	"X"
Okulun bilgisayarla ilgili teknik elemanı	
Okulunuzun teknoloji koordinatörü	
Bölgenizde bulunan ve okulunuza zaman zaman hizmet veren bir teknoloji uzmanı	
İnternet (Teknik yardımla ilgili web sayfaları ya da sohbet odaları)	
Donanım ve yazılım firmaları tarafından gönderilen temsilciler	
Aile bireyleri ya da arkadaş	
Öğrenciler	
Diğer öğretmenler	
Diğer *(Lütfen belirtiniz)*	

10. Okulunuzda eğitim teknolojisi ile ilgili bir problemin çözümlenmesi ortalama kaç gün almaktadır? [ ]

11. Aşağıdaki eğitim teknolojisi araçlarından hangileri okulunuzda öğretmenlerin eğitim amaçlı kullanımına açık bulunmaktadır? *Uygun olan tüm seçenekleri işaretleyiniz*

	Bulunmuyor	**Bilgisayar laboratuvarında var**	**Bazı sınıflarda var**	**Çoğu sınıfta ya da tüm sınıflarda var**
Masaüstü bilgisayar				
Dizüstü bilgisayar				
Yazıcı				
CD-ROM sürücü				
CD-ROM yazıcı				
Bilgisayar mikrofonu				
Bilgisayar hoperlörü				
DVD sürücü				
Tarayıcı				
Zip veya benzer sürücüler				
Dijital video kamera				
Dijital kamera				
Bilgisayar projektörü				
İnternet bağlantısı				
Diğer *(Lütfen belirtiniz)*				

12. Okulunuz aşağıdakilerden hangisine/ hangilerine sahiptir?

	"X"
İnternet bağlantısı	
Uzaktan eğitim programları	
Web sayfası	
Video-telekonferans araç gereçleri	
Fen bilimleri ile ilgili yazılımlar *	

* *Fen bilimleri ile ilgili herhangi bir yazılıma sahip değilseniz lütfen 14. soruya geçiniz*

13. Kullanmakta olduğunuz fen bilimleri ile ilgili yazılımların isimlerini, hangi sınıflar için uygun olduğunu ve konusunu belirtiniz.

Yazılım	**Türü**						
	Araştırma	**Simulasyon & Modelleme**	**Alıştırma**	**Oyun**	**Problem çözme**	**Değerlendirme**	**Özel eğitim**

(Gerektiğinde sayfanın arka yüzünden devam ediniz)

4. Öğretmenlerin bilgisayar ve İnternet kullanmalarını arttırmak için okulunuz aşağıdaki stratejileri ne oranda uygulamaktadır?

	Uygulanmıyor	Bazen	Çoğunlukla
Öğretmenlere eğitimle ilgili yazılımlar temin etmek			
Kariyer geliştirme etkinliklerinde öğretmenlere teknolojiyi kullanmalarını önermek			
Müfredata teknoloji kullanımını eklemek			
Teknik destek sağlamak			
Eğitim teknolojisini zorunlu tutmak			
Eğitim teknolojisi ile ilgili hizmet içi eğitim olanakları sunmak			
Eğitim teknolojisi ile ilgili uzman kişiler bulmak			
Uzman kişiler tarafından bilgisayar kullanımını takip etmek			
Online (çevrim içi) destek sağlamak			
Yüksek eğitim kurumları ile birlikte çalışmak			
Örnek gösterimler sunmak			
Diğer *(Lütfen belirtiniz)*			

ÖLÜM II: TEKNOLOJİ DENEYİMİNİZ VE GÖRÜŞLERİNİZ

5. İlk olarak hangi yıl bilgisayar kullandınız? [ ]

6. Aşağıda belirtilen amaçlar için kaç yıldır bilgisayar kullanıyorsunuz?

a) Kişisel kullanım... [ ]
b) Öğretim materyallerinin hazırlanması................. [ ]
c) Sınıf içi öğretim .... [ ]
d) Öğrenci ve velilerle iletişim.............................. [ ]
e) Sınıf yönetimi... [ ]

7. Aşağıda belirtilen amaçlar için kaç yıldır İnternet kullanıyorsunuz?

a) Kişisel kullanım... [ ]
b) Öğretim materyallerinin hazırlanması................. [ ]
c) Sınıf içi öğretim .... [ ]
d) Öğrenci ve velilerle iletişim .... [ ]
e) Sınıf yönetimi... [ ]

18. Aşağıdakilerden hangisine kişisel olarak sahipsiniz?

	"X"
Bilgisayar (masaüstü veya dizüstü)	
İnternet bağlantısı	
Web sayfası	
Video-telekonferans araç gereçleri	
Eğitsel fen bilimleri yazılımları	

19. Bilgisayar kullanmayı öğrenmenizde aşağıda belirtilenler ne derece önemlidir?

	Önemli değil	**Biraz önemli**	**Çok önemli**
Kişisel ilgim			
Aile/arkadaş/öğrenciler veya okulumdaki diğer öğretmenler			
Lisans eğitimim sırasında almış olduğum dersler			
Teknoloji ile ilgili hizmet içi eğitim programları			
Başka okul veya organizasyonlar tarafından yürütülen dersler			
Diğer *(Lütfen belirtiniz)*			

20. Aşağıdaki konu/ konular hakkında herhangi bir eğitim programına katıldınız mı?

	"X"
Öğretimde bilgisayar kullanımı	
Teknolojinin müfredatla tümleştirilmesi	
Uzaktan eğitim	

21. Aşağıda belirtilen konular hakkındaki bilgi düzeyiniz nedir?

	Bilmiyorum	**Başlangıç seviyesinde**	**Orta seviyede**	**İleri seviyede**
İşletim sistemleri				
Masaüstü yayımcılık				
Kelime işlemcisi				
Çizelge işleme				
Veritabanı				
Sunum programları				
Çoklu ortam				
İnternet				
Tarama				
Elektronik posta programları				
Görüntüleme				
Web sayfası tasarımı				
Dosya Transfer Protokolleri (FTP)				
İnternet ortamında olan kısa haber panoları, haber grupları, tartışma grupları,vs.				
Diğer *(Lütfen belirtiniz)*				

22. Teknoloji ile ilgili hizmet içi eğitim olanakları öğretmenlerin ihtiyaçlarını karşılama bakımından yeterli midir? ☐ Evet ☐ Hayır

23. Teknolojiyle ilgili hizmet içi eğitim olanaklarının kolay erişilebilir olduğunu düşünüyor musunuz?
☐ Evet ☐ Hayır

24. Bilgisayar ve İnternet kullanımı ile ilgili ihtiyaçlarınızı karşılamak için önümüzdeki bir yıl içinde kaç saatlik bir hizmet içi eğitimine ihtiyacınız var? ☐

25. Öğretmenlerin okullarda bilgisayar ve İnternet kullanımlarını arttırmak için aşağıdakiler ne kadar önemli bir role sahiptir?

	Önemli değil	**Biraz önemli**	**Çok önemli**
Resmi			
Seminerler veya çalışma grupları			
Konferanslar			
Üniversiteler tarafından yürütülen dersler			
Online (çevrim içi) derslere katılım			
Teknoloji ve müfredat üzerinde çalışan komiteler			
Milli Eğitim Bakanlığı tarafından düzenlenen hizmet içi eğitim programları			
Resmi olmayan			
Öğretmen grupları			
Çeşitli yayınların okunması ya da İnternet aracılığıyla ilgili bilgilere ulaşma şeklindeki kişisel öğrenim			
Konu ile ilgili İnternet gruplarına veya sohbet odalarına katılmak			
Öğretimde teknolojinin kullanımıyla ilgili iş, aile veya arkadaş çevresinden kişilerle birlikte çalışmak			
Diğer *(Lütfen belirtiniz)*			

26. Katıldığınız kariyer geliştirme programlarında aşağıdaki konular hangi düzeyde anlatılmıştır?

	Anlatılmadı	Eğer anlatıldıysa ne düzeyde bir eğitimdi? Başlangıç seviyesinde	Orta seviyede	İleri seviyede
İşletim sistemi				
Masaüstü yayımcılık				
Kelime işlemcisi				
Çizelge işlemcisi				
Veritabanı				
Sunum programları				
Çoklu ortam				
İnternet				
Tarama				
Elektronik-posta programları				
Görüntüleme				
Web sayfası tasarımı				
Dosya Transfer Protokolleri (FTP)				
Internet ortamında olan kısa haber panoları, haber grupları, tartışma grupları,vs.				
Diğer, *(Lütfen belirtiniz)*				

27. Teknoloji ile ilgili olarak şuanda hangi konular hakkında bir eğitime ihtiyaç duyuyorsunuz?

	İhtiyacım yok	Bazı konularda eksiğim var	Bu konuda kesinlikle bir eğitime ihtiycım var
İşletim sistemi			
Masaüstü yayımcılık			
Kelime işlemcisi			
Çizelge işlemcisi			
Veritabanı			
Sunum programları			
Çoklu ortam			
İnternet			
Tarama			
Elektronik-posta programları			
Görüntüleme			
Web sayfası tasarımı			
Mevcut müfredat ile teknolojinin tümleştirilmesi			
Uzaktan eğitim			
Öğrencilerin değerlendirilmesinde teknolojinin kullanıldığı yeni metodlar			
Uygun yazılımların seçimi			
Sınıf içi yazılımlarının ya da teknolojik etkinliklerin kullanımı			
Sınıf yönetimi etkinliklerinde teknoloji kullanımı			
Diğer *(Lütfen belirtiniz)*			

28. Aşağıda belirtilen görüşlere katılıp katılmadığınızı seçeneklerden uygun olanını işaretleyerek belirtiniz.

	Kesinlikle katılmıyorum	**Katılmıyorum**	**Katılıyorum**	**Kesinlikle katılıyorum**
Bilgisayarda birşeyler yapmaktan zevk alıyorum				
Benim için bilgisayar kullanmak sıkıcı				
Bilgisayar kullanmayı öğrenirsem iyi bir iş bulabilirim				
Bilgisayar kullanmaya çaba gösteriyorum				
Bilgisayar oyunlarından zevk alıyorum				
Eğer bilgisayarı daha sık kullansaydım daha çok çalışmam gerekecekti				
Bilgisayar kullandığımda bir işi bitirmek daha çok zamanımı alıyor				
Bilgisayar kullandığımda bir çok şey öğrenebiliyorum				
Bilgisayar kullanılan dersleri seviyorum				
Bilgisayar kullanımını öğrenmek benim için önemlidir				
Bilgisayar kullanımının kolay olduğunu düşünüyorum				
Bilgisayarla çalışma konusunda kendimi rahat hissediyorum				
Bilgisayar kullanmayı düşündüğümde kendimi kötü hissediyorum				
Bilgisayarla çalışma beni endişelendiriyor				
Bilgisayar kullanmak benim için oldukça sinir bozucu				
Bilgisayarı mümkün olduğunca az kullanırım				
Bilgisayar kullanmak zordur				
Bilgisayarlar eğitimin niteliğini arttıracak değerli araçlardır				
Bilgisayarlar artık beni korkutmuyor				
Bilgisayara kıyasla kitaplardan daha fazla öğrenebiliyorum				

BÖLÜM III. FEN BİLİMLERİ ÖĞRETİMİNDE BİLGİSAYAR VE İNTERNET KULLANIMI

29. Aşağıdaki görevleri yerine getirirken ne kadar sıklıkla bilgisayar kullanıyorsunuz? *Uygun olan seçeneği işaretleyiniz*

	Kullanmıyorum	**Ayda bir kezden daha az**	**Ayda bir kaç defa**	**Haftada bir kaç defa**	**Hemen hemen hergün yada hergün**
Kişisel kullanım					
Öğretim materyallerinin hazırlanması					
Sınıf yönetimi					
Öğrencilere yönelik öğretim etkinlikleri					
Değerlendirme faaliyetleri					
Öğrencilerle iletişim					
Velilerle iletişim					
Meslektaş ve/veya diğer uzmanlarla iletişim					
Diğer *(Lütfen belirtiniz)*					

30. Aşağıdaki görevleri yaparken ne kadar sıklıkla <u>İnternet</u> kullanıyorsunuz? *Uygun olan seçeneği işaretleyiniz*

	Kullanmıyorum	**Ayda bir kezden daha az**	**Ayda bir kaç defa**	**Haftada bir kaç defa**	**Hemen hemen hergün ya da hergün**
Kişisel kullanım					
Öğretim materyallerinin hazırlanması					
Uzaktan eğitim					
Öğrencilere yönelik öğretim etkinlikleri					
Elektronik posta ile öğrencilerle iletişim					
Elektronik posta ile velilerle iletişim					
Elektronik posta ile meslektaş ve/veya diğer uzmanlarla iletişim					
Elektronik posta aracılığı ile dosya gönderme					
İnternette eğitim ile ilgili siteler aramak					
Arama motorlarını kullanarak eğitim ile ilgili bilgileri araştırma					
World Wide Web (WWW)					
Web sayfası tasarımı veya geliştirilmesi					
Haber gruplarında ya da kısa haber panolarında eğitimle ilgili tartışmalara katılmak					
Dosya Transfer Protokol (FTP) siteleri aracılığıyla dosya gönderme ya da dosya yükleme					
İnternet kütüphanelerinden kaynak bulma					
İnternet üzerinden düşük maliyetli telefon servisi					
Video-konferans					
Radyo yayınları					
Televizyon yayınları					
Diğer *(Lütfen belirtiniz)*					

31. <u>Bilgisayara</u> hangi sıklıkta ulaşabilme olanağına sahipsiniz?

	Böyle Bir olanağım yok	**Olanağım var ama kullanmıyorum**	**Ayda bir kezden daha az**	**Ayda bir kaç defa**	**Haftada bir kaç defa**	**Hemen hemen hergün yada hergün**
Sınıfta						
Okulda (sınıf dışında)						
Evde						

32. Aşağıda belirtilen yazılımları ya da araçları ne kadar sıklıkta kullanıyorsunuz?

	Kullanmıyorum	Ayda bir kezden daha az	Ayda bir kaç defa	Haftada bir kaç defa	Hemen hemen hergün ya da hergün
Kelime işlemciler- örneğin MS word ile test veya sınıf materyallerinin hazırlanması, mektup yazımı vs.					
Öğrenci notlarının hesaplanmasında kullanılan yazılımlar					
Çizelge işleme- örneğin Excel ile notların, okul ya da sınıf istatistiklerinin hesaplanması vs.					
Sunum yazılımları- örneğin Power Point ile ders sunumlarının hazırlanması vs.					
Test hazırlama yazılımları					
Masaüstü yayımcılık yazılımları- örneğin MS publisher ile afiş, broşür hazırlama vs.					
Print Shop veya Print Artist yazılımları ile ilan,afiş, broşür vs hazırlama vs.					
Eğitim amaçlı yazılımların incelenmesi / izlenmesi					
Öğretim materyallerinin tarayıcı ile taranması					
CD-ROM, disket yada zip sürücüsündeki bilgilere ulaşma					
Grafik yazılımlarını kullanarak resim yaratma					
Dosya silme ve kopyalama					
Program yükleme					
Dijital kamera					
Sınıf içi sunumlarında bilgisayar projektörü veya LCD paneli vs kullanma					
Diğer *(Lütfen belirtiniz)*					

33. Eğitim yılının başlangıcından bu yana bilgisayarlı öğretim etkinlikleri hangi sıklıkta aşağıda verilen yöntemlerle gerçekleştirilmiştir?

	Hiçbir zaman	Bazen	Çoğu zaman	Hepsi
Bütün sınıf aynı anda – tepegöz/LCD, büyük monitör, veya bilgisayar projektörü yardımıyla tüm sınıf aktiviteyi izlemektedir				
Öğrenciler sınıf içinde ve küçük gruplar halinde				
Öğrenciler bireysel olarak bilgisayarla çalışmaktadır				

34. Okulunuzda bilgisayarın eğitim alanında kullanılmasında hangi sorunlarla karşılaşılmıştır?

	"X"
Donanım	
Bilgisayarların sayıca yetersiz olması	
Çevre birimlerinin yetersiz olması	
İnternet	
İnternet bağlantısının öğretimde kullanmaya uygun hızda ve süreklilikte olmaması	
Öğrencilerin yaş düzeylerine uygun veya içerik olarak eğitimde kullanılabilecek web sayfalarının bulunmaması	
Eğitim amaçlı kullanılabilecek öğrenciler için uygun türkçe web sayfalarının bulunmaması	
Yazılım	
Öğrencilerin yaş düzeylerine uygun veya içerik olarak uygun yazılımların bulunmaması	
Milli Eğitm Bakanlığı standartlarına uygun yeterli yazılımın bulunmaması	
Personel	
Bilgisayar ve çevre birimlerinin alımı konusunda uzman personelin olmaması	
Bilgisayar ve çevre birimlerinin kurulması konusunda uzman personelin olmaması	
Bilgisayar ve çevre birimlerinin bakımı ve tamiri konusunda uzaman personelin olmaması	
Okul idaresi desteğinin olmaması	
Yeterli bilgi ve beceriye sahip öğretmen veya uzman personelin olmaması	
Okul personeli için yeterli hizmet içi eğitim olanaklarının olmaması	
Okul Binası	
Okul binasında bilgisayarlar için yeterli alanının bulunmaması	
Okul binasının elektirik kaynağının ve kablo sisteminin uygun olmaması	
Okul binasının ısıtma, havalandırma ve klima sisteminin uygun olmaması	
Okul binasının güvenliğinin yeterli olmaması	
Diğer *(Lütfen belirtiniz)*	

35. Aşağıda verilen cümleler hakkındaki görüşünüzü seçeneklerden uygun olanını işaretleyerek belirtiniz.

	Kesinlikle katılmıyorum	Katılmıyorum	Katılıyorum	Kesinlikle katılıyorum
Teknolojiyi içeren dersleri hazırlamak için zaman yeterlidir				
Teknolojiyi kullanarak öğretim yapmak için ders süresi yeterlidir				
Verilecek mesai ücreti çalışma saatlerim dışında teknoloji ile ilgili hizmet içi eğitimine katılmamda teşvik edici olacaktır				
Öğretmenlere yönelik teknoloji ile ilgili hizmet içi eğitim programları arttırılmalıdır				
Teknolojinin müfredat ve öğretim stratejileri ile tümleştirilmesi konusunda daha fazla hizmet içi eğitimine ihtiyaç duyuyorum				
Okulumuz branşımla ilgili olarak öğretim amaçlarımıza ve öğrencilerin yaş düzeyine uygun yeterli yazılıma sahiptir				
Okulumuz mevcut fen bilimleri müfredatı ile uyumlu yazılımlara sahiptir				
Okulumuz fen bilimleri alanında daha fazla yazılıma ihtiyaç duymaktadır				
Sınıflarımızda yeterli sayıda bilgisayar bulunmaktadır				
Okulumuz sınıfta kullanılmak üzere yeterli sayıda büyük ekran, LCD paneli veya bilgisayar projektörü gibi araçlara sahiptir				
Okulda kullandığımız bilgisayarlar zamanında tamir edilmektedir				
Sınıf içerisinde bilgisayar olması öğretmenlerin bilgisayar kullanmalarını teşvik edecektir				
Okul idaresi tarafından öğretimde bilgisayar kullanımı desteklenmektedir				
Diğer *(Lütfen belirtiniz)*				

36. Aşağıda öğretmenlerin öğretimde neden bilgisayar kullanmadıkları ile ilgili bazı sebepler verilmiştir. Bu sebepler sizin bilgisayar kullanımınızı engelleyen etkenler olarak ne kadar önemlidir?

	Önemli değil	Kısmen önemli	Önemli	Çok önemli
Bilgisayar kullanmayı bilmemek				
Bilgisayar kullanmaya istekli olmamak				
Bilgisayar korkusunun olması				
Öğretim materyallerinin / derslerin bilgisayar olmadan da hazırlanabiliyor olması				
Bilgisayar kullanmadan kitap, tahta vb geleneksel yöntemler kullanılarak etkili bir şekilde öğretilebilmesi				
Öğretim materyallerini/dersleri bilgisayar kullanarak hazırlamak için yeterli zamanın olmaması				
Öğretim materyallerini / dersleri hazırlamada bilgisayarın nasıl kullanılacağını öğrenmek için yeterli zamanın olmaması				
Bilgisayarla ilgili daha fazla eğitime ihtiyaç duyulması				
Evde bilgisayar olmaması				
Bilgisayar alabilecek yeterli paraya sahip olunmaması				
Okulda bilgisayarların kolay erişilebilir olmaması				
Teknik problemlerin zamanında çözümlenmesi için yeterli desteğin olmaması				
Sınıf içinde bilgisayar bulunmaması				
Sınıf içinde yeterli sayıda bilgisayarın bulunmaması				
Bilgisayarla ilgili yeterli araç ve sarf malzemesinin olmaması				
Bilgisayarla yapılan aktivitenin tüm sınıf tarafından görülebilmesi için gerekli olan tepegöz / LCD, büyük ekran veya bilgisayar projektörü gibi araçların olmaması				
Okul idaresinin ve diğer öğretmenlerin desteğinin olmaması				
Çok fazla sayıda sınıfta ders verilmesi				
Öğrencilerin bilgisayar kullanımına olan isteksizliği				
Konu alanı ile ilgili uygun yazılımların olmaması				
Konu alanının bilgisayarla öğretime uygun olmaması				
Bilgisayarın konu alanı ile nasıl tümleştirileceğinin bilinmemesi				
Bilgisayar hızının çok yavaş olması				
İnternete bağlı bilgisayar olmaması				
Bilgisayar modellerinin çok eski olması				
Türkçe web sayfalarının yetersiz olması				

BÖLÜM IV: KİŞİSEL BİLGİLER

37. Hangi sınıf/sınıflara fen bilimleri dersi veriyorsunuz? *Uygun olan seçenekleri işaretleyiniz*

Sınıf	Hazırlık	9	10	11	12

38. Cinsiyetiniz: ☐ Kadın ☐ Erkek

39. Yaşınız: ☐ 20-29 ☐ 30-39 ☐ 40-49 ☐ 50-59

40. Öğrenim durumunuz: ☐ Öğretmen okulu ☐ Lisans ☐ Yüksek Lisans ☐ Doktora

41. Eğitim dalınız (Lisans eğitimi gördüğünüz program):

☐

42. Ocak 2003 tarihi itibariyle hizmet süreniz kaç yıldır? ☐

43. Şu anda çalıştığınız okulda kaç yıldır öğretmenlik yapıyorsunuz? ☐

44. Haftada toplam kaç saat ders veriyorsunuz? ☐

PROJEYE ZAMAN AYIRDIĞINIZ İÇİN ÇOK TEŞEKKÜRLER. *Bu anket hakkındaki her türlü sorularınız için meost11@pitt.edu adresinden Melike Özer'le görüşebilirsiniz.. Çalışma tamamlandıktan sonra çalışma sonucu tüm katılımcılara gönderilicektir. Anket hakkındaki eleştiri ve görüşlerinizi lütfen aşağıda belirtiniz.*

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F. The Cronbach's Alpha Coefficients

Computer and Internet use: School Survey

Item 14: Subject teachers' participation in technology-related professional development programs

RELIABILITY ANALYSIS - SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	Q14_B	1.9080	.9481	163.0
2.	Q14_C	1.8405	.9157	163.0
3.	Q14_D	2.0491	.9149	163.0
4.	Q14_E	1.7730	.9183	163.0

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	7.5706	11.2218	3.3499	4

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q14_B	5.6626	6.2620	.8558	.8966
Q14_C	5.7301	6.4699	.8400	.9020
Q14_D	5.5215	6.5350	.8230	.9076
Q14_E	5.7975	6.5946	.8024	.9144

Reliability Coefficients

N of Cases = 163.0 N of Items = 4

Alpha = .9272

Item 15: Methods school used to provide technology-related professional development

RELIABILITY ANALYSIS - SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	Q15_A	1.2153	.5310	144.0
2.	Q15_B	1.4375	.6867	144.0
3.	Q15_C	1.8542	.8607	144.0
4.	Q15_D	2.0556	.8427	144.0
5.	Q15_E	1.7986	.8657	144.0
6.	Q15_F	2.0903	.8013	144.0

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	10.4514	11.4102	3.3779	6

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q15_A	9.2361	9.9718	.3448	.8346
Q15_B	9.0139	9.6222	.3090	.8441
Q15_C	8.5972	7.4031	.6974	.7679
Q15_D	8.3958	7.3317	.7381	.7580
Q15_E	8.6528	7.3331	.7098	.7647
Q15_F	8.3611	7.5750	.7239	.7625

Reliability Coefficients

N of Cases = 144.0 N of Items = 6

Alpha = .8218

Item 17: Individuals' or groups' contributions to professional development programs

RELIABILITY ANALYSIS - SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	Q17_A	.5903	1.1307	144.0
2.	Q17_B	1.7292	1.2303	144.0
3.	Q17_C	.2361	.6792	144.0
4.	Q17_D	.7431	1.0495	144.0
5.	Q17_E	.5069	.9752	144.0
6.	Q17_F	.1806	.5503	144.0
7.	Q17_G	.5972	.9411	144.0
8.	Q17_H	.7222	1.0066	144.0

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	5.3056	17.7521	4.2133	8

Item-total Statistics

	Scale Mean If Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q17_A	4.7153	14.1212	.2768	.6520
Q17_B	3.5764	13.4766	.3058	.6478
Q17_C	5.0694	15.1979	.3952	.6258
Q17_D	4.5625	13.6464	.3875	.6190
Q17_E	4.7986	14.5955	.2960	.6426
Q17_F	5.1250	15.5927	.4272	.6276
Q17_G	4.7083	13.8724	.4271	.6098
Q17_H	4.5833	13.5175	.4352	.6062

Reliability Coefficients

N of Cases = 144.0 N of Items = 8

Alpha = .6595

Item 18: Forms of technology-related professional development

RELIABILITY ANALYSIS - SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	Q18F_A	2.4038	.5987	156.0
2.	Q18F_B	2.1346	.6231	156.0
3.	Q18F_C	2.0962	.6795	156.0
4.	Q18F_D	2.0449	.6257	156.0
5.	Q18F_E	2.2179	.6843	156.0
6.	Q18F_F	2.7115	.5081	156.0
7.	Q18I_A	2.0385	.6313	156.0
8.	Q18I_B	2.3077	.5636	156.0
9.	Q18I_C	1.9231	.6480	156.0
10.	Q18I_D	2.2244	.5631	156.0

RELIABILITY ANALYSIS - SCALE (ALPHA)

N of Cases = 156.0

Statistics for	Mean	Variance	Std Dev	N of Variables
Scale	22.1026	13.3184	3.6494	10

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q18F_A	19.6987	10.7796	.5546	.7680
Q18F_B	19.9679	10.9990	.4673	.7781
Q18F_C	20.0064	10.7806	.4653	.7788
Q18F_D	20.0577	10.6096	.5685	.7658
Q18F_E	19.8846	10.6060	.5035	.7738
Q18F_F	19.3910	11.8139	.3568	.7897
Q18I_A	20.0641	10.7959	.5120	.7727
Q18I_B	19.7949	11.5964	.3659	.7892
Q18I_C	20.1795	11.2579	.3773	.7893
Q18I_D	19.8782	11.0883	.5101	.7737

Reliability Coefficients

N of Cases = 156.0 N of Items = 10

Alpha = .7958

Item 18: Forms of technology-related professional development: FORMAL

RELIABILITY ANALYSIS - SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	Q18F_A	2.4000	.5956	160.0
2.	Q18F_B	2.1375	.6193	160.0
3.	Q18F_C	2.0875	.6765	160.0
4.	Q18F_D	2.0500	.6224	160.0
5.	Q18F_E	2.2250	.6817	160.0
6.	Q18F_F	2.7125	.5064	160.0

Statistics for	Mean	Variance	Std Dev	N of Variables
Scale	13.6125	6.3646	2.5228	6

RELIABILITY ANALYSIS - SCALE (ALPHA)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q18F_A	11.2125	4.5332	.5823	.7123
Q18F_B	11.4750	4.5277	.5515	.7196
Q18F_C	11.5250	4.4145	.5250	.7270
Q18F_D	11.5625	4.4866	.5653	.7159
Q18F_E	11.3875	4.4904	.4878	.7379
Q18F_F	10.9000	5.3107	.3417	.7679

Reliability Coefficients

N of Cases = 160.0 N of Items = 6

Alpha = .7655

Item 18: Forms of technology-related professional development: INFORMAL

RELIABILITY ANALYSIS - SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	Q18I_A	2.0179	.6236	168.0
2.	Q18I_B	2.3155	.5595	168.0
3.	Q18I_C	1.9107	.6459	168.0
4.	Q18I_D	2.2381	.5606	168.0

Statistics for	Mean	Variance	Std Dev	N of Variables
Scale	8.4821	3.0296	1.7406	4

Item-total Statistics

	Scale Mean If Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q18I_A	6.4643	1.8550	.4625	.6555
Q18I_B	6.1667	1.8643	.5578	.5986
Q18I_C	6.5714	1.9350	.3771	.7123
Q18I_D	6.2440	1.8383	.5770	.5869

RELIABILITY ANALYSIS - SCALE (ALPHA)

Reliability Coefficients

N of Cases = 168.0 N of Items = 4

Alpha = .7025

Item 19: Teachers' needs in regard to technology-related professional development

RELIABILITY ANALYSIS - SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	Q19_A	2.5476	.6363	168.0
2.	Q19_B	2.5000	.6746	168.0
3.	Q19_C	2.4702	.6559	168.0
4.	Q19_D	2.5238	.6088	168.0
5.	Q19_E	2.6131	.6374	168.0
6.	Q19_F	2.5893	.5927	168.0
7.	Q19_G	2.5119	.6380	168.0
8.	Q19_H	2.4762	.6652	168.0
9.	Q19_I	2.4821	.6472	168.0
10.	Q19_J	2.5595	.5863	168.0
11.	Q19_K	2.5000	.6566	168.0
12.	Q19_L	2.6726	.5739	168.0
13.	Q19_M	2.7083	.5174	168.0
14.	Q19_N	2.5655	.6890	168.0
15.	Q19_O	2.6964	.4986	168.0
16.	Q19_P	2.6071	.5794	168.0
17.	Q19_Q	2.6190	.5771	168.0
18.	Q19_R	2.6429	.5611	168.0

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	46.2857	61.3670	7.8337	18

RELIABILITY ANALYSIS - SCALE (ALPHA)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q19_A	43.7381	55.2484	.6040	.9402
Q19_B	43.7857	54.1454	.6816	.9387
Q19_C	43.8155	54.1873	.6989	.9383
Q19_D	43.7619	54.3382	.7418	.9375

Q19_E	43.6726	55.5389	.5707	.9408
Q19_F	43.6964	54.5720	.7359	.9376
Q19_G	43.7738	54.5234	.6831	.9386
Q19_H	43.8095	53.5324	.7594	.9370
Q19_I	43.8036	53.5001	.7867	.9365
Q19_J	43.7262	54.9066	.7040	.9382
Q19_K	43.7857	53.6664	.7556	.9371
Q19_L	43.6131	56.3943	.5387	.9412
Q19_M	43.5774	56.2215	.6286	.9397
Q19_N	43.7202	55.2805	.5477	.9416
Q19_O	43.5893	56.6986	.5886	.9404
Q19_P	43.6786	55.0937	.6903	.9385
Q19_Q	43.6667	54.9900	.7061	.9382
Q19_R	43.6429	55.7998	.6266	.9397

Reliability Coefficients

N of Cases = 168.0 N of Items = 18

Alpha = .9421

Item 26: Administrative support

RELIABILITY ANALYSIS - SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	Q26_A	1.8333	.6891	180.0
2.	Q26_B	2.1833	.7730	180.0
3.	Q26_C	1.9944	.7130	180.0
4.	Q26_D	2.1667	.7361	180.0
5.	Q26_E	1.6722	.7386	180.0
6.	Q26_F	1.9556	.6997	180.0
7.	Q26_G	1.6667	.6850	180.0
8.	Q26_H	1.6833	.7049	180.0
9.	Q26_I	1.3833	.5816	180.0
10.	Q26_J	1.1833	.4158	180.0
11.	Q26_K	1.6833	.6557	180.0

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	19.4056	23.3039	4.8274	11

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q26_A	17.5722	19.2741	.5875	.8465
Q26_B	17.2222	19.2017	.5173	.8526
Q26_C	17.4111	19.3608	.5474	.8496
Q26_D	17.2389	18.7415	.6308	.8429
Q26_E	17.7333	19.4257	.5118	.8526
Q26_F	17.4500	19.3774	.5579	.8488
Q26_G	17.7389	19.0097	.6403	.8425
Q26_H	17.7222	18.8051	.6546	.8412
Q26_I	18.0222	20.5693	.4542	.8558
Q26_J	18.2222	21.6151	.3920	.8596
Q26_K	17.7222	19.4196	.5978	.8459

Reliability Coefficients

N of Cases = 180.0 N of Items = 11

Alpha = .8609

Item 35: Methods to learn how to use computer

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

		Mean	Std Dev	Cases
1.	Q35_A	2.9134	.2824	127.0
2.	Q35_B	2.3465	.6592	127.0
3.	Q35_C	1.6850	.7838	127.0
4.	Q35_D	2.2756	.7936	127.0
5.	Q35_E	1.7402	.7582	127.0

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	10.9606	4.1810	2.0447	5

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q35_A	8.0472	4.0771	.0212	.5964
Q35_B	8.6142	3.2230	.2211	.5479
Q35_C	9.2756	2.4234	.4685	.3876
Q35_D	8.6850	2.6460	.3506	.4750
Q35_E	9.2205	2.5066	.4580	.3980

Reliability Coefficients

N of Cases = 127.0 N of Items = 5

Alpha = .5524

Item 36: Computer knowledge

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

		Mean	Std Dev	Cases
1.	Q36_A	2.6000	.9093	165.0
2.	Q36_B	2.2424	.9948	165.0
3.	Q36_C	2.5333	1.0273	165.0
4.	Q36_D	2.6182	1.0446	165.0
5.	Q36_E	1.9152	.9397	165.0
6.	Q36_F	2.2848	.9927	165.0
7.	Q36_G	2.2545	.9731	165.0
8.	Q36_H	2.8364	.8431	165.0
9.	Q36_I	2.4242	.9763	165.0
10.	Q36_J	2.4303	.9641	165.0
11.	Q36_K	2.1212	.9357	165.0
12.	Q36_L	1.6182	.8516	165.0
13.	Q36_M	1.6909	.9013	165.0
14.	Q36_N	2.0788	.9626	165.0

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	31.6485	107.8757	10.3863	14

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q36_A	29.0485	94.3513	.7188	.9469
Q36_B	29.4061	93.0963	.7183	.9469
Q36_C	29.1152	91.4318	.7833	.9452
Q36_D	29.0303	91.7613	.7507	.9461
Q36_E	29.7333	93.4163	.7474	.9462
Q36_F	29.3636	91.4401	.8138	.9444
Q36_G	29.3939	92.7280	.7577	.9459
Q36_H	28.8121	94.8486	.7500	.9463
Q36_I	29.2242	91.4189	.8305	.9440
Q36_J	29.2182	92.2936	.7910	.9450
Q36_K	29.5273	93.9459	.7197	.9468
Q36_L	30.0303	96.3222	.6478	.9485
Q36_M	29.9576	95.2116	.6738	.9479
Q36_N	29.5697	94.9540	.6394	.9489

RELIABILITY ANALYSIS - SCALE (ALPHA)

Reliability Coefficients

N of Cases = 165.0 N of Items = 14

Alpha = .9500

Item 47: Barriers with regard to computer use

RELIABILITY ANALYSIS - SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	Q47_A	1.9362	.8184	188.0
2.	Q47_B	2.2500	.8052	188.0
3.	Q47_C	3.2553	.7230	188.0
4.	Q47_D	3.5957	.5236	188.0
5.	Q47_E	3.5266	.5611	188.0
6.	Q47_F	3.2500	.7431	188.0
7.	Q47_G	3.2713	.7355	188.0
8.	Q47_H	3.4043	.7063	188.0
9.	Q47_I	3.3191	.9502	188.0
10.	Q47_J	3.4255	.8589	188.0

11.	Q47_K	2.2872	.8606	188.0
12.	Q47_L	3.3085	.8277	188.0
13.	Q47_M	1.5851	.6360	188.0

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	38.4149	14.4580	3.8024	13

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q47_A	36.4787	13.7696	.0031	.5504
Q47_B	36.1649	13.7748	.0058	.5489
Q47_C	35.1596	13.1509	.1496	.5127
Q47_D	34.8191	13.5821	.1559	.5111
Q47_E	34.8883	13.2655	.2147	.5006
Q47_F	35.1649	11.3256	.5159	.4224
Q47_G	35.1436	11.3750	.5124	.4242
Q47_H	35.0106	12.3421	.3259	.4727
Q47_I	35.0957	11.6913	.2868	.4760
Q47_J	34.9894	11.3368	.4121	.4409
Q47_K	36.1277	12.8606	.1388	.5182
Q47_L	35.1064	13.4859	.0472	.5402
Q47_M	36.8298	14.5698	-.1063	.5602

RELIABILITY ANALYSIS - SCALE (ALPHA)

Reliability Coefficients

N of Cases = 188.0 N of Items = 13

Alpha = .5219

Item 48: Attitude toward computers

RELIABILITY ANALYSIS - SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	Q48_A	3.4419	.6042	172.0
2.	Q48_B	3.5349	.6788	172.0
3.	Q48_C	2.9826	.8410	172.0
4.	Q48_D	3.3430	.5659	172.0
5.	Q48_E	2.5465	.8259	172.0
6.	Q48_F	2.8140	.8721	172.0
7.	Q48_G	3.3547	.7066	172.0
8.	Q48_H	3.4186	.5817	172.0
9.	Q48_I	3.2965	.6573	172.0
10.	Q48_J	3.4767	.6348	172.0
11.	Q48_K	3.2209	.6380	172.0
12.	Q48_L	3.2791	.6147	172.0
13.	Q48_M	3.6105	.5666	172.0
14.	Q48_N	3.5291	.5766	172.0
15.	Q48_O	3.5523	.6047	172.0
16.	Q48_P	3.3140	.6969	172.0
17.	Q48_Q	3.4593	.6698	172.0
18.	Q48_R	3.2326	.8743	172.0
19.	Q48_S	2.8140	.7725	172.0

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	62.2209	44.7462	6.6893	19

RELIABILITY ANALYSIS - SCALE (ALPHA)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q48_A	58.7791	40.1263	.5559	.8292
Q48_B	58.6860	40.0763	.4898	.8314
Q48_C	59.2384	40.1592	.3640	.8384
Q48_D	58.8779	40.4002	.5596	.8296
Q48_E	59.6744	43.1799	.0815	.8532

Q48_F	59.4070	42.5118	.1296	.8519
Q48_G	58.8663	40.8534	.3757	.8367
Q48_H	58.8023	39.6215	.6536	.8255
Q48_I	58.9244	39.0527	.6405	.8247
Q48_J	58.7442	40.1681	.5189	.8304
Q48_K	59.0000	40.0351	.5331	.8298
Q48_L	58.9419	39.4937	.6310	.8258
Q48_M	58.6105	40.5667	.5346	.8305
Q48_N	58.6919	39.9688	.6097	.8274
Q48_O	58.6686	40.4802	.5069	.8312
Q48_P	58.9070	39.9679	.4872	.8315
Q48_Q	58.7616	40.1709	.4860	.8316
Q48_R	58.9884	40.6431	.2995	.8425
Q48_S	59.4070	42.2778	.1863	.8467

Reliability Coefficients

N of Cases = 172.0 N of Items = 19

Alpha = .8416

Item 48: Attitude toward computers: Liking

RELIABILITY ANALYSIS - SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	Q48_A	3.4402	.5975	184.0
2.	Q48_B	3.5435	.6680	184.0
3.	Q48_D	3.3370	.5586	184.0
4.	Q48_E	2.5598	.8276	184.0
5.	Q48_I	3.2826	.6499	184.0
6.	Q48_P	3.2989	.6957	184.0

Statistics for Scale	Mean	Variance	Std Dev	N of Variables
	19.4620	6.0969	2.4692	6

RELIABILITY ANALYSIS - SCALE (ALPHA)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance If Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q48_A	16.0217	4.3165	.5733	.5696
Q48_B	15.9185	4.5234	.3968	.6253
Q48_D	16.1250	4.5253	.5300	.5886
Q48_E	16.9022	4.9849	.1156	.7431
Q48_I	16.1793	4.2026	.5523	.5706
Q48_P	16.1630	4.5416	.3613	.6382

Reliability Coefficients

N of Cases = 184.0 N of Items = 6

Alpha = .6673

Item 48: Attitude toward computers: Usefulness

RELIABILITY ANALYSIS - SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	Q48_C	2.9836	.8547	183.0
2.	Q48_F	2.7923	.9021	183.0
3.	Q48_G	3.3661	.6972	183.0
4.	Q48_H	3.4208	.5770	183.0
5.	Q48_J	3.4809	.6276	183.0
6.	Q48_S	2.8197	.7669	183.0

Statistics for	Mean	Variance	Std Dev	N of Variables
Scale	18.8634	5.5362	2.3529	6

RELIABILITY ANALYSIS - SCALE (ALPHA)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q48_C	15.8798	3.9195	.2618	.4161
Q48_F	16.0710	4.4290	.0773	.5355
Q48_G	15.4973	4.5481	.1688	.4641
Q48_H	15.4426	4.0173	.5127	.3127
Q48_J	15.3825	4.1935	.3691	.3702
Q48_S	16.0437	4.3827	.1760	.4636

Reliability Coefficients

N of Cases = 183.0 N of Items = 6

Alpha = .4749

Item 48: Attitude toward computers: Confidence

RELIABILITY ANALYSIS - SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	Q48_K	3.2189	.6417	201.0
2.	Q48_L	3.2537	.6085	201.0
3.	Q48_Q	3.4229	.6747	201.0

Statistics for Scale	Mean	Variance	Std Dev	N of Variables
	9.8955	2.1640	1.4711	3

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted

Q48_K	6.6766	1.0299	.5545	.3968
Q48_L	6.6418	1.2310	.4167	.5913
Q48_Q	6.4726	1.1405	.3943	.6284

Reliability Coefficients

N of Cases = 201.0 N of Items = 3

Alpha = .6423

Item 48: Attitude toward computers: Anxiety

R E L I A B I L I T Y   A N A L Y S I S - S C A L E (A L P H A)

		Mean	Std Dev	Cases
1.	Q48_M	3.5842	.5602	202.0
2.	Q48_N	3.5248	.5659	202.0
3.	Q48_O	3.5396	.5993	202.0
4.	Q48_R	3.1634	.8911	202.0

Statistics for	Mean	Variance	Std Dev	N of Variables
Scale	13.8119	3.7057	1.9250	4

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q48_M	10.2277	2.4951	.5068	.6142
Q48_N	10.2871	2.2754	.6502	.5329
Q48_O	10.2723	2.1892	.6527	.5215
Q48_R	10.6485	2.2390	.2522	.8346

R E L I A B I L I T Y   A N A L Y S I S - S C A L E (A L P H A)

Reliability Coefficients

N of Cases = 202.0 N of Items = 4

Alpha = .6903

Science Teacher Computer and Internet Use

Item 14: Administrative support

RELIABILITY ANALYSIS - SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	Q14_A	1.4356	.6316	264.0
2.	Q14_B	1.8030	.7842	264.0
3.	Q14_C	1.5833	.7352	264.0
4.	Q14_D	1.7311	.7797	264.0
5.	Q14_E	1.3447	.6216	264.0
6.	Q14_F	1.6212	.7088	264.0
7.	Q14_G	1.4356	.6376	264.0
8.	Q14_H	1.4583	.6685	264.0
9.	Q14_I	1.1553	.4640	264.0
10.	Q14_J	1.1477	.3960	264.0
11.	Q14_K	1.3371	.5411	264.0

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	16.0530	22.7957	4.7745	11

Item-total Statistics

	Scale Mean If Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q14_A	14.6174	19.0508	.6069	.8679
Q14_B	14.2500	18.3631	.5680	.8718
Q14_C	14.4697	18.2196	.6429	.8654
Q14_D	14.3220	17.6640	.6902	.8619
Q14_E	14.7083	19.2644	.5763	.8698
Q14_F	14.4318	18.6265	.5994	.8685
Q14_G	14.6174	18.6097	.6871	.8625
Q14_H	14.5947	18.8047	.6112	.8675
Q14_I	14.8977	20.4876	.4982	.8750
Q14_J	14.9053	20.8693	.4891	.8762
Q14_K	14.7159	19.7707	.5678	.8708

Reliability Coefficients

N of Cases = 264.0 N of Items = 11

Alpha = .8795

Item 19: Methods to learn how to use computer

RELIABILITY ANALYSIS - SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	Q19_A	2.8111	.4577	217.0
2.	Q19_B	2.2488	.6823	217.0
3.	Q19_C	1.7512	.8124	217.0
4.	Q19_D	2.1290	.8119	217.0
5.	Q19_E	1.7235	.7373	217.0

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	10.6636	5.2891	2.2998	5

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q19_A	7.8525	4.6726	.2057	.6689
Q19_B	8.4147	3.8457	.3654	.6149
Q19_C	8.9124	3.2562	.4682	.5644
Q19_D	8.5346	3.2314	.4791	.5582
Q19_E	8.9401	3.3992	.4952	.5511

Reliability Coefficients

N of Cases = 217.0 N of Items = 5

Alpha = .6502

Item 21: Computer knowledge

RELIABILITY ANALYSIS - SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	Q21_A	1.8514	.9014	249.0
2.	Q21_B	1.6707	.8637	249.0

3.	Q21_C	1.8434	.9649	249.0
4.	Q21_D	1.9237	.9621	249.0
5.	Q21_E	1.5382	.8277	249.0
6.	Q21_F	1.7189	.9209	249.0
7.	Q21_G	1.6627	.9411	249.0
8.	Q21_H	2.1888	.9464	249.0
9.	Q21_I	1.7671	.9472	249.0
10.	Q21_J	1.7671	.9343	249.0
11.	Q21_K	1.5582	.8265	249.0
12.	Q21_L	1.2811	.6167	249.0
13.	Q21_M	1.3534	.6924	249.0
14.	Q21_N	1.6104	.8405	249.0

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	23.7349	92.7520	9.6308	14

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q21_A	21.8835	79.6356	.7648	.9482
Q21_B	22.0643	80.2700	.7583	.9483
Q21_C	21.8916	79.0567	.7439	.9488
Q21_D	21.8112	78.5328	.7796	.9478
Q21_E	22.1968	81.0700	.7378	.9488
Q21_F	22.0161	78.6207	.8134	.9469
Q21_G	22.0723	78.4464	.8050	.9471
Q21_H	21.5462	79.1279	.7560	.9484
Q21_I	21.9679	78.4506	.7989	.9473
Q21_J	21.9679	78.5474	.8050	.9471
Q21_K	22.1767	79.9848	.8174	.9470
Q21_L	22.4538	85.2005	.6299	.9515
Q21_M	22.3815	84.4627	.6136	.9516
Q21_N	22.1245	82.3675	.6343	.9512

R E L I A B I L I T Y   A N A L Y S I S - S C A L E (A L P H A)

Reliability Coefficients

N of Cases = 249.0   N of Items = 14

Alpha = .9521

Item 25: Forms of technology-related professional development

RELIABILITY ANALYSIS - SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	Q25_FA	2.5473	.6360	296.0
2.	Q25_FB	2.0743	.7327	296.0
3.	Q25_FC	2.2534	.7855	296.0
4.	Q25_FD	2.3953	.7101	296.0
5.	Q25_FE	2.5203	.6737	296.0
6.	Q25_FF	2.7162	.5404	296.0
7.	Q25_IA	2.2973	.6374	296.0
8.	Q25_IB	2.6351	.5602	296.0
9.	Q25_IC	2.2635	.6675	296.0
10.	Q25_ID	2.5946	.5803	296.0

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	24.2973	13.8164	3.7170	10

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q25_FA	21.7500	11.5983	.4186	.7461
Q25_FB	22.2230	10.7501	.5265	.7300
Q25_FC	22.0439	10.6116	.5057	.7334
Q25_FD	21.9020	10.8005	.5381	.7285
Q25_FE	21.7770	11.2179	.4753	.7382
Q25_FF	21.5811	12.3392	.3121	.7586
Q25_IA	22.0000	11.5932	.4186	.7461
Q25_IB	21.6622	12.0889	.3629	.7530
Q25_IC	22.0338	11.5650	.3978	.7490
Q25_ID	21.7027	12.2774	.2956	.7608

Reliability Coefficients

N of Cases = 296.0 N of Items = 10

Alpha = .7644

Item 25: Forms of technology-related professional development: FORMAL

RELIABILITY ANALYSIS - SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	Q25_FA	2.5537	.6362	307.0
2.	Q25_FB	2.0945	.7371	307.0
3.	Q25_FC	2.2704	.7850	307.0
4.	Q25_FD	2.4039	.7046	307.0
5.	Q25_FE	2.5244	.6681	307.0
6.	Q25_FF	2.7134	.5386	307.0

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	14.5603	7.6067	2.7580	6

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q25_FA	12.0065	5.6339	.5191	.7192
Q25_FB	12.4658	5.2104	.5506	.7093
Q25_FC	12.2899	4.9582	.5813	.7002
Q25_FD	12.1564	5.3807	.5291	.7155
Q25_FE	12.0358	5.6164	.4876	.7268
Q25_FF	11.8469	6.4242	.3268	.7622

Reliability Coefficients

N of Cases = 307.0 N of Items = 6

Alpha = .7587

Item 25: Forms of technology-related professional development: INFORMAL

RELIABILITY ANALYSIS - SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	Q25_IA	2.3086	.6313	337.0
2.	Q25_IB	2.6231	.5647	337.0
3.	Q25_IC	2.2582	.6738	337.0
4.	Q25_ID	2.5846	.5872	337.0

Statistics for SCALE	Mean	Variance	Std Dev	N of Variables
	9.7745	2.9847	1.7276	4

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q25_IA	7.4659	1.9103	.3873	.6224
Q25_IB	7.1513	1.9621	.4448	.5847
Q25_IC	7.5163	1.7207	.4582	.5741
Q25_ID	7.1899	1.8924	.4627	.5715

Reliability Coefficients

N of Cases = 337.0 N of Items = 4

Alpha = .6560

Item 26: Topics in professional development programs

RELIABILITY ANALYSIS - SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	Q26_A	.8480	.8542	171.0
2.	Q26_B	.6959	.8196	171.0
3.	Q26_C	.8421	.8968	171.0
4.	Q26_D	.8070	.8965	171.0
5.	Q26_E	.5497	.7909	171.0
6.	Q26_F	.6491	.8223	171.0
7.	Q26_G	.5146	.7620	171.0
8.	Q26_H	.7251	.8543	171.0
9.	Q26_I	.5439	.8555	171.0
10.	Q26_J	.5205	.7696	171.0
11.	Q26_K	.4795	.7303	171.0
12.	Q26_L	.2982	.6029	171.0
13.	Q26_M	.2982	.5625	171.0
14.	Q26_N	.2982	.5729	171.0

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	8.0702	70.2303	8.3804	14

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q26_A	7.2222	60.0680	.7124	.9434
Q26_B	7.3743	60.4356	.7159	.9432
Q26_C	7.2281	59.2947	.7335	.9430
Q26_D	7.2632	58.8892	.7658	.9420
Q26_E	7.5205	59.9922	.7846	.9414
Q26_F	7.4211	59.6923	.7762	.9416
Q26_G	7.5556	60.1660	.8022	.9410
Q26_H	7.3450	59.9214	.7242	.9431
Q26_I	7.5263	59.9331	.7221	.9432
Q26_J	7.5497	60.2843	.7827	.9415
Q26_K	7.5906	60.4079	.8182	.9407
Q26_L	7.7719	63.1653	.6993	.9440
Q26_M	7.7719	64.1889	.6352	.9454
Q26_N	7.7719	64.8124	.5518	.9470

R E L I A B I L I T Y   A N A L Y S I S   -   S C A L E   (A L P H A)

Reliability Coefficients

N of Cases = 171.0 N of Items = 14

Alpha = .9468

Item 27: Teachers' technology-related professional development needs

R E L I A B I L I T Y   A N A L Y S I S   -   S C A L E   (A L P H A)

		Mean	Std Dev	Cases
1.	Q27_A	2.4789	.6748	284.0
2.	Q27_B	2.5493	.6243	284.0
3.	Q27_C	2.5317	.6691	284.0
4.	Q27_D	2.5563	.6514	284.0
5.	Q27_E	2.6585	.6058	284.0
6.	Q27_F	2.6268	.6133	284.0
7.	Q27_G	2.6232	.6366	284.0
8.	Q27_H	2.4859	.6205	284.0
9.	Q27_I	2.5775	.6654	284.0
10.	Q27_J	2.5634	.6231	284.0
11.	Q27_K	2.6127	.6495	284.0
12.	Q27_L	2.7113	.5954	284.0
13.	Q27_M	2.7430	.5258	284.0
14.	Q27_N	2.6620	.6390	284.0
15.	Q27_O	2.7113	.5649	284.0
16.	Q27_P	2.6549	.5890	284.0
17.	Q27_Q	2.7254	.5269	284.0
18.	Q27_R	2.7183	.5232	284.0

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	47.1901	72.4089	8.5093	18

RELIABILITY ANALYSIS - SCALE (ALPHA)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q27_A	44.7113	64.5524	.6825	.9587
Q27_B	44.6408	64.2239	.7790	.9571
Q27_C	44.6585	63.5402	.7894	.9569
Q27_D	44.6338	63.4626	.8211	.9564
Q27_E	44.5317	64.7446	.7485	.9576
Q27_F	44.5634	64.0066	.8179	.9565
Q27_G	44.5669	63.6245	.8251	.9564
Q27_H	44.7042	65.1702	.6842	.9586
Q27_I	44.6127	63.4890	.7995	.9568
Q27_J	44.6268	64.2418	.7789	.9571
Q27_K	44.5775	63.4180	.8283	.9563
Q27_L	44.4789	65.8193	.6454	.9591
Q27_M	44.4472	65.8099	.7412	.9578
Q27_N	44.5282	65.5151	.6270	.9595
Q27_O	44.4789	65.9748	.6663	.9588
Q27_P	44.5352	64.6454	.7830	.9571
Q27_Q	44.4648	66.4899	.6565	.9589
Q27_R	44.4718	66.5752	.6512	.9590

Reliability Coefficients

N of Cases = 284.0 N of Items = 18

Alpha = .9600

Item 28: Attitude toward computers

RELIABILITY ANALYSIS - SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	Q28_A	3.4047	.6844	257.0
2.	Q28_B	3.3580	.7155	257.0

3.	Q28_C	2.7782	.9022	257.0
4.	Q28_D	3.2335	.6903	257.0
5.	Q28_E	2.7276	.8947	257.0
6.	Q28_F	2.5798	.9325	257.0
7.	Q28_G	2.9377	.8028	257.0
8.	Q28_H	3.3113	.6030	257.0
9.	Q28_I	3.2023	.6540	257.0
10.	Q28_J	3.4241	.6458	257.0
11.	Q28_K	3.0233	.7177	257.0
12.	Q28_L	2.9689	.7228	257.0
13.	Q28_M	3.2840	.7078	257.0
14.	Q28_N	3.2646	.7016	257.0
15.	Q28_O	3.4163	.6686	257.0
16.	Q28_P	2.9300	.7924	257.0
17.	Q28_Q	3.1518	.7981	257.0
18.	Q28_R	3.5486	.6721	257.0
19.	Q28_S	3.1595	.7868	257.0
20.	Q28_T	2.6887	.8774	257.0

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	62.3930	55.6145	7.4575	20

RELIABILITY ANALYSIS - SCALE (ALPHA)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q28_A	58.9883	50.1756	.5126	.8261
Q28_B	59.0350	50.4089	.4620	.8280
Q28_C	59.6148	51.5190	.2534	.8391
Q28_D	59.1595	50.7205	.4493	.8287
Q28_E	59.6654	52.3016	.1941	.8421
Q28_F	59.8132	53.2853	.1072	.8474
Q28_G	59.4553	50.8349	.3612	.8327
Q28_H	59.0817	50.8175	.5156	.8268
Q28_I	59.1907	50.3815	.5176	.8261
Q28_J	58.9689	50.3193	.5324	.8256
Q28_K	59.3696	50.0933	.4928	.8267
Q28_L	59.4241	49.4014	.5601	.8236
Q28_M	59.1089	50.2068	.4891	.8269
Q28_N	59.1284	49.9874	.5176	.8257

Q28_O	58.9767	49.6401	.5866	.8231
Q28_P	59.4630	49.9684	.4480	.8285
Q28_Q	59.2412	49.0744	.5279	.8245
Q28_R	58.8444	50.9210	.4422	.8291
Q28_S	59.2335	49.1328	.5316	.8244
Q28_T	59.7043	53.2481	.1247	.8453

Reliability Coefficients

N of Cases = 257.0 N of Items = 20

Alpha = .8373

Item 28: Attitude toward computers: Liking

RELIABİLITY ANALYSIS - SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	Q28_A	3.3974	.6896	307.0
2.	Q28_B	3.3746	.7138	307.0
3.	Q28_D	3.2248	.6990	307.0
4.	Q28_E	2.7101	.9024	307.0
5.	Q28_I	3.2052	.6570	307.0
6.	Q28_P	2.9186	.7941	307.0

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	18.8306	7.1608	2.6760	6

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q28_A	15.4332	4.9261	.5747	.5205
Q28_B	15.4560	5.6018	.3106	.6161
Q28_D	15.6059	5.2461	.4454	.5681
Q28_E	16.1205	5.2501	.2651	.6462
Q28_I	15.6254	5.2546	.4896	.5557
Q28_P	15.9121	5.7145	.2148	.6551

Reliability Coefficients

N of Cases = 307.0 N of Items = 6
Alpha = .6386

Item 28: Attitude toward computers: Usefulness

RELIABILITY ANALYSIS - SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	Q28_C	2.7500	.8982	292.0
2.	Q28_F	2.5651	.9338	292.0
3.	Q28_G	2.9486	.8212	292.0
4.	Q28_H	3.3014	.6245	292.0
5.	Q28_J	3.4212	.6714	292.0
6.	Q28_R	3.5616	.6681	292.0
7.	Q28_T	2.6849	.8754	292.0

Statistics for SCALE	Mean	Variance	Std Dev	N of Variables
	21.2329	7.7875	2.7906	7

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q28_C	18.4829	5.8107	.2702	.4566
Q28_F	18.6678	6.5662	.0730	.5541
Q28_G	18.2842	5.8468	.3189	.4340
Q28_H	17.9315	6.1465	.4040	.4158
Q28_J	7.8116	5.9885	.4103	.4073
Q28_R	17.6712	6.3245	.3025	.4486
Q28_T	18.5479	6.6609	.0797	.5442

Reliability Coefficients

N of Cases = 292.0 N of Items = 7

Alpha = .5065

Item 28: Attitude toward computers: Confidence

RELIABILITY ANALYSIS - SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	Q28_K	3.0234	.7262	342.0
2.	Q28_L	2.9532	.7371	342.0
3.	Q28_Q	3.1433	.7958	342.0

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	9.1199	3.0442	1.7448	3

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q28_K	6.0965	1.4892	.5799	.4198
Q28_L	6.1667	1.4707	.5763	.4216
Q28_Q	5.9766	1.7883	.2925	.8027

Reliability Coefficients

N of Cases = 342.0 N of Items = 3

Alpha = .6604

Item 28: Attitude toward computers: Anxiety

RELIABILITY ANALYSIS - SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	Q28_M	3.2933	.6917	341.0
2.	Q28_N	3.2845	.6804	341.0
3.	Q28_O	3.4106	.6654	341.0

4.	Q28_S	3.1525	.7555	341.0

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	13.1408	4.8272	2.1971	4

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q28_M	9.8475	2.7061	.7218	.6816
Q28_N	9.8563	2.7646	.7070	.6905
Q28_O	9.7302	2.8270	.6961	.6976
Q28_S	9.9883	3.3116	.3436	.8731

Reliability Coefficients

N of Cases = 341.0 N of Items = 4

Alpha = .7934

Item 29: Computer use

RELIABILITY ANALYSIS - SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	Q29_A	2.0688	1.5070	320.0
2.	Q29_B	1.4750	1.3388	320.0
3.	Q29_C	.5156	1.0292	320.0
4.	Q29_D	.9156	1.1992	320.0
5.	Q29_E	.8531	1.2293	320.0
6.	Q29_F	.3938	.9172	320.0
7.	Q29_G	.2188	.6688	320.0
8.	Q29_H	.5844	1.0320	320.0

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	7.0250	45.1467	6.7191	8

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q29_A	4.9563	33.2959	.5508	.8809
Q29_B	5.5500	32.9191	.6792	.8607
Q29_C	6.5094	35.3541	.7135	.8576
Q29_D	6.1094	33.5084	.7347	.8537
Q29_E	6.1719	32.7509	.7736	.8491
Q29_F	6.6313	36.9232	.6622	.8638
Q29_G	6.8063	39.9122	.5665	.8750
Q29_H	6.4406	36.6422	.5955	.8686

Reliability Coefficients

N of Cases = 320.0   N of Items = 8

Alpha = .8789

Item 30: Internet use

RELIABILITY ANALYSIS - SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	Q30_A	1.5385	1.5114	286.0
2.	Q30_B	.9545	1.1400	286.0
3.	Q30_C	.2238	.6950	286.0
4.	Q30_D	.5385	.9386	286.0
5.	Q30_E	.1958	.6517	286.0
6.	Q30_F	.1678	.6039	286.0
7.	Q30_G	.4196	.8618	286.0
8.	Q30_H	.4196	.8819	286.0
9.	Q30_I	1.0769	1.2598	286.0
10.	Q30_J	.8986	1.2482	286.0
11.	Q30_K	.6678	1.1927	286.0
12.	Q30_L	.1923	.6868	286.0
13.	Q30_M	.2587	.6879	286.0
14.	Q30_N	.3112	.7976	286.0

15.	Q30_O	.7343	1.0426	286.0
16.	Q30_P	.3077	.8396	286.0
17.	Q30_Q	.1434	.5654	286.0
18.	Q30_R	.2203	.6834	286.0
19.	Q30_S	.2832	.7494	286.0

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	9.5524	148.5429	12.1878	19

RELIABILITY ANALYSIS - SCALE (ALPHA)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q30_A	8.0140	123.6419	.6728	.9367
Q30_B	8.5979	128.0869	.7424	.9328
Q30_C	9.3287	137.4425	.6515	.9351
Q30_D	9.0140	132.6524	.6942	.9338
Q30_E	9.3566	138.8829	.6013	.9359
Q30_F	9.3846	139.6200	.5997	.9361
Q30_G	9.1329	133.4630	.7201	.9334
Q30_H	9.1329	132.5507	.7492	.9329
Q30_I	8.4755	125.7240	.7515	.9328
Q30_J	8.6538	125.5464	.7664	.9324
Q30_K	8.8846	127.6463	.7226	.9334
Q30_L	9.3601	138.2804	.6062	.9357
Q30_M	9.2937	137.8082	.6354	.9353
Q30_N	9.2413	134.9907	.6969	.9340
Q30_O	8.8182	129.8686	.7401	.9328
Q30_P	9.2448	135.8136	.6144	.9353
Q30_Q	9.4091	140.3338	.5889	.9364
Q30_R	9.3322	140.3980	.4740	.9376
Q30_S	9.2692	139.0255	.5068	.9371

Reliability Coefficients

N of Cases = 286.0 N of Items = 19

Alpha = .9380

Item 32: Use of computer applications

RELIABILITY ANALYSIS - SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	Q32_A	1.2300	1.4181	313.0
2.	Q32_B	.8754	1.2223	313.0
3.	Q32_C	.9840	1.2772	313.0
4.	Q32_D	.4665	.9606	313.0
5.	Q32_E	.8179	1.0928	313.0
6.	Q32_F	.2268	.6720	313.0
7.	Q32_G	.1981	.6090	313.0
8.	Q32_H	.7061	1.0047	313.0
9.	Q32_I	.4473	.8868	313.0
10.	Q32_J	1.0671	1.3440	313.0
11.	Q32_K	.4409	.8864	313.0
12.	Q32_L	1.3802	1.4933	313.0
13.	Q32_M	.9105	1.3101	313.0
14.	Q32_N	.1853	.6916	313.0
15.	Q32_O	.1885	.6402	313.0

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	10.1246	126.3081	11.2387	15

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q32_A	8.8946	102.4985	.7592	.9163
Q32_B	9.2492	108.8095	.6276	.9205
Q32_C	9.1406	105.3648	.7366	.9168
Q32_D	9.6581	111.7129	.6733	.9191
Q32_E	9.3067	110.8223	.6211	.9204
Q32_F	9.8978	117.2844	.5889	.9222
Q32_G	9.9265	118.5234	.5591	.9231
Q32_H	9.4185	111.8723	.6317	.9201
Q32_I	9.6773	113.6423	.6283	.9204
Q32_J	9.0575	103.6313	.7627	.9159
Q32_K	9.6837	113.0182	.6634	.9196
Q32_L	8.7444	100.3063	.7947	.9151
Q32_M	9.2141	103.3611	.7970	.9146

Q32_N	9.9393	119.2495	.4356	.9250
Q32_O	9.9361	119.2074	.4786	.9244

RELIABILITY ANALYSIS - SCALE (ALPHA)

Reliability Coefficients

N of Cases = 313.0 N of Items = 15

Alpha = .9247

Item 33: Learning activities with computer

RELIABILITY ANALYSIS - SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	Q33_A	1.4713	.6930	331.0
2.	Q33_B	1.4502	.6830	331.0
3.	Q33_C	1.6435	.8311	331.0

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	4.5650	2.8223	1.6800	3

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q33_A	3.0937	1.6670	.3773	.6117
Q33_B	3.1148	1.3928	.5974	.3186
Q33_C	2.9215	1.3999	.3721	.6475

Reliability Coefficients

N of Cases = 331.0 N of Items = 3

Alpha = .6298

Item 35: Barriers with regard to computer use

RELIABILITY ANALYSIS - SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	Q35_A	2.3725	.8240	298.0
2.	Q35_B	2.3893	.8466	298.0
3.	Q35_C	3.1242	.8336	298.0
4.	Q35_D	3.5168	.6042	298.0
5.	Q35_E	3.3389	.6736	298.0
6.	Q35_F	1.7852	.7834	298.0
7.	Q35_G	1.7315	.7533	298.0
8.	Q35_H	3.3490	.7603	298.0
9.	Q35_I	1.7550	1.0069	298.0
10.	Q35_J	1.5201	.8131	298.0
11.	Q35_K	2.5134	.8693	298.0
12.	Q35_L	3.4732	.7346	298.0
13.	Q35_M	2.9195	.8724	298.0

Statistics for SCALE	Mean	Variance	Std Dev	N of Variables
	33.7886	18.4299	4.2930	13

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q35_A	31.4161	15.8801	.2849	.5605
Q35_B	31.3993	15.9242	.2648	.5645
Q35_C	30.6644	17.0318	.1022	.5974
Q35_D	30.2718	16.8316	.2488	.5701
Q35_E	30.4497	17.0227	.1715	.5817
Q35_F	32.0034	15.9360	.3006	.5579
Q35_G	32.0570	16.5186	.2195	.5736
Q35_H	30.4396	16.5906	.2036	.5766
Q35_I	32.0336	15.6689	.2192	.5767
Q35_J	32.2685	15.7863	.3068	.5561
Q35_K	31.2752	15.5537	.3093	.5547
Q35_L	30.3154	16.4793	.2366	.5706
Q35_M	30.8691	15.9054	.2534	.5670

RELIABILITY ANALYSIS - SCALE (ALPHA)

Reliability Coefficients

N of Cases = 298.0 N of Items = 13

Alpha = .5896

Item 36: Reasons why teachers do not use computer

RELIABILITY ANALYSIS - SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	Q36_A	2.9197	1.0088	249.0
2.	Q36_B	2.8675	1.0561	249.0
3.	Q36_C	2.1847	1.0110	249.0
4.	Q36_D	2.4980	.8382	249.0
5.	Q36_E	2.4056	.8182	249.0
6.	Q36_F	2.5863	.9845	249.0
7.	Q36_G	2.5984	.9415	249.0
8.	Q36_H	3.2450	.7983	249.0
9.	Q36_I	3.2811	.9966	249.0
10.	Q36_J	3.2490	.9516	249.0
11.	Q36_K	2.7309	1.0297	249.0
12.	Q36_L	2.7590	.9323	249.0
13.	Q36_M	3.4257	.8054	249.0
14.	Q36_N	3.3614	.8459	249.0
15.	Q36_O	3.2129	.8369	249.0
16.	Q36_P	3.2369	.9092	249.0
17.	Q36_Q	2.5703	.9940	249.0
18.	Q36_R	2.7550	.9756	249.0
19.	Q36_S	2.4538	1.0506	249.0
20.	Q36_T	3.1888	.7934	249.0
21.	Q36_U	2.6145	1.0337	249.0
22.	Q36_V	3.1044	.8014	249.0
23.	Q36_W	2.5261	.9921	249.0
24.	Q36_X	2.7912	1.0063	249.0
25.	Q36_Y	2.8956	.9446	249.0
26.	Q36_Z	2.9357	.8912	249.0

Statistics for SCALE	Mean	Variance	Std Dev	N of Variables
	74.3976	149.0066	12.2068	26

RELIABILITY ANALYSIS - SCALE (ALPHA)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q36_A	71.4779	138.5892	.3957	.8779
Q36_B	71.5301	138.3307	.3848	.8783
Q36_C	72.2129	139.2005	.3682	.8786
Q36_D	71.8996	142.7520	.2772	.8804
Q36_E	71.9920	143.9032	.2259	.8814
Q36_F	71.8112	141.8876	.2622	.8813
Q36_G	71.7992	139.1450	.4041	.8776
Q36_H	71.1526	141.5492	.3590	.8785
Q36_I	71.1165	138.1840	.4195	.8772
Q36_J	71.1486	139.1593	.3983	.8777
Q36_K	71.6667	136.4731	.4769	.8757
Q36_L	71.6386	135.8608	.5649	.8735
Q36_M	70.9719	139.6323	.4584	.8764
Q36_N	71.0361	138.3011	.5021	.8753
Q36_O	71.1847	137.5706	.5468	.8743
Q36_P	71.1606	136.4741	.5510	.8739
Q36_Q	71.8273	135.8209	.5265	.8743
Q36_R	71.6426	137.7629	.4494	.8764
Q36_S	71.9438	138.0533	.3990	.8779
Q36_T	71.2088	140.4562	.4212	.8772
Q36_U	71.7831	135.7915	.5042	.8749
Q36_V	71.2932	138.7403	.5098	.8752
Q36_W	71.8715	136.5883	.4931	.8752
Q36_X	71.6064	136.2800	.4986	.8751
Q36_Y	71.5020	134.5091	.6209	.8720
Q36_Z	71.4618	137.9512	.4902	.8754

Reliability Coefficients

N of Cases = 249.0 N of Items = 26

Alpha = .8808

G. Institutional Review Board Approval Letter

University of Pittsburgh
Institutional Review Board

Exempt and Expedited Reviews
Christopher M. Ryan, Ph.D., Vice Chair

3500 Fifth Avenue
Suite 105
Pittsburgh, PA 15213
Phone: 412.578.3424
Fax: 412.578.8566
e-mail: irbexempt@msx.upmc.edu

TO: Melike Ozer, M.Ed.

FROM: Christopher M. Ryan, Ph.D., Vice Chair *Ch*

DATE: 7/16/2003

PROTOCOL: Factors in Computer Internet Technology Implementation in Biology, Chemistry, and Physics Education in Turkish Secondary Schools.

IRB Number: 0303014

The above-referenced protocol has been reviewed by the University of Pittsburgh Institutional Review Board. This protocol meets all the necessary requirements and is hereby designated as "exempt" under section 45 CFR 46.101(b)(2). Exempt protocols must be re-reviewed every three years. If you wish to continue the research after that time, a new application must be submitted.

- If any modifications are made to this project, please submit an 'exempt modification' form to the IRB.
- Please advise the IRB when your project has been completed so that it may be officially terminated in the IRB database.
- This research study may be audited by the University of Pittsburgh Research Conduct and Compliance Office.

Approval Date: 7/16/2003
Renewal Date: 7/16 2006

University of Pittsburgh
Institutional Review Board

Exempt and Expedited Reviews
Christopher M. Ryan, Ph.D., Vice Chair

Multiple Project Assurance: M-1259

3500 Fifth Avenue
Suite 105
Pittsburgh, PA 15213
Phone: 412.578.3424
Fax: 412.578.8566
e-mail: irbexempt@msx.upmc.edu

TO: Melike Ozer, M.Ed.

FROM: Christopher M. Ryan, Ph.D., Vice Chair

DATE: 11/14/2003

PROTOCOL: Factors Associated with Computer and Internet Technology Implementation in Biology, Chemistry, and Physics Education in Turkish Secondary Schools

IRB Number: 0303014

The Institutional Review Board reviewed the recent modifications to your protocol and find them acceptable for expedited review. These changes, noted in your submission of 11/13/2003, are approved.

- Please advise the IRB when your project has been completed so that it may be officially terminated in the IRB database.
- This research study may be audited by the University of Pittsburgh Research Conduct and Compliance Office.

Approval Date: 11/13/2003

CR/ky

H. The Letter of General Directorate of Educational Technologies

T.C.
MİLLİ EĞİTİM BAKANLIĞI
Eğitim Teknolojileri Genel Müdürlüğü

SAYI : B.08.0.ETG.0.21.08.01.300/ 4688 9 / 5 / 2003
KONU: Bilgisayar ve İnternet Anketi

.. VALİLİĞİNE
(İl Milli Eğitim Müdürlüğü)

Milli Eğitim Bakanlığı'nın yurtdışında öğrenim görecek kişilere verdiği eğitim bursu ile Pittsburgh Üniversitesi'nde doktora öğrenimi gören Melike ÖZER "Türkiye'de Bulunan Ortaöğretim Okullarında Biyoloji, Kimya ve Fizik Eğitiminde Bilgisayar ve İnternet Teknolojilerinin Kullanımını Etkileyen Faktörler" konulu bir doktora tez çalışması yapmaktadır.

Ankette yer alan verilerin değerlendirilmesi sonucu oluşacak raporun, Bakanlığımız çalışmalarına da ışık tutacağı düşünülmektedir. Bu amaçla ilinizde anket uygulanacak ortaöğretim kurumları tespit edilmiştir. Bu okullarda; okul yöneticisi ve her okulda iki branş öğretmeni için ayrı ayrı hazırlanan anketleri doldurmaları gerekmektedir.

Bu çalışmanın 26 Mayıs 2003 tarihine kadar tamamlanarak Eğitim Teknolojileri Genel Müdürlüğü 06500 Teknikokullar ANKARA adresine okullar tarafından doğrudan posta yolu ile gönderilmesinin sağlanması hususunda gereğini rica ederim.

Ruhi ESİRGEN
Bakan a.
Genel Müdür

EKLER
EK 1 : İlinizde Ankete Katılacak Okul Listesi
EK 2: Anket Formları (... takım – 1 takım 26 yaprak)

Teknikokullar 06500 ANKARA
Tel : 296 94 00
Faks: 223 87 36
E-posta : egitek@eğitek.gov.tr
Int. adresi : http://egitek.meb.gov.tr

TURKISH REPUBLIC

THE MINISTRY OF NATIONAL EDUCATION

General Directorate of Educational Technology

No : ....

Subject: Computer and Internet Survey 9/5/2003

.... Provincial Directorate of National Education

Melike Ozer, who was sent to the University of Pittsburgh by the scholarship of Ministry of National Education, is doing her doctoral study on "Factors In Computer And Internet Technology Implementation In Biology, Chemistry, And Physics Education In Turkish Secondary Schools."

It is assumed that the evaluation of her doctoral study results will give direction to the prospective projects in that field. From this respect, some of the schools in your province were selected. The school principal and two science teachers from each selected schools should fill out the relevant surveys of the study.

We expect you to show necessary effort to make schools send their surveys by direct mail to the address ....

Name

General Director

Included:

1. List of the participating schools
2. Surveys (... pocket, each pocket with 26 pages)

Address:	Phone :	E-mail :
	Fax :	URL :

I. Selecting Science Teachers

Sayın Okul Yöneticisi,

Milli Eğitim Bakanlığı'nın yurtdışında öğrenim görecek kişilere verdiği eğitim bursu ile Pittsburgh Üniversitesi'nde doktora öğrenimime devam etmekteyim. "Türkiye'de Bulunan Ortaöğretim Okullarında Biyoloji, Kimya ve Fizik Eğitiminde Bilgisayar ve İnternet Teknolojilerinin Kullanımını Etkileyen Faktörler" konulu doktora tezi çalışmam MEB Eğitim Teknolojileri Genel Müdürlüğü tarafından desteklenmektedir. Elinizdeki pakette "Bilgisayar ve İnternet Kullanımı: Okul Anketi" (Okul yöneticileri için), "Fen Bilimleri Öğretmenlerinin Bilgisayar ve İnternet Kullanımı" (Biyoloji, kimya ve fizik öğretmenleri için) ve bilgi formu bulunmaktadır.

Çalışmaya her okuldan 1 okul yöneticisi ve 2 branş öğretmeninin katılımı istenmektedir. Araştırma için okulunuzdaki branş öğretmenlerinin seçiminde sizin yardımınıza ihtiyaç duymaktayım.

Okulunuzda fen derslerini yürüten bir ya da iki öğretmen varsa "Fen Bilimleri Öğretmenlerinin Bilgisayar ve İnternet Kullanımı" anketinin bu öğretmenler tarafından doldurulması gerekmektedir. İkiden fazla biyoloji, kimya ve fizik öğretmeni bulunması durumunda, bu öğretmenleri soyadlarına göre alfabetik olarak sıralamanız ve bu listedeki ilk iki branş öğretmenine anketleri vermeniz örnek seçimi açısından önem taşımaktadır.

Anketlerin doldurulmasında tüm soruların eksiksiz cevaplandırılması, araştırmanın amacına ulaşması açısından oldukça önemlidir. Öğretmenlerin seçiminde ve soruların cevaplandırılmasında göstereceğiniz yardımınız için şimdiden çok teşekkür ediyor iyi çalışmalar diliyorum.

Saygılarımla,

Melike Özer

Dear School Principal,

I am on the process of continuing my doctoral degree on science education at the University of Pittsburgh by the scholarship of Ministry of National Education. My dissertation topic on "Factors In Computer And Internet Technology Implementation In Biology, Chemistry, And Physics Education.In Turkish Secondary Schools" is supported by General Directorate of Educational Technology. The package that you have is included followings, "Computer and the Internet Use: School Survey" (school administrator's survey), "Science Teacher Computer and Internet Use" (Science Teacher Survey), and consent form.

We expect one school principal and two science teachers from each selected school to participate in my study. But your help in selecting science teachers from your school is very necessary at this point.

If you have one or two science teachers in your schools, your science teachers should fill out "Science Teacher Computer and Internet Use" surveys. However, if you have more than two science teachers in your school, we expect you list your science teachers alphabetically and then select first two names in your list and give "Science Teacher Computer and Internet Use" surveys to those selected teachers. This process is very important for sampling procedure for my study.

Completing the surveys without missing any questions is really important to meet our study purposes. We appreciate your help and thank you for your effort for teacher selection process and your attention on answering questions on surveys properly.

Sincerely,

Melike Ozer

J. Informed Consent Document (in English and Turkish)

INFORMED CONSENT DOCUMENT

TITLE: Factors in computer and Internet technology implementation in Biology, Chemistry, and Physics education in Turkish secondary schools.

PRINCIPAL INVESTIGATOR: Melike Ozer, M.Ed.
Ph. D Student, University of Pittsburgh
Address:
E-mail: meost11@pitt.edu
Phone:

Why is this research being done?

You are being asked to participate in a research study in which we will examine how computers and the Internet are used in science education. The purpose of this research is to isolate the variables related to computer and Internet technology implementation in secondary school science subject areas in Turkey. This research will examine the current status of computer technology in schools, and also identify the factors that encourage or prevent teachers from using the computer in education. We will ask 250 school administrators and 500 science teachers to complete the survey (approximately 40-45 minutes) about their computer use, and issues regarding computer use.

Who is being asked to take part in this research study?

People invited into this research have to be either males or females between 21-65 years of age. The research is being performed on a total of 250 secondary schools that have computer lab. A total of 250 administrators and 500 science teachers will take part in this research.

What procedures will be performed for research purposes?

If you decide to take part in this research study, surveys will be distributed to you. The completed surveys will be returned to the principal investigator.

What are the possible benefits, risks, and discomforts of this research study?

There are no foreseeable risks associated with this project, nor are there any direct benefits to you. You will receive no direct benefit from taking part in this research study.

Who will know about my participation in this research study?

All records related to your involvement in this research study will be stored in a locked file cabinet. Your identity on these records will be indicated by a case number. The information linking these case numbers with your identity will be kept separate from the research records. Only the researcher listed on the first page of this form will have access to your research records. Your research records will be retained for at least 5 years following study completion, per University policy.

Any information about you and your school obtained from this research will be kept as confidential as possible. You and your school will not be identified by name in any publication of research results.

Is my participation in this research study voluntary?

Your participation in this research study is completely voluntary. You do not have to take part in this research study and, should you change your mind, you can withdraw from the study at any time.

BİLGİ FORMU

Konu: Türkiye'de Bulunan Orta Öğretim Okullarında Biyoloji, Kimya ve Fizik Eğitiminde Bilgisayar ve İnternet Teknolojilerinin Kullanımını Etkileyen Faktörler

Araştırmacı : Melike Özer, M.Ed

Doktora öğrencisi, Pittsburgh Üniversitesi, ABD

Adres:
E-posta: meost11@pitt.edu
Telefon:

Araştırmanın amacı nedir?

Fen bilimleri eğitiminde bilgisayar ve İnternet teknolojisinin nasıl kullanıldığını araştırmak üzere hazırlanmış bir çalışmaya katılımınız istenmektedir. Çalışmanın amacı ülkemizde ortaöğretim okullarında okutulan fen bilimleri (biyoloji, kimya ve fizik) derslerinde bilgisayar ve İnternet teknolojisinin kullanımını etkileyen faktörleri belirlemektir. Söz konusu araştırmada okullarda mevcut bilgisayar ve İnternet kullanımı incelenecek aynı zamanda okul içinde bilgisayar kullanımını destekleyen yada engelleyen faktörler belirlenecektir. Araştırmada 250 okul yöneticisine ve 500 fen bilimleri öğretmenlerine bilgisayar kullanımı ve bu konuda karşılaşılan sorunlar hakkında bir anket (yaklaşık 40 -45 dakika) uygulanacaktır.

Araştırmaya kim katılıyor?

Araştırmaya 21 ile 65 yaş grubundaki öğretmen ve yöneticiler katılacaktır. Araştırma toplam 250 ortaöğretim okulunda gerçekleştirilecek ve çalışmaya toplam 250 okul yöneticisi ve 500 fen bilimleri öğretmeni katılacaktır.

Araştırma sırasında ne yapacaksınız?

Araştırmaya katılmayı kabul ettiğinizde size bir anket yollanacaktır. Anket tamamlandıktan sonra araştırmacıya geri yollanacaktır.

Araştırmadaki muhtemel riskler, faydalar ve sıkıntılar nelerdir?

Araştırma ile bağlantılı olarak kesinlikle bir risk yada direkt bir fayda söz konusu değildir.

Araştırmaya katılımınızı kim bilecek?

Bu araştırmaya katılımınızla ilgili tüm belgeler kilitli bir dolapta saklanacaktır. Kayıtlarda kimliğiniz kesinlikle belirtilmeyecek ve kimliğiniz bir numara ile gösterilecektir. Numaralar ve kimliğinizle ilgili bilgiyi içeren kayıt ayrı bir yerde bulundurulacaktır. Söz konusu kayıda sadece yukarıda ismi belirtilen araştırmacı ulaşabilecektir. Araştırma ile ilgili tüm belgeler üniversitenin bir kuralı olarak çalışmanın tamamlanmasını takiben 5 yıl boyunca saklanacaktır.

Araştırmada toplanılan tüm bilgiler saklı tutulacaktır. Çalışma sonuçlarının yayınlanmasında kimliğiniz ve okul isimleri kesinlikle belirtilmeyecektir.

Araştırmaya katılmak kendi isteğime mi bağlı?

Araştırmaya katılımınız tamamiyle kendi isteğinize bağlıdır. Çalışmaya katılmak zorunda olmadığınız gibi fikrinizi değiştirdiğiniz anda istediğiniz zaman araştırmadan çekilebilirsiniz.

K. Tables

Table K.1. Number of School Administrators and Science Teachers Responding

	City	Sample	No of school administrator responding	No of science teachers responding
1	ADANA	5	4	8
2	ADIYAMAN	2	2	3
3	AFYON	5	4	7
4	AGRI	1	1	2
5	AKSARAY	2	2	4
6	AMASYA	2	2	4
7	ANKARA	15	14	27
8	ANTALYA	5	4	7
9	ARDAHAN	1	1	2
10	ARTVIN	2	2	2
11	AYDIN	5	4	8
12	BALIKESIR	5	5	10
13	BARTIN	2	2	4
14	BATMAN	1	-	-
15	BAYBURT	1	-	-
16	BILECIK	3	3	5
17	BINGOL	1	1	1
18	BITLIS	1	-	-
19	BOLU	2	2	4
20	BURDUR	2	2	4
21	BURSA	6	4	8
22	CANAKKALE	3	3	4
23	CANKIRI	2	2	4
24	CORUM	3	3	6
25	DENIZLI	4	3	5
26	DIYARBAKIR	2	1	2
27	DUZCE	1	1	1
28	EDIRNE	2	2	4
29	ELAZIG	2	1	2
30	ERZINCAN	2	2	4
31	ERZURUM	3	2	4
32	ESKISEHIR	3	2	3
33	GAZIANTEP	3	3	6
34	GIRESUN	2	1	2
35	GUMUSHANE	1	1	2
36	HAKKARI	1	1	2
37	HATAY	4	4	8
38	ICEL	6	4	8
39	IGDIR	1	1	2
40	ISPARTA	3	3	5
41	ISTANBUL	21	19	37

Table K.1 (cont'd)

	City	Sample	No of school administrator responding	No of science teachers responding
42	IZMIR	10	9	17
43	KAHRAMANMARAS	5	4	7
44	KARABUK	2	1	2
45	KARAMAN	1	1	2
46	KARS	1	1	2
47	KASTAMONU	2	2	3
48	KAYSERI	5	4	8
49	KILIS	1	1	1
50	KIRIKKALE	3	1	2
51	KIRKLARELI	2	1	2
52	KIRSEHIR	1	1	2
53	KOCAELI	4	2	4
54	KONYA	7	7	13
55	KUTAHYA	3	3	5
56	MALATYA	4	2	4
57	MANISA	4	4	8
58	MARDIN	2	2	3
59	MUGLA	3	3	6
60	MUS	1	1	2
61	NEVSEHIR	2	1	2
62	NIGDE	2	2	4
63	ORDU	3	3	6
64	OSMANIYE	2	1	2
65	RIZE	2	2	4
66	SAKARYA	3	3	6
67	SAMSUN	4	4	7
68	SANLIURFA	2	2	2
69	SIIRT	1	1	1
70	SINOP	2	2	4
71	SIRNAK	1	-	-
72	SIVAS	4	4	8
73	TEKIRDAG	3	2	4
74	TOKAT	4	4	8
75	TRABZON	4	4	8
76	TUNCELI	1	1	2
77	USAK	2	2	4
78	VAN	2	2	4
79	YALOVA	1	1	2
80	YOZGAT	3	1	2
81	ZONGULDAK	3	2	4
	Total	250	212	398

Table K.2. Distribution of School Administrators by Gender and Age

Demographics	Frequency	Percent (%)
Gender[1]		
Female	20	9.6
Male	189	90.4
Age[2]		
20-29	15	7.1
30-39	72	34.3
40-49	103	49.0
50-59	20	9.5

[1]There are 209 valid and 3 missing responses. [2]There are 210 valid and 2 missing responses.

Table K.3. Distribution of School Administrators by Highest Degree Earned

Degree	Frequency*	Percent (%)
Teacher preparation high school	12	5.8
Pre-bachelor	1	.5
Bachelor	181	87.0
Master	13	6.3
Doctorate	1	1

*There are 208 valid and 4 missing responses.

Table K.4. Distribution of School Administrators by Teaching Experience

Teaching experience	Frequency*	Percent (%)
Teaching experience		
Less than one year	-	-
1-3 years	4	1.9
4-6 years	15	7.1
7-9 years	22	10.5
10 years and more	169	80.5
Teaching experience at current school		
Less than one year	5	2.4
1-3 years	40	19.0
4-6 years	53	25.2
7-9 years	42	20.0
10 years and more	70	33.3

*There are 210 valid and 2 missing responses.

Table K.5. First Usage of Computer by School Administrator (Year)

					Percentiles		
Mean	Median	Mode	Min	Max	25%	50%	75%
1994.41	1995	1996	1983	2003	1992	1995	1998

Note: There are 207 valid and 5 missing responses.

Table K.6. School Administrators' Computer Use (Year)

Type of use	Mean *	SD	Median	Mode	Min	Max	Percentiles		
							25%	50%	75%
Individual use [1]	6.62	4.52	6	5	0	20	3	6	10
Preparing instructional materials [2]	3.99	3.70	3	0	0	20	0	3	6
Administrative purpose [3]	5.70	3.32	5	3	0	15	3	5	8
Instructional use [4]	2.33	3.31	0	0	0	13	0	0	4
Communication with students and parents [5]	2.32	3.16	0	0	0	14	0	0	4
Class Management [6]	1.80	3.09	0	0	0	14	0	0	3

*Grand mean= 4.25 *SD*=2.93. There are 207 valid and 5 missing responses.
[1]There are 200 valid and 12 missing responses.
[2]There are 180 valid and 32 missing responses.
[3]There are 203 valid and 9 missing responses.
[4]There are 165 valid and 47 missing responses.
[5]There are 167 valid and 45 missing responses.
[6]There are 156 valid and 56 missing responses.

Table K.7. School Administrators' Internet Use (Year)

Type of use	Mean [a]	SD	Median	Mode	Min	Max	Percentiles 25%	50%	75%
Individual use [1]	3.36	2.61	3	3	0	11	2	3	5
Preparing instructional materials [2]	2.0	2.44	2	0	0	13	0	2	3
Administrative purpose [3]	2.69	2.29	2	2	0	13	1	2	3
Instructional use [4]	1.04	2.05	0	0	0	13	0	0	2
Communication with students and parents [5]	.93	1.93	0	0	0	10	0	0	1
Class Management [4]	.86	2.05	0	0	0	13	0	0	0

[a] Grand mean= 2.15; *SD*=2.01. There are 199 valid and 13 missing responses.
[1]There are 194 valid and 18 missing responses.
[2]There are 172 valid and 40 missing responses.
[3]There are 188 valid and 24 missing responses.
[4]There are 150 valid and 62 missing responses.
[5]There are 159 valid and 53 missing responses.

Table K.8. Methods in Helping School Administrators Learn to Use the Computer

Methods	Mean [a]	SD	Not significant		Somewhat significant		Very significant	
			n	%	n	%	n	%
Personal interest [1]	2.87	.33	-	-	26	12.7	179	87.3
Family/friends/ students or teachers [2]	2.36	.63	14	8.1	83	48.0	76	43.9
Courses offered in undergraduate education [3]	1.78	.82	66	46.2	42	29.4	35	24.5
Technology –related professional development [4]	2.36	.76	28	16.9	50	30.1	88	53.0
Courses offered by other schools or organizations [5]	1.81	.78	59	41.5	51	35.9	32	22.5

Mean score scales: 1= Not significant; 2= Somewhat significant; 3= Very significant.
[a] Grand mean= 2.38 *SD*=.45 There are 206 valid and 6 missing responses.
[1]There are 205 valid and 7 missing responses.
[2] There are 173 valid and 39 missing responses.
[3]There are 143 valid and 69 missing responses.
[4] There are 166 valid and 46 missing responses.
[5]There are 142 valid and 70 missing responses.

Table K.9. Training Programs School Administrators Attended

Topics in training program	Frequency	Percent (%)
The use of computers in teaching [1]	117	76.5
How to integrate technology into curriculum [2]	24	15.9
Distance learning [3]	7	4.7

[1] There are 153 valid and 59 missing responses.
[2] There are 151 valid and 61 missing responses.
[3] There are 149 valid and 63 missing responses.

Table K.10. Level of Computer Skills Reported by School Administrators

Computer related applications	Mean [a]	SD	Not familiar with		Beginner		Intermediate		Advanced	
			n	%	n	%	n	%	n	%
Basic Operating Systems[1]	2.61	.91	28	13.9	54	26.9	88	43.8	31	15.4
Desktop publishing[2]	2.26	1.00	59	30.4	45	23.2	71	36.6	19	9.8
Word Processing [3]	2.53	1.02	42	22.1	38	20.0	78	41.1	32	16.8
Spreadsheets [4]	2.63	1.02	39	20.2	33	17.1	82	42.5	39	20.2
Databases[5]	1.93	.95	81	43.3	48	25.7	48	25.7	10	5.3
Presentation programs[6]	2.31	1.00	52	27.5	49	25.9	66	34.9	22	11.6
Multimedia [7]	2.31	.98	50	27.0	46	24.9	71	38.4	18	9.7
Internet browsers [8]	2.88	.81	15	7.4	35	17.3	111	55.0	41	20.3
Scanning [9]	2.44	.98	43	22.5	45	23.6	79	41.4	24	12.6
E-mail programs [4]	2.45	.96	41	21.2	48	24.9	80	41.5	24	12.4
Imaging [10]	2.14	.93	56	30.6	57	31.1	58	31.7	12	6.6
Web page creation [9]	1.62	.85	113	59.2	44	23.0	28	14.7	6	3.1
File Transfer Protocol (FTP) [5]	1.71	.91	102	54.5	46	24.6	30	16.0	9	4.8
Electronic bulletin boards, listserv, newsgroups, discuss groups [11]	2.11	.96	64	33.3	58	30.2	55	28.6	15	7.8

Mean score scales: 1= Not familiar with; 2= Beginner; 3= Intermediate; 4= Advanced.

[a] Grand mean= 2.29 *SD*=.73 There are 205 valid and 7 missing responses.
[2] There are 194 valid and 18 missing responses.
[4] There are 193 valid and 19 missing responses.
[6] There are 189 valid and 23 missing responses.
[8] There are 202 valid and 10 missing responses.
[10] There are 183 valid and 29 missing responses.
[1] There are 201 valid and 11 missing responses.
[3] There are 190 valid and 22 missing responses.
[5] There are 187 valid and 25 missing responses.
[7] There are 185 valid and 27 missing responses.
[9] There are 191 valid and 21 missing responses.
[11] There are 192 valid and 20 missing responses.

Table K.11. School Administrators' Beliefs about the Benefits of Technology

Does technology provide practical benefits?	Frequency*	Percent (%)
Don't know/ I am not sure	2	1.0
No benefits	-	-
Yes, in some cases	12	5.8
Yes, in most cases	193	93.2

*There are 207 valid and 5 missing responses.

Table K.12. Administrators' Beliefs about the Impact of Educational Technology on Student Academic Performance

The impact of educational technology	Frequency*	Percent (%)
Negative impact	1	.5
No impact	4	1.9
Positive impact	205	97.6

*There are 210 valid and 2 missing responses.

Table K.13. School Administrators' Attitudes toward Computers

Statements	Mean [a]	SD	Strongly disagree		Disagree		Agree		Strongly agree	
			n	%	n	%	n	%	n	%
I enjoy doing things on a computer [1]	3.44	.60	3	1.4	3	1.4	101	48.3	102	48.8
I am tired of using a computer [2*]	3.54	.66	5	2.4	4	1.9	72	34.6	127	61.1
I will be able to get a good job if I learn how to use a computer [3]	2.98	.85	9	4.7	43	22.5	82	42.9	57	29.8
I concentrate on using a computer [4]	3.33	.58	2	1.0	5	2.6	116	59.2	73	37.2
I enjoy computer games very much [5]	2.56	.84	23	11.6	64	32.2	90	45.2	22	11.1
I would work harder if I could use computers more often [6*]	2.78	.91	21	10.7	44	22.3	89	45.2	43	21.8
I think that it takes a long time to finish when I use a computer [5*]	3.35	.71	6	3.0	9	4.5	93	46.7	91	45.7
I can learn many things when I use a computer [7]	3.39	.59	3	1.5	2	1.0	110	54.2	88	43.3
I enjoy lessons on the computer [5]	3.28	.64	4	2.0	8	4.0	116	58.3	71	35.7
I believe that it is important for me to learn how to use a computer[8]	3.48	.64	5	2.5	1	.5	90	44.1	108	52.9

Table K.13 . (cont'd)

Statements	Mean [a]	SD	Strongly disagree		Disagree		Agree		Strongly agree	
			n	%	n	%	n	%	n	%
I think that computers are easy to use [7]	3.23	.64	2	1.0	18	8.9	115	56.7	68	33.5
I feel comfortable working with a computer [9]	3.24	.62	4	1.9	9	4.4	126	61.2	67	32.5
I get a sinking feeling when I think of trying to use a computer [7*]	3.58	.56	2	1.0	1	.5	77	37.9	123	60.6
Working with a computer makes me nervous [8*]	3.52	.57	1	.5	4	2.0	86	42.2	113	55.4
Using a computer is frustrating [10*]	3.54	.60	3	1.5	2	1.0	82	40.0	118	57.6
I will do as little work with computers as possible [8*]	3.31	.69	2	1.0	20	9.8	95	46.6	87	42.6
Computers are difficult to use [10*]	3.42	.67	3	1.5	12	5.9	85	41.5	105	51.2
Computers do not scare me at all [9]	3.16	.90	18	8.7	15	7.3	89	43.2	84	40.8
I can learn more from books than from a computer [9*]	2.83	.75	9	4.4	51	24.8	111	53.9	35	17.0

Note: Mean score scales: 1=Strongly disagree; 2= Disagree; 3= Agree; 4= Strongly agree

[a] Grand mean= 3.27 *SD*=.36 There are 210 valid and 2 missing responses.
[2] There are 208 valid responses and 4 missing responses.
[4] There are 196 valid responses and 16 missing responses.
[6] There are 197 valid responses and 15 missing responses
[8] There are 204 valid responses and 8 missing responses
[10] There are 205 valid responses and 7 missing responses

[1] There are 209 valid and 3 missing responses.
[3] There are 191 valid responses and 21 missing responses.
[5] There are 199 valid responses and 13 missing responses.
[7] There are 203 valid responses and 9 missing responses.
[9] There are 206 valid responses and 6 missing responses.
[*] These items are reverse-coded.

Table K.14. School Type

School type	Frequency	Percent (%)
General High School	44	20.8
Anatolian High School and Science High School	28	13.2
Vocational and Technical High School	49	23.1
Multi-Program High School	36	17.0
Anatolian Vocational and Technical High School	48	22.6
Anatolian Teacher Preparation High School	3	1.4
Religious Education School	4	1.9
Total	212	100.0

Table K.15. Number of Students and Teachers

Demographics	Mean	SD	Range	Median	Mode	Min	Max	Percentiles		
								25%	50%	75%
Students[1]	742.79	719.43	4506	507	650	35	4541	230	507	1057
Teachers[2]	45.87	36.38	235	38	20*	1	236	20	38	59
Science teachers[2]	5.73	4.72	29	4	3	1	30	3	4	7

[1]There are 204 valid and 8 missing responses. [2]There are 203 valid and 9 missing responses.
*Multiple modes exist. The smallest value is shown

Table K.16. School Budget for Computer and Internet Technologies

Currency	Mean	SD	Median	Mode	Min	Max	Percentiles		
							25%	50%	75%
Turkish Lira (TL)	2.35E+09	5.29E+09	1.00E+09	0.00E+00	0.00E+00	5.00E+10	0.00E+00	1.00E+09	2.50E+09
Dollar ($)	1.57E+03	3.53E+03	6.67E+02	0.00E+00	0.00E+00	3.33E+04	0.00E+00	6.67E+02	1.67E+03

Note: There are 135 valid and 77 missing responses. 1$= 1,500,000 Turkish Lira

Table K.17. Schools' Written Plan Regarding Educational Technology

Written plan	Frequency	Percent (%)
Have a written plan	95	47.0
a school-specific technology plan	23	11.4
a plan developed by the MONE	41	20.3
Modified plan developed by the MONE	31	15.3
Do not have a written plan	107	53.0
Total	202	100.0

Note: The Ministry of National Education (MONE)

Table K.18. Schools' Major Goals Related to Use of Educational Technology Resources

Goals	Frequency	Percent (%)
Providing professional development for teachers on using technology [1]	124	59.9
Providing professional development for teachers on integrating technology into instruction[2]	82	39.8
Using technology to deliver professional development for teachers [2]	63	30.6
Providing technical support for teachers [1]	108	52.2
Increasing the availability of modern computers in the classroom [3]	86	42.0
Increasing connectivity to the Internet[2]	120	58.3
Providing software and online resources [4]	76	37.3
Improving students' educational technology proficiency[2]	156	75.7
Improving students' academic achievement[2]	112	54.4
Supporting parental involvement [2]	115	55.8
Improving administrative efficiency such as better record keeping and monitoring systems[3]	143	69.8

Note: Respondents could select all that applied
[1]There are 207 valid and 5 missing responses.
[2]There are 206 valid and 6 missing responses.
[3]There are 205 valid and 7 missing responses.
[4]There are 204 valid and 8 missing responses.

Table K.19. Number of Computers in School

Location	Mean	Median	Mode	Min	Max	Percentiles		
						25%	50%	75%
In computer lab[1]	22.09	19.50	11	1	85	11	19.50	26.25
In classroom[2]	4.23	0	0	0	70	0	0	1
In elsewhere[3]	3.78	2	0	0	40	0	2	4
For administrative use[4]	4.92	4	3*	0	19	3	4	6

[1]There are 206 valid and 6 missing responses.
[2]There are 169 valid and 43 missing responses.
[3] There are 189 valid and 23 missing responses.
[4] There are 211 valid and 1 missing responses.
*Multiple modes exist. The smallest value is shown

Table K.20. Technology Resources in School

Technology resources	Frequency	Percent (%)
Internet access[1]	192	96.0
Distance-learning programs[1]	12	6.0
A web site[1]	91	45.5
Video teleconference equipment[2]	39	19.6
Educational science software[1]	38	19.0

[1]There are 200 valid and 12 missing responses.
[2]There are 199 valid and 13 missing responses.

Table K.21. Distribution of Computers in Terms of Network Type

Network type	Mean [a]	SD	None		1-25%		26-50%		51-75%		76-100%	
			n	%	n	%	N	%	n	%	n	%
A local area network (LAN)[1]	1.86	1.46	40	22.2	50	27.8	20	11.1	35	19.4	35	19.4
A wide area network (WAN)[2]	.25	.80	83	86.5	9	9.4	-	-	1	1.0	3	3.1
The Internet [3]	1.69	1.23	14	7.2	114	58.8	15	7.7	21	10.8	30	15.5

Note: Mean score scales: 0=None; 1= 1-25%; 2=26-50%; 3= 51-75%; 4=76-100%
[a] Grand mean= 1.60 *SD*=1.17 There are 201 valid and 11 missing responses.
[1]There are 180 valid and 32 missing responses.
[2]There are 96 valid and 116 missing responses.
[3]There are 194 valid and 18 missing responses.

Table K.22. Available Computer Technology Resources to Teachers, Reported by School Administrators

Technology resources	Not available		Available in computer lab		Available in a few classrooms		Available in most or all classrooms	
	n	%	n	%	n	%	n	%
Desktop computer[1]	22	10.6	175	84.5	12	5.8	2	1.0
Laptop computer[1]	138	66.7	18	8.7	1	.5	-	-
Printers [1]	21	10.1	162	78.3	8	3.9	1	.5
CD-ROM drive[2]	13	6.3	183	88.8	7	3.4	4	1.9
CD-ROM read/write drive[2]	52	25.2	114	55.3	4	1.9	2	1.0
Computer microphones[3]	31	15.1	158	77.1	2	1.0	2	1.0
Computer speakers[2]	14	6.8	180	87.4	7	3.4	1	.5
DVD drive[4]	101	49.5	44	21.6	7	3.4	2	1.0
Scanner[2]	57	27.7	106	51.5	5	2.4	1	.5
Zip or similar drive[2]	80	38.8	78	37.9	3	1.5	-	-
Digital video camera[3]	124	60.5	23	11.2	-	-	-	-
Digital camera[3]	118	57.6	31	15.1	1	.5	-	-
Computer projector[3]	100	48.8	59	28.8	5	2.4	1	.5
Internet access from school[2]	33	16.0	152	73.8	4	1.9	1	.5

Note: Respondents could select all that applied
[1]There are 207 valid and 5 missing responses.
[2]There are 206 valid and 6 missing responses.
[3]There are 205 valid and 7 missing responses.
[4]There are 204 valid and 8 missing responses.

Table K.23. Types of Policies Related to Appropriate Use of Computers

Methods	Frequency	Percent (%)
Students must sign a "contract" agreeing to use computers for appropriate purposes [1]	20	16.8
Teachers use classroom management techniques to monitor use and instruct students on appropriate use [2]	83	69.2
Teachers receive professional development on the appropriate use of computer and the Internet in their classrooms [3]	60	49.6
Filters are installed on computers to limit the Internet access to certain forms of information [1]	33	27.7

Note: Respondents could select all that applied
[1]There are 119 valid and 93 missing responses.
[2]There are 120 valid and 92 missing responses.
[3]There are 121 valid and 91 missing responses.

Table K.24. Type of Technology Support in School

Type of technology support	Yes		No	
	n	%	n	%
Installing equipment and networks [1]	117	59.7	79	40.3
Troubleshooting and maintain equipment and networks [1]	108	55.1	88	44.9
Installing Operating Systems and software[1]	115	58.7	81	41.3
Troubleshooting and maintain Operating Systems and software[2]	97	49.7	98	50.3
Helping teachers to integrate computer into curriculum [3]	72	37.5	120	62.5
Selecting and purchasing computer-related hardware, software and support materials [3]	131	68.2	61	31.8

Note: Respondents could select all that applied
[1]There are 196 valid and 16 missing responses.
[2]There are 195 valid and 17 missing responses.
[3]There are 192 valid and 20 missing responses.

Table K.25. Forms of Technology Support in Terms of Source

Sources	None		Computer peripheral devices, or software		Wiring or Internet connections		Technical support or training		Educational technology planning	
	n	%	n	%	n	%	n	%	n	%
Businesses[1]	90	43.3	64	30.8	24	11.5	19	9.1	4	1.9
The MONE or other government agencies[1]	23	11.1	107	51.4	36	17.3	71	34.1	38	18.3
Non-profit agencies[2]	105	51.0	14	6.8	7	3.4	10	4.9	6	2.9
Institutions of higher education[2]	124	60.2	2	1.0	5	2.4	7	3.4	5	2.4
Technology coordinator[2]	109	52.9	4	1.9	2	1.0	8	3.9	7	3.4
Parents[2]	100	48.5	32	15.5	7	3.4	10	4.9	3	1.5
School administrators[3]	21	10.2	86	42.0	82	40.0	63	30.7	40	19.5
Teachers[3]	41	20.0	50	24.4	40	19.5	58	28.3	39	19.0
Other school staff[2]	93	45.1	9	4.4	7	3.4	14	6.8	10	4.9
Students[2]	83	40.3	22	10.7	20	9.7	12	5.8	9	4.4

Note: The Ministry of National Education (MONE)
[1] There are 208 valid and 4 missing responses.
[3] There are 205valid and 7 missing responses.
Respondents could select all that applied
[2] There are 206 valid and 6 missing responses.

Table K.26. Sources of Funding for Educational Technology

Funding sources	Frequency	Percent (%)
The Ministry of National Education[1]	154	75.1
The World Bank[1]	14	6.8
School's sources[1]	105	51.2
Parents[1]	95	46.3
Organizations/ business[2]	24	11.9

[1]There are 205 valid and 7 missing responses. [2]There are 201 valid and 11 missing responses.

Table K.27. Responsibility for Supporting Technology in School

Person	Frequency[*]	Percent (%)
Teacher or other staff as part of formal responsibilities	123	59.4
Volunteers (including teachers, other school staff, and community members)	28	13.5
Consultant/outside contractor	6	2.9
No one	50	24.2

[*]There are 207 valid and 5 missing responses.

Table K.28. Extent to which the School Promotes Teachers' Computer Use

Type of support	Mean [a]	SD	Not at all		Somewhat		A great deal	
			n	%	n	%	n	%
Providing appropriate software [1]	1.83	.70	67	33.7	98	49.2	34	17.1
Recommending the computer use during the professional development activities [2]	2.20	.77	42	21.4	73	37.2	81	41.3
Including the computer use in the curriculum [3]	1.99	.71	48	25.0	96	50.0	48	25.0
Providing technical assistance at school [4]	2.17	.74	39	20.0	84	43.1	72	36.9
Requiring educational technology training [5]	1.69	.74	90	47.9	67	35.6	31	16.5
Offering optional educational technology training [6]	1.99	.71	50	25.8	96	49.5	48	24.7
Providing mentor follow-ups to training [7]	1.68	.69	83	44.4	80	42.8	24	12.8
Providing trainers [8]	1.70	.71	84	44.4	78	41.3	27	14.3
Providing online support [8]	1.39	.58	124	65.6	56	29.6	9	4.8
Partnering with institutions of higher education [9]	1.21	.44	154	81.1	33	17.4	3	1.6
Offering demonstrations [3]	1.69	.64	78	40.6	95	49.5	19	9.9

Note: Mean score scales: 1= Not at all; 2=somewhat; 3= A great deal. [a] Grand mean= 1.79 *SD*=.46 There are 208 valid and 4 missing responses.
[1] There are 199 valid and 13 missing responses.
[2] There are 196 valid and 16 missing responses.
[3] There are 192 valid and 20 missing responses.
[4] There are 195 valid and 17 missing responses.
[5] There are 188 valid and 24 missing responses.
[6] There are 194 valid and 18 missing responses.
[7] There are 187 valid and 25 missing responses.
[8] There are 189 valid and 23 missing responses.
[9] There are 190 valid and 22 missing responses.

Table K.29. Participation in Technology-Related Professional Development Programs by Subject Teachers

Subject Teachers	Mean [a]	SD	None or almost none		Some		Most		All or almost all	
			n	%	N	%	n	%	n	%
Math teachers[1]	1.90	.94	70	40.0	68	38.9	21	12.0	16	9.1
Language and literature teachers[1]	1.85	.91	74	42.3	68	38.9	19	10.9	14	8.0
Science teachers[2]	2.08	.91	51	26.8	94	49.5	24	12.6	21	11.1
Social studies teachers[3]	1.79	.93	80	47.3	59	34.9	16	9.5	14	8.3

Note: Mean score scales: 1= None or almost none; 2= Some; 3= Most; 4= All or almost all
[a] Grand mean= 1.94 *SD*=.85 There are 194 valid and 18 missing responses
[1] There are 175 valid and 37 missing responses.
[2] There are 190 valid and 22 missing responses.
[3] There are 169 valid and 43 missing responses.

Table K.30. Types of Technology-Related Professional Development Programs

Type of professional development	Mean [a]	SD	Not used		Minor factor		Major factor	
			N	%	n	%	n	%
Partnering with an institution of higher education[1]	1.21	.53	135	84.4	16	10.0	9	5.6
Contracting with a software vendor or other for-profit company[2]	1.45	.7	108	66.7	35	21.6	19	11.7
Providing teachers courses via the Internet, videoconferencing, or other form of distance learning strategy[3]	1.93	.85	70	39.8	49	27.8	57	32.4
Sending teachers or technology leaders to technology-related training provided by the MONE[4]	2.15	.82	49	26.9	56	30.8	77	42.3
Having teachers develop new curriculum units that incorporate technology[5]	1.89	.88	74	44.8	35	21.2	56	33.9
Sending teachers to workshops, conferences or summer institutes[6]	2.16	.79	42	24.4	61	35.5	69	40.1

Note: Mean score scales: 1= Not used; 2=Minor factor; 3= Major factor
[a] Grand mean= 1.88 *SD*=.61 There are 194 valid and 18 missing.
[1] There are 160 valid and 52 missing responses.
[2] There are 162 valid and 50 missing responses.
[3] There are 176 valid and 36 missing responses.
[4] There are 182 valid and 30 missing responses.
[5] There are 165 valid and 47 missing responses.
[6] There are 172 valid and 40 missing responses.

Table K.31. Contribution to Professional Development

Individuals	Mean [a]	SD	None (0%)		Some (1-25%)		A moderate amount (26-50%)		Most (51-75%)		All or almost all (76-100%)	
			n	%	N	%	n	%	n	%	n	%
The technology coordinator[1]	.65	1.18	114	69.5	20	12.2	13	7.9	7	4.3	10	6.1
Expert teachers or school administrators from within or outside your school[2]	1.85	1.21	27	14.1	56	29.3	45	23.6	44	23.0	19	9.9
Faculty or staff from institutions of higher education[1]	.29	.75	136	82.9	16	9.8	5	3.0	6	3.7	1	.6
Business partners[3]	.88	1.13	90	52.6	35	20.5	28	16.4	12	7.0	6	3.5
For-profit vendors[4]	.57	1.01	113	69.8	21	13.0	14	8.6	12	7.4	2	1.2
Representatives from a volunteer organization[5]	.27	.74	136	84.5	13	8.1	7	4.3	3	1.9	2	1.2
An online professional development community[6]	.71	1.05	102	61.1	30	18.0	20	12.0	12	7.2	3	1.8
Students[7]	.89	1.10	90	50.6	42	23.6	26	14.6	16	9.0	4	2.2

Note: Mean score scales: 0= None; 1=Some; 2= A moderate amount; 3= Most; 4= All or almost all

[a] Grand mean= .92 *SD*=.81 There are 196 valid and 16 missing responses.
[1] There are 164 valid and 48 missing responses.
[2] There are 191 valid and 21 missing responses.
[3] There are 171 valid and 41 missing responses.
[4] There are 162 valid and 50 missing responses.
[5] There are 161 valid and 51 missing responses.
[6] There are 167 valid and 45 missing responses
[7] There are 178 valid and 34 missing responses.

Table K.32. Formal and Informal Technology-Related Professional Development Programs for Teachers

Forms of professional development	Mean [a]	SD	Not significant		Somewhat significant		Very significant	
			n	%	n	%	n	%
Formal [1]	**2.22**	**.47**						
Workshops or institutes [2]	2.41	.58	9	4.7	96	49.7	88	45.6
Conferences [3]	2.15	.60	22	11.9	114	61.6	49	26.5
Courses offered by colleges [4]	2.12	.69	31	18.0	89	51.7	52	30.2
On-line course participation [5]	2.06	.62	28	16.2	106	61.3	39	22.5
Committees focusing on technology and curriculum [6]	2.21	.67	23	13.6	87	51.5	59	34.9
In-service training implemented by the MONE [7]	2.67	.51	4	2.0	58	28.6	141	69.5
Informal [8]	**2.16**	**.45**						
Teacher collaborative or networks [9]	2.05	.61	28	15.9	111	63.1	37	21.0
Individual learning [10]	2.31	.55	8	4.2	116	60.4	68	35.4
Participating in on-line networks or chat-rooms [11]	1.93	.65	44	24.6	104	58.1	31	17.3
Informally working with peers, family, friends [12]	2.25	.56	12	6.4	117	62.2	59	31.4

Note: Mean score scales: 1= Not significant; 2=Somewhat significant; 3= Very significant

[a] Grand mean= 2.25 *SD*=.38. There are 209 valid and 3 missing responses.
[1] There are 198 valid and 14 missing responses.
[2] There are 193 valid and 19 missing responses.
[3] There are 185 valid and 27 missing responses.
[4] There are 172 valid and 40 missing responses.
[5] There are 173 valid and 39 missing responses.
[6] There are 169 valid and 43 missing responses.
[7] There are 203 valid and 9 missing responses
[8] There are 200 valid and 12 missing responses.
[9] There are 176 valid and 36 missing responses.
[10] There are 192 valid and 20 missing responses.
[11] There are 179 valid and 33 missing responses.
[12] There are 188 valid and 24 missing responses.

Table K.33. Teachers' Technology-Related Professional Development Needs, Observed By Administrators

Topics	Mean [a]	SD	No need		Some need		Definitely need	
			n	%	n	%	n	%
Basic Operating Systems [1]	2.53	.65	17	8.3	63	30.7	125	61.0
Desktop publishing [2]	2.50	.66	18	9.3	61	31.4	115	59.3
Word Processing [2]	2.49	.65	16	8.2	67	34.5	111	57.2
Spreadsheets [2]	2.53	.60	11	5.7	69	35.6	114	58.8
Databases [3]	2.64	.61	14	7.2	42	21.5	139	71.3
Presentation programs [4]	2.58	.60	11	5.6	60	30.5	126	64.0
Multimedia [5]	2.53	.64	15	7.8	61	31.6	117	60.6
Internet browsers [3]	2.50	.65	17	8.7	64	32.8	114	58.5
Scanning [6]	2.48	.64	15	7.9	69	36.5	105	55.6
E-mail programs [7]	2.54	.60	11	5.5	70	35.2	118	59.3
Imaging [5]	2.50	.66	18	9.3	60	31.1	115	59.6
Web page creation [4]	2.66	.59	12	6.1	43	21.8	142	72.1
Integrating technology into the curriculum [4]	2.70	.53	7	3.6	45	22.8	145	73.6
Distance learning [8]	2.58	.68	20	10.8	39	21.0	127	68.3
New ways that use technology to assess student [3]	2.69	.53	6	3.1	49	25.1	140	71.8
Selecting good software [2]	2.57	.60	11	5.7	62	32.0	121	62.4
Using software or technology activities [9]	2.62	.58	10	5.1	56	28.3	132	66.7
Managing classroom activities that integrate technology [10]	2.65	.57	9	4.5	53	26.5	138	69.0

Note: Mean score scales: 1= No need; 2=Some need; 3= Definitely significant

[a] Grand mean= 2.58 *SD*=.43. There are 209 valid and 3 missing responses.
[1] There are 205 valid and 7 missing responses.
[2] There are 194 valid and 18 missing responses.
[3] There are 195 valid and 17 missing responses.
[4] There are 197 valid and 15 missing responses.
[5] There are 193 valid and 19 missing responses.
[6] There are 189 valid and 23 missing responses.
[7] There are 199 valid and 13 missing responses.
[8] There are 186 valid and 26 missing responses.
[9] There are 198 valid and 14 missing responses.
[10] There are 200 valid and 12 missing responses.

Table K.34. Barriers Affecting the Use of Computer and Internet Technologies, Observed by School Administrators

Barriers	Frequency	Percent (%)
Hardware Resources		
Insufficient number of computers [1]	165	78.9
Insufficient number of peripheral devices [2]	136	65.4
Internet Resource		
Internet connection isn't fast or reliable enough for use during instruction [1]	154	73.7
A lack of age-appropriate or educationally-relevant websites for students [3]	62	30.0
A lack of Turkish educationally-relevant websites for students [4]	65	31.6
Software Resources		
A lack of age-appropriate or educationally-relevant software resources [4]	77	37.4
A lack of software products aligned with state standards [4]	98	47.6
Staff Resources		
Lack of trained technical staff available for <u>product and service acquisition</u> [3]	106	51.2
Lack of trained technical staff available for <u>installation</u> [4]	89	43.2
Lack of trained technical staff available for <u>equipment maintenance</u> [3]	113	54.6
Lack of administrative support [3]	17	8.2
Lack of adequately trained teachers or other instructional staff [4]	106	51.5
Lack of training opportunities for school staff [3]	130	62.8
Infrastructure		
Inadequate school building space [5]	59	29.2
Inadequate school building electric power supply and/or wiring [5]	22	10.9
Inadequate school building HVAC (heating, ventilation, air conditioning) [6]	48	23.6
Inadequate school building security [6]	41	20.2

[1] There are 209 valid and 3 missing responses.
[2] There are 208 valid and 4 missing responses.
[3] There are 207 valid and 5 missing responses.
[4] There are 206 valid and 6 missing responses.
[5] There are 202 valid and 10 missing responses.
[6] There are 203 valid and 9 missing responses.

Table K.35. Issues Reported By School Administrators

Issues	Mean [a]	SD	Strongly disagree		Disagree		Agree		Strongly agree	
			N	%	n	%	n	%	n	%
Teachers do not have time to prepare lessons include technology [1]	1.92	.82	67	32.8	95	46.6	33	16.2	9	4.4
There is enough time in class to include technology in instruction [2*]	2.26	.81	31	15.0	108	52.2	52	25.1	16	7.7
A stipend would encourage teacher to participate in technology training [2]	3.24	.72	7	3.4	14	6.8	108	52.2	78	37.7
More in-service training in technology should be made available for teachers [3]	3.60	.52	-	-	3	1.5	77	37.4	126	61.2
Teachers need more training with curriculum and teaching strategies that integrate technology [2]	3.53	.56	1	.5	4	1.9	87	42.0	115	55.6
The school has age-appropriate or educationally relevant software in science subject area [4*]	3.22	.75	5	2.4	24	11.7	96	46.8	80	39.0
The school has software aligned with current science curriculum [1*]	3.25	.75	3	1.5	29	14.2	85	41.7	87	42.6

Note: Mean score scales: 1=strongly disagree; 2= Disagree; 3= Agree; 4= strongly agree
[a] Grand mean= 2.95 *SD*=.30 There are 208 valid and 4 missing responses.
[1] There are 204 valid and 8 missing responses.
[2] There are 207 valid and 5 missing responses.
[3] There are 206 valid and 6 missing responses.
[4] There are 205 valid responses and 7 missing responses.
[*] These items are reverse-coded.

Table K.35. (cont'd)

Issues	Mean [a]	SD	Strongly disagree		Disagree		Agree		Strongly agree	
			N	%	n	%	n	%	n	%
The school needs more software in science subject area [5]	3.39	.71	6	3.0	9	4.4	87	42.9	101	49.8
There are enough computers in classrooms [1*]	3.31	.95	20	9.8	9	4.4	62	30.4	113	55.4
The school has enough projection devices such as large monitors, LCD panels, or computer projectors for class use [6*]	3.43	.85	10	5.0	17	8.5	50	25.0	123	61.5
The computers in the school are repaired in a timely manner [1*]	2.30	.87	32	15.7	101	49.5	48	23.5	23	11.3
Having a computer at the learning site where teachers teach would encourage teachers to use computers for educational purposes [1]	3.29	.83	11	5.4	16	7.8	80	39.2	97	47.5
The administration supports use of computer in education [3*]	1.58	.63	100	48.5	94	45.6	10	4.9	2	1.0

Note: Mean score scales: 1=strongly disagree; 2= Disagree; 3= Agree; 4= strongly agree

[a] Grand mean= 2.95 *SD*=.30 There are 208 valid and 4 missing responses.

[2] There are 207 valid and 5 missing responses.

[4] There are 205 valid and 7 missing responses.

[6] There are 200 valid and 12 missing responses.

[1] There are 204 valid and 8 missing responses.

[3] There are 206 valid and 6 missing responses.

[5] There are 203 valid and 9 missing responses.

[*] These items are reverse-coded.

Table K.36. Distribution of Science Teachers by Gender and Age

Demographics	Frequency*	Percent (%)
Gender		
Female	167	42.7
Male	224	57.3
Age		
20-29	78	19.9
30-39	209	53.5
40-49	98	25.1
50-59	6	1.5

*There are 391 valid and 7 missing responses.

Table K.37. Weekly Teaching Hours Reported By Science Teachers

Teaching hours	Mean	SD	Median	Mode	Min	Max	Percentiles		
							25%	50%	75%
Total Teaching hours[1]	20.43	6.85	21	20	2	44	16	21	25
Science teaching[2]	17.63	7.59	18	20	2	32	14	18	23

[1]There are 391 valid and 7 missing responses. [2]There are 393 valid and 5 missing responses.

Table K.38. Distribution of Science Teachers by Highest Degree Earned

Education level	Frequency*	Percent (%)
Teacher preparation high school	16	4.1
Bachelor	342	88.1
Master	28	7.2
Doctorate	2	.5

*There are 388 valid and 10 missing responses.

Table K.39. Academic Background Reported By Science Teachers

Major	Frequency*	Percent (%)
Biology	104	28.97
Chemistry	112	31.20
Physics	131	36.49
Science	10	2.79
Other	2	.56

*There are 359 valid and 39 missing responses.

Table K.40. Teaching Experience Reported By Science Teachers (Year)

Teaching experience	Mean	SD	Median	Mode	Min	Max	Percentiles		
							25%	50%	75%
Teaching experience[1]	11.79	6.27	11	5[a]	.3	30	7	11	16
Teaching experience at current school[2]	5.28	4.72	4	1	.2	22	2	4	7

[a] Multiple modes exist. The smallest value is shown
[1] There are 387 valid and 11 missing responses.
[2] There are 386 valid and 12 missing responses.

Table K.41. Science Teachers' Computer Use by Purpose (Year)

Purposes	Mean *	SD	Median	Mode	Min	Max	Percentiles		
							25%	50%	75%
Individual use [1]	4.64	3.81	4	3	0	18	2	4	7
Preparing instructional materials [2]	2.51	2.39	2	0	0	11	1	2	4
Instructional use [3]	.85	1.66	0	0	0	11	0	0	1
Communication with students and parents [4]	.52	1.44	0	0	0	10	0	0	0
Class Management [5]	.52	1.62	0	0	0	13	0	0	0

*Grand mean= 2.35 *SD*=2.42. There are 322 valid and 76 missing responses.
[1] There are 319 valid and 79 missing responses.
[2] There are 289 valid and 109 missing responses.
[3] There are 266 valid and 132 missing responses.
[4] There are 258 valid and 140 missing responses.
[5] There are 253 valid and 145 missing responses.

Table K.42. Science Teachers' Internet Use by Purpose (Year)

Purposes	Mean[a]	SD	Median	Mode	Min	Max	Percentiles 25%	50%	75%
Individual use [1]	2.51	2.37	2	0	0	15	1	2	3
Preparing instructional materials [2]	1.70	1.91	1	0	0	10	0	1	3
Instructional use [3]	.47	1.24	0	0	0	10	0	0	0
Communication with students and parents [4]	.21	.74	0	0	0	5	0	0	0
Class Management [4]	.25	.86	0	0	0	6	0	0	0

[a] Grand mean= 1.36; *SD*=1.54. There are 307 valid and 91 missing responses.
[1] There are 304 valid and 94 missing responses.
[2] There are 282 valid and 116 missing responses.
[3] There are 260 valid and 138 missing responses.
[4] There are 256 valid and 142 missing responses.

Table K.43. Methods in Helping Teachers Learn To Use the Computer

Methods	Mean [a]	SD	Not significant n	Not significant %	Somewhat significant n	Somewhat significant %	Very significant n	Very significant %
Personal interest [1]	2.81	.43	6	1.7	57	15.7	299	82.6
Family/friends/ students or teachers [2]	2.30	.66	36	11.3	152	47.6	131	41.1
Courses offered in undergraduate education [3]	1.76	.80	117	46.6	77	30.7	57	22.7
Technology –related professional development [4]	2.23	.78	60	21.1	100	35.1	125	43.9
Courses offered by other schools or organizations [5]	1.81	.76	101	39.8	99	39.0	54	21.3

Mean score scales: 1= Not significant; 2= Somewhat significant; 3= Very significant.
[a] Grand mean= 2.31; *SD*=.5 There are 371 valid and 27 missing responses.
[1] There are 362 valid and 36 missing responses.
[2] There are 319 valid and 79 missing responses.
[3] There are 251 valid and 147 missing responses.
[4] There are 285 valid and 113 missing responses.
[5] There are 254 valid and 144 missing responses.

Table K.44. Science Teachers' Computer Skills

Computer related applications	Mean [a]	SD	Not familiar with		Beginner		Intermediate		Advanced	
			n	%	n	%	n	%	n	%
Basic Operating Systems[1]	1.91	.89	143	41.3	103	29.8	89	25.7	11	3.2
Desktop publishing[2]	1.72	.86	174	53.7	73	22.5	72	22.2	5	1.5
Word Processing [2]	1.89	.96	153	47.2	72	22.2	82	25.3	17	5.2
Spreadsheets [3]	2.01	.95	130	38.8	93	27.8	92	27.5	20	6.0
Databases[4]	1.55	.82	194	63.0	68	22.1	36	11.7	10	3.2
Presentation programs[5]	1.77	.93	165	52.1	78	24.6	57	18.0	17	5.4
Multimedia [6]	1.67	.92	182	59.3	60	19.5	50	16.3	15	4.9
Internet browsers [7]	2.35	.92	80	22.5	103	28.9	142	39.9	31	8.7
Scanning [8]	1.88	.96	153	47.4	74	22.9	78	24.1	18	5.6
E-mail programs [9]	1.85	.97	159	48.9	76	23.4	70	21.5	20	6.2
Imaging [10]	1.61	.86	185	60.5	66	21.6	45	14.7	10	3.3
Web page creation [11]	1.28	.61	249	79.8	40	12.8	21	6.7	2	.6
File Transfer Protocol (FTP) [12]	1.38	.71	220	74.3	46	15.5	25	8.4	5	1.7
Electronic bulletin boards, listserv, newsgroups, discuss groups [13]	1.68	.88	172	56.4	70	23.0	53	17.4	10	3.3

Mean score scales: 1= Not familiar with; 2= Beginner; 3= Intermediate; 4= Advanced.

[a] Grand mean= 1.85 *SD*=.72 There are 374 valid and 24 missing responses.

[1] There are 346 valid and 52 missing responses.

[2] There are 324 valid and 74 missing responses.

[3] There are 335 valid and 63 missing responses.

[4] There are 308 valid and 90 missing responses.

[5] There are 317 valid and 81 missing responses.

[6] There are 307 valid and 91 missing responses.

[7] There are 356 valid and 42 missing responses.

[8] There are 323 valid and 75 missing responses.

[9] There are 325 valid and 73 missing responses.

[10] There are 306 valid and 92 missing responses.

[11] There are 312 valid and 86 missing responses.

[12] There are 296 valid and 102 missing responses.

[13] There are 305 valid and 93 missing responses.

Table K.45. Science Teachers' Attitudes toward Computers

Statements	Mean [a]	SD	Strongly disagree		Disagree		Agree		Strongly agree	
			n	%	n	%	n	%	n	%
I enjoy doing things on a computer [1]	3.39	.68	10	2.7	11	2.9	175	46.9	177	47.5
I am tired of using a computer [2*]	3.40	.69	8	2.2	19	5.2	157	43.1	180	49.5
I will be able to get a good job if I learn how to use a computer [3]	2.75	.89	28	8.7	93	28.9	133	41.3	68	21.1
I concentrate on using a computer [4]	3.20	.71	11	3.0	29	8.0	197	54.6	124	34.3
I enjoy computer games [5]	2.71	.90	45	12.5	79	22.0	171	47.6	64	17.8
I would work harder if I could use computers more often [6*]	2.59	.94	45	13.0	114	33.0	122	35.4	64	18.6
I think that it takes a long time to finish when I use a computer [7*]	2.93	.83	20	5.6	76	21.3	169	47.5	91	25.6
I can learn many things when I use a computer [8]	3.30	.64	9	2.5	9	2.5	211	57.5	138	37.6
I enjoy lessons on the computer [9]	3.21	.66	11	3.3	12	3.6	207	61.8	105	31.3
I believe that it is important for me to learn how to use a computer [10]	3.42	.67	10	2.7	7	1.9	167	45.6	182	49.7

Note: Mean score scales: 1=strongly disagree; 2= Disagree; 3= Agree; 4= strongly agree
[*] These items are reverse-coded
[a] Grand mean= 3.12 *SD*=.39 There are 382 valid and 16 missing responses.
[1] There are 373 valid and 25 missing responses.
[2] There are 364 valid responses and 34 missing responses.
[3] There are 322 valid responses and 76 missing responses.
[4] There are 361 valid responses and 37 missing responses.
[5] There are 359 valid responses and 39 missing responses.
[6] There are 345 valid responses and 53 missing responses
[7] There are 356 valid responses and 42 missing responses.
[8] There are 367 valid responses and 31 missing responses
[9] There are 335 valid responses and 63 missing responses.
[10] There are 366 valid responses and 32 missing responses
[11] There are 357 valid responses and 41 missing responses
[12] There are 354 valid responses and 44 missing responses
[13] There are 352 valid responses and 46 missing responses
[14] There are 370 valid responses and 28 missing responses
[15] There are 348 valid responses and 50 missing responses

Table K.45 (cont'd)

Statements	Mean [a]	SD	Strongly disagree		Disagree		Agree		Strongly agree	
			n	%	n	%	n	%	n	%
I think that computers are easy to use [4]	3.01	.73	13	3.6	56	15.5	206	57.1	86	23.8
I feel comfortable working with a computer [7]	2.94	.75	15	4.2	67	18.8	198	55.6	76	21.3
I get a sinking feeling when I think of trying to use a computer [11*]	3.28	.71	5	1.4	38	10.6	165	46.2	149	41.7
Working with a computer makes me nervous [11*]	3.27	.70	5	1.4	38	10.6	170	47.6	144	40.3
Using a computer is frustrating [12*]	3.42	.66	4	1.1	22	6.2	149	42.1	179	50.6
I will do as little work with computers as possible [13*]	2.95	.80	10	2.8	90	25.6	159	45.2	93	26.4
Computers are difficult to use [5*]	3.14	.80	13	3.6	53	14.8	162	45.1	131	36.5
Computers are valuable tools that can be used to improve the quality of education [14]	3.56	.65	8	2.2	8	2.2	121	32.7	233	63.0
Computers do not scare me at all [7]	3.14	.77	17	4.8	33	9.3	189	53.1	117	32.9
I can learn more from books than from a computer [15*]	2.68	.87	34	9.8	103	29.6	153	44.0	58	16.7

Note: Mean score scales: 1=strongly disagree; 2= Disagree; 3= Agree; 4= strongly agree
[a] Grand mean= 3.12 *SD*=.39 There are 382 valid and 16 missing responses.
[2] There are 364 valid responses and 34 missing responses.
[4] There are 361 valid responses and 37 missing responses.
[6] There are 345 valid responses and 53 missing responses
[8] There are 367 valid responses and 31 missing responses
[10] There are 366 valid responses and 32 missing responses
[12] There are 354 valid responses and 44 missing responses
[14] There are 370 valid responses and 28 missing responses

[*] These items are reverse-coded
[1] There are 373 valid and 25 missing responses.
[3] There are 322 valid responses and 76 missing responses.
[5] There are 359 valid responses and 39 missing responses.
[7] There are 356 valid responses and 42 missing responses.
[9] There are 335 valid responses and 63 missing responses.
[11] There are 357 valid responses and 41 missing responses
[13] There are 352 valid responses and 46 missing responses
[15] There are 348 valid responses and 50 missing responses

Table K.46. Number of Computers in School Reported By Science Teachers

Location	Mean	SD	Median	Mode	Min	Max	Percentile		
							25%	50%	75%
In classroom[1]	.82	3.99	0	0	0	40	0	0	0
In computer lab[2]	20.31	15.38	17.00	20	0	130	10	17.00	25.00
In elsewhere[3]	5.02	9.86	2	0	0	61	0	2.00	5.00

1 There are282 valid and 116 missing responses. [2]There are 324 valid and 74 missing responses.
[3] There are 307 valid and 91 missing responses.

Table K.47. Available Computer Technology Resources Reported By Science Teachers

Technology resources	Not available		Available in computer lab		Available in a few classrooms		Available in most or all classrooms	
	n	%	n	%	n	%	n	%
Desktop computer[1]	43	11.2	331	86.4	12	3.1	-	-
Laptop computer[2]	219	57.3	21	5.5	-	-	-	-
Printers[2]	56	14.7	272	71.2	9	2.4	-	-
CD-ROM drive[3]	40	10.6	287	75.7	8	2.1	1	.3
CD-ROM read/write drive[3]	107	28.2	183	48.3	5	1.3	1	.3
Computer microphones[3]	86	22.7	211	55.7	4	1.1	-	-
Computer speakers[3]	42	11.1	271	71.5	13	3.4	-	-
DVD drive[3]	167	44.1	76	20.1	4	1.1	-	-
Scanner[3]	118	31.1	152	40.1	2	.5	-	-
Zip or similar drive[3]	148	39.1	64	16.9	3	.8	-	-
Digital video camera[3]	195	51.5	27	7.1	2	.5	-	-
Digital camera[3]	196	51.7	25	6.6	2	.5	-	-
Computer projector[3]	161	42.5	84	22.2	7	1.8	-	-
Internet access from school[3]	69	18.2	232	61.2	5	1.3	-	-

[1]There are 383 valid and 15 missing responses. [2]There are 382 valid and 16 missing responses.
[3]There are 379 valid and 19 missing responses.

Table K.48. Schools' Technology Resources Reported By Science Teachers

Technology resources	Frequency	Percent (%)
Internet access[1]	324	91.5
Distance-learning programs[1]	19	5.4
A web site[1]	145	41.0
Video teleconference equipment[1]	60	16.9
Educational science software[2]	44	12.6

[1]There are 354 valid and 44 missing responses. [2]There are 348 valid and 50 missing responses.

Table K.49. Technology Resources that Teachers Have At Home

Technology resources	Frequency	Percent (%)
Computer[1]	221	68.6
Internet access[1]	170	52.8
A web site[2]	27	8.4
Video teleconference equipment[3]	15	4.7
Educational science software[2]	84	26.3

[1]There are 322 valid and 76 missing responses. [2]There are 320 valid and 78 missing responses.
[3]There are 319 valid and 79 missing responses.

Table K.50. Extent to Which School Promotes Teachers' Computer Use, Reported by Science Teachers

Type of technology support	Mean [a]	SD	Not at all		Somewhat		A great deal	
			n	%	n	%	n	%
Provide appropriate software to schools [1]	1.51	.66	194	58.1	109	32.6	31	9.3
Recommend the computer use during the professional development activities [2]	1.88	.79	122	37.3	121	37.0	84	25.7
Include the computer use in the curriculum[3]	1.65	.76	174	52.4	100	30.1	58	17.5
Provide technical assistance at all schools[4]	1.80	.78	139	42.1	117	35.5	74	22.4
Require educational technology training[5]	1.41	.66	217	69.1	66	21.0	31	9.9
Offer optional educational technology training[2]	1.70	.71	146	44.6	132	40.4	49	15.0
Provide mentor follow-ups to training[6]	1.52	.68	186	58.7	98	30.9	33	10.4
Provide trainers[7]	1.52	.69	196	59.8	95	29.0	37	11.3
Provide online support[8]	1.17	.49	261	87.6	23	7.7	14	4.7
Partner with institutions of higher education[9]	1.15	.39	268	86.7	37	12.0	4	1.3
Offer demonstrations[10]	1.38	.57	207	66.6	90	28.9	14	4.5

Note: Mean score scales: 1= Not at all; 2=somewhat; 3= A great deal.
[a] Grand mean= 1.57 *SD*=.51 There are 363 valid and 35 missing responses.
[1]There are 334 valid and 64 missing responses.
[2] There are 327 valid and 71 missing responses.
[3]There are 332 valid and 66 missing responses.
[4] There are 330 valid and 68 missing responses.
[5]There are 314 valid and 84 missing responses.
[6]There are 317 valid and 81 missing responses.
[7]There are 328 valid and 70 missing responses.
[8]There are 298 valid and 100 missing responses.
[9]There are 309 valid and 89 missing responses.
[10]There are 311 valid and 87 missing responses.

Table K.51. Technology Support Resources for Science Teachers

Technology support resources	Frequency	Percent (%)
The school's computing support staff [1]	130	35.2
Your school technology coordinator[1]	43	11.7
Part time technology specialist [2]	45	12.2
The Internet (e.g., technical support web site or chat room)[1]	75	20.3
Representative from hardware or software vendor[1]	56	15.2
Family and friends[3]	155	41.9
Students[1]	52	14.1
Other teachers[1]	233	63.1

[1]There are 369 valid and 29 missing responses. [2]There are 368 valid and 30 missing responses.
[3]There are 370 valid and 28 missing responses.

Table K.52. Length of Time to Fix Any Problems Regarding the Computer Technology

Mean	SD	Median	Mode	Min	Max	Percentiles		
						25%	50%	75%
4.54	7.03	2	1	1	60	1	2	5

Note: There are 177 valid and 221 missing responses.

Table K.53. Training Programs Science Teachers Attended

	Frequency	Percent (%)
The use of computers in teaching [1]	163	55.3
How to integrate technology into curriculum [2]	39	13.3
Distance learning [3]	14	4.8

[1]There are 295 valid and 103 missing responses.
[2]There are 293 valid and 105 missing responses.
[3]There are 292 valid and 106 missing responses.

Table K.54. Formal and Informal Technology-Related Professional Development Programs for Teachers

	Mean [a]	SD	Not Significant		Somewhat Significant		Very significant	
			n	%	n	%	n	%
Formal [1]	**2.46**	**.46**						
Workshops or institutes [2]	2.56	.62	26	7.0	111	29.7	237	63.4
Conferences [3]	2.15	.73	71	20.2	158	45.0	122	34.8
Courses offered by colleges [4]	2.27	.79	73	21.0	109	31.4	165	47.6
On-line course participation [5]	2.41	.71	43	13.0	110	33.1	179	53.9
Committees focusing on technology and curriculum [6]	2.53	.66	32	9.2	99	28.4	218	62.5
In-service training programs implemented by the MONE [7]	2.71	.53	14	3.7	81	21.4	283	74.9
Informal [8]	**2.45**	**.44**						
Teacher collaborative or networks [9]	2.32	.63	32	9.0	177	50.0	145	41.0
Individual learning in which teachers read journals or other professional publications, browse the Internet, etc. [10]	2.63	.56	14	3.9	107	29.6	240	66.5
Participating in on-line networks or chat-rooms [11]	2.26	.68	48	13.5	169	47.5	139	39.0
Informally working with peers, family, friends [10]	2.58	.59	18	5.0	116	32.1	227	62.9

Note: Mean score scales: 1= Not significant; 2=Somewhat significant; 3= Very significant

[a] Grand mean= 2.46 *SD*=.38. There are 387 valid and 11missing responses.
[1] There are 387 valid and 11 missing responses.
[2] There are 374 valid and 24 missing responses.
[3] There are 351 valid and 47 missing responses.
[4] There are 347 valid and 51 missing responses.
[5] There are 332 valid and 66 missing responses.
[6] There are 349 valid and 49 missing responses.
[7] There are 378 valid and 20 missing responses
[8] There are 375 valid and 23 missing responses.
[9] There are 354 valid and 44 missing responses.
[10] There are 361 valid and 37 missing responses.
[11] There are 356 valid and 42 missing responses.

Table K.55. Science Teachers' Technology-Related Professional Development Needs

	Mean [a]	SD	No need		Some need		Definitely need	
			n	%	n	%	n	%
Basic Operating Systems[1]	2.45	.67	34	10.0	118	34.8	187	55.2
Desktop publishing[2]	2.50	.64	26	7.9	112	33.8	193	58.3
Word Processing [3]	2.50	.68	35	10.6	96	29.2	198	60.2
Spreadsheets [2]	2.52	.66	31	9.4	97	29.3	203	61.3
Databases[4]	2.65	.61	23	6.9	72	21.6	238	71.5
Presentation programs[5]	2.61	.61	22	6.6	88	26.3	225	67.2
Multimedia [3]	2.59	.64	28	8.5	80	24.3	221	67.2
Internet browsers [6]	2.47	.61	21	6.3	136	40.5	179	53.3
Scanning [3]	2.55	.67	32	9.7	84	25.5	213	64.7
E-mail programs [7]	2.56	.63	24	7.3	98	29.7	208	63.0
Imaging [8]	2.60	.64	28	8.5	75	22.9	225	68.6
Web page creation [9]	2.70	.60	25	7.4	52	15.3	263	77.4
Integrating technology into the curriculum[10]	2.75	.52	13	3.8	61	17.7	270	78.5
Distance learning[11]	2.65	.65	31	9.5	53	16.3	242	74.2
New ways that use technology to assess student [12]	2.71	.55	17	4.9	67	19.3	263	75.8
Selecting good software[4]	2.66	.57	17	5.1	79	23.7	237	71.2
Using available classroom software or technology activities [13]	2.72	.53	13	3.7	72	20.7	263	75.6
Managing classroom activities that integrate technology[10]	2.72	.51	11	3.2	73	21.2	260	75.6

Mean score scales: 1= No need; 2= Some need; 3= Definitely need. [a] Grand mean= 2.60 *SD*=.47 There are 372 valid and 26 missing responses.
[1]There are 339 valid and 59 missing responses.
[2]There are 331 valid and 67 missing responses.
[3]There are 329 valid and 69 missing responses.
[4]There are 333 valid and 65 missing responses.
[5]There are 335 valid and 63 missing responses.
[6]There are 336 valid and 62 missing responses.
[7]There are 330 valid and 68 missing responses.
[8]There are 328 valid and 70 missing responses.
[9]There are 340 valid and 58 missing responses.
[10]There are 344 valid and 54 missing responses.
[11]There are 326 valid and 72 missing responses.
[12]There are 347 valid and 51 missing responses.
[13]There are 348 valid and 50 missing responses.

Table K.56. Computer Use Reported by Science Teachers

	Mean [a]	SD	Do not use		Less than once a month		A few times a month		A few times a week		Almost everyday or daily	
			n	%	n	%	n	%	n	%	n	%
Personal use[1]	2.16	1.47	87	23.0	37	9.8	66	17.5	103	27.2	85	22.5
Preparing instructional materials[2]	1.55	1.32	118	32.2	59	16.1	82	22.4	84	23.0	23	6.3
Class management[3]	.57	1.07	247	72.9	33	9.7	27	8.0	23	6.8	9	2.7
Instructional activities for students [4]	.97	1.21	183	52.9	54	15.6	57	16.5	40	11.6	12	3.5
Assessment activities [5]	.91	1.23	200	58.5	37	10.8	53	15.5	41	12.0	11	3.2
To communicate with students [3]	.40	.92	274	80.8	22	6.5	20	5.9	19	5.6	4	1.2
To communicate with students' parents[6]	.23	.69	295	86.8	24	7.1	11	3.2	7	2.1	3	.9
To communicate with colleagues and /or other professionals[7]	.68	1.12	233	67.1	39	11.2	39	11.2	26	7.5	10	2.9

Note: Mean score scales: 0= Do not use; 1=Less than once a month; 2= A few times a month; 3= A few times a week; 4= Almost everyday or daily.
[a] Grand mean= 1.04 *SD*=.92 There are 381 valid and 17 missing responses.
[1] There are 378 valid and 20 missing responses.
[2] There are 366 valid and 32 missing responses.
[3] There are 339 valid and 59 missing responses.
[4] There are 346 valid and 52 missing responses.
[5] There are 342 valid and 56 missing responses.
[6] There are 340 valid and 58 missing responses.
[7] There are 347 valid and 51 missing responses.

Table K.57. Use of Computer Applications by Science Teachers

	Mean [a]	SD	Do not use		Less than once a month		A few times a month		A few times a week		Almost everyday/daily	
			n	%	n	%	n	%	n	%	n	%
Word Processing software [1]	1.27	1.4	161	44.7	61	16.9	49	13.6	56	15.6	33	9.2
Grading software [2]	.95	1.22	188	51.9	72	19.9	54	14.9	27	7.5	21	5.8
Spreadsheet software [1]	1.03	1.26	176	48.9	74	20.6	55	15.3	32	8.9	23	6.4
Presentation software [3]	.55	1.03	262	73.8	26	7.3	38	10.7	23	6.5	6	1.7
Test generating software [4]	.91	1.14	183	51.0	77	21.4	59	16.4	27	7.5	13	3.6
Desktop publishing software [5]	.27	.74	298	84.4	29	8.2	14	4.0	8	2.3	4	1.1
Print Shop or Print Artist [6]	.25	.71	305	85.7	25	7.0	16	4.5	7	2.0	3	.8
Preview educational software [6]	.79	1.06	197	55.3	81	22.8	42	11.8	29	8.1	7	2.0
Scanner [7]	.53	.99	248	71.5	50	14.4	21	6.1	21	6.1	7	2.0
Accessing information on a floppy disk[5]	1.16	1.37	177	50.1	49	13.9	41	11.6	64	18.1	22	6.2
Graphics software [8]	.49	.93	260	73.9	37	10.5	33	9.4	19	5.4	3	.9
Copying /deleting files [9]	1.44	1.49	151	42.3	54	15.1	43	12.0	63	17.6	46	12.9
Installing a program [5]	.96	1.32	202	57.2	52	14.7	33	9.3	43	12.2	23	6.5
Digital camera [10]	.20	.70	309	89.8	20	5.8	3	.9	6	1.7	6	1.7
Computer Projector or LCD [11]	.21	.66	306	87.2	28	8.0	7	2.0	7	2.0	3	.9

Note: Mean score scales: 0= Do not use; 1=Less than once a month; 2= A few times a month; 3= A few times a week; 4= Almost everyday or daily.

[a] Grand mean= .79; *SD*=.81 There are 376 valid and 22 missing responses.
[1] There are 360 valid and 38 missing responses.
[2] There are 362 valid and 36 missing responses.
[3] There are 355 valid and 43 missing responses.
[4] There are 359 valid and 39 missing responses.
[5] There are 353 valid and 45 missing responses.
[6] There are 356 valid and 42 missing responses.
[7] There are 347 valid and 51 missing responses.
[8] There are 352 valid and 46 missing responses.
[9] There are 357 valid and 41 missing responses.
[10] There are 344 valid and 54 missing responses.
[11] There are 351 valid and 47 missing responses

Table K.58. Internet Use Reported by Science Teachers

	Mean [a]	SD	Do not use		Less than once a month		A few times a month		A few times a week		Almost everyday or daily	
			n	%	n	%	n	%	n	%	n	%
Personal use [1]	1.67	1.47	123	33.3	58	15.7	57	15.4	79	21.4	52	14.1
Preparing instructional materials[2]	1.04	1.15	157	44.1	87	24.4	63	17.7	38	10.7	11	3.1
Distance learning[3]	.23	.70	292	87.4	19	5.7	13	3.9	7	2.1	3	.9
Instructional activities for students [4]	.60	.95	218	64.9	63	18.8	31	9.2	21	6.3	3	.9
Using e-mail to communicate with students[5]	.22	.69	300	88.0	21	6.2	9	2.6	8	2.3	3	.9
Using e-mail to communicate with parents [6]	.18	.63	306	90.0	18	5.3	6	1.8	8	2.4	2	.6
Using e-mail to communicate with colleagues and /or other professionals[7]	.46	.89	251	73.4	49	14.3	20	5.8	20	5.8	2	.6
Attach files to e-mail[8]	.46	.93	255	75.2	42	12.4	18	5.3	19	5.6	5	1.5
Looking for educational sites on the Internet [9]	1.21	1.28	150	43.0	67	19.2	58	16.6	58	16.6	16	4.6
Using search engines to search for specific educational information[10]	1.01	1.28	185	53.8	47	13.7	51	14.8	45	13.1	16	4.7

Table K.58. (cont'd)

	Mean [a]	SD	Do not use		Less than once a month		A few times a month		A few times a week		Almost everyday or daily	
			n	%	n	%	n	%	n	%	n	%
Browsing the WWW[11]	.68	1.19	231	71.1	23	7.1	30	9.2	27	8.3	14	4.3
Publishing or revising a web page[4]	.20	.69	302	89.9	17	5.1	7	2.1	5	1.5	5	1.5
Participating in educational discussions on newsgroups[4]	.25	.69	286	85.1	29	8.6	13	3.9	4	1.2	4	1.2
Downloading or uploading files via FTP [12]	.30	.76	274	81.8	36	10.7	13	3.9	8	2.4	4	1.2
Locate references at an Internet libraries [13]	.79	1.06	192	56.0	67	19.5	54	15.7	24	7.0	6	1.7
Low-cost Internet telephony [12]	.33	.87	279	83.3	27	8.1	11	3.3	10	3.0	8	2.4
Videoconferencing [4]	.15	.59	308	91.7	17	5.1	4	1.2	3	.9	4	1.2
Radio broadcasting [14]	.22	.68	292	86.6	29	8.6	6	1.8	6	1.8	4	1.2
Television broadcasting [15]	.32	.81	277	82.0	36	10.7	10	3.0	9	2.7	6	1.8

Note: Mean score scales: 0= Do not use; 1=Less than once a month; 2= A few times a month; 3= A few times a week; 4= Almost everyday or daily.

[a] Grand mean= .66; *SD*=.78 There are 371 valid and 27 missing responses.
[1] There are 369 valid and 29 missing responses.
[2] There are 356 valid and 42 missing responses.
[3] There are 334 valid and 64 missing responses.
[4] There are 336 valid and 62 missing responses.
[5] There are 341 valid and 57 missing responses.
[6] There are 340 valid and 58 missing responses.
[7] There are 342 valid and 56 missing responses.
[8] There are 339 valid and 59 missing responses.
[9] There are 349 valid and 49 missing responses.
[10] There are 344 valid and 54 missing responses.
[11] There are 325 valid and 73 missing responses.
[12] There are 335 valid and 63 missing responses.
[13] There are 343 valid and 55 missing responses.
[14] There are 337 valid and 61 missing responses.
[15] There are 338 valid and 60 missing responses.

Table K.59. Science Teachers' Access to Computers

	Mean [a]	SD	Not applicable		Never		Less than once a month		A few times a month		A few times a week		Almost everyday or daily	
			n	%	n	%	n	%	n	%	n	%	n	%
The site where they teach	.43	1.27	273	87.5	8	2.6	2	.6	7	2.2	8	2.6	14	4.5
A site managed by the school but not classroom	2.48	1.78	53	15.5	76	22.3	55	16.1	38	11.1	49	14.4	70	20.5
Home	2.52	2.23	139	38.8	13	3.6	17	4.7	25	7.0	40	11.2	124	34.6

Note: Mean score scales: 0= Not applicable; 1= Never; 2=Less than once a month; 3= A few times a month; 4= A few times a week; 5= Almost everyday or daily.

[a] Grand mean= 1.96; *SD*=1.34 There are 377 valid and 21 missing responses.

[1] There are 312 valid and 86 missing responses.

[2] There are 341 valid and 57 missing responses.

[3] There are 358 valid and 40 missing responses.

Table K.60. Barriers Affecting the Use of Computer and Internet Technologies at School, Reported by Science Teachers

	Frequency	Percent (%)
Hardware Resources		
Insufficient number of computers [1]	287	79.7
Insufficient number of peripheral devices [2]	232	64.3
Internet Resource Quality		
Internet connection isn't fast or reliable enough for use during instruction [3]	234	65.2
A lack of age-appropriate or educationally-relevant websites for students [3]	131	36.5
A lack of Turkish educationally-relevant websites for students [4]	134	37.4
Software Resources		
A lack of age-appropriate or educationally-relevant software resources [3]	129	35.9
A lack of software products aligned with state standards [3]	192	53.5
Staff Resources		
Lack of trained technical staff available for product and service acquisition [3]	177	49.3
Lack of trained technical staff available for installation [3]	163	45.4
Lack of trained technical staff available for equipment maintenance [3]	155	43.2
Lack of administrative support [5]	63	17.6
Lack of adequately trained teachers or other instructional staff [3]	157	43.7
Lack of training opportunities for school staff [3]	223	62.1
Infrastructure		
Inadequate school building space [3]	125	34.8
Inadequate school building electric power supply and/or wiring [3]	41	11.4
Inadequate school building HVAC (heating, ventilation, air conditioning) [4]	68	19.0
Inadequate school building security [6]	59	16.6

[1] There are 360 valid and 38 missing responses.
[2] There are 361 valid and 37 missing responses.
[3] There are 359 valid and 39 missing responses.
[4] There are 358 valid and 40 missing responses.
[5] There are 357 valid and 41 missing responses.
[6] There are 356 valid and 42 missing responses.

Table K.61. Issues Reported by Science Teachers

	Mean [a]	SD	Strongly disagree		Disagree		Agree		Strongly agree	
			n	%	n	%	n	%	n	%
There is enough free time to prepare lessons that include technology [1*]	2.32	.84	64	18.2	129	36.8	138	39.3	20	5.7
There is enough time in class to include technology [2*]	2.36	.84	64	17.6	126	34.6	152	41.8	22	6.0
A stipend would encourage teacher to participate in technology training [3]	3.11	.83	23	6.4	38	10.5	178	49.2	123	34.0
Teachers need more in-service training in technology [4]	3.49	.63	4	1.1	16	4.3	145	39.1	206	55.5
Teachers need more training in integrating technology with curriculum [5]	3.36	.66	4	1.1	25	6.8	174	47.4	164	44.7
The school has age-appropriate or educationally relevant software in science area [6*]	1.80	.78	140	38.9	165	45.8	43	11.9	12	3.3
The school has software aligned with science curriculum [2*]	1.75	.76	149	40.9	169	46.4	34	9.3	12	3.3

Table K.61. (cont'd)

	Mean [a]	SD	Strongly disagree		Disagree		Agree		Strongly agree	
			n	%	n	%	n	%	n	%
The school needs more software in science area [7]	3.31	.76	16	4.4	17	4.7	169	46.3	163	44.7
There are sufficient number of computers in classrooms [8*]	1.72	.97	200	55.1	100	27.5	27	7.4	36	9.9
The school has enough projection devices [9*]	1.52	.80	230	63.7	88	24.4	29	8.0	14	3.9
The computers are repaired in a timely manner [10*]	2.56	.86	51	14.9	83	24.2	176	51.3	33	9.6
Having a computer at the learning site would encourage teachers to use computers for educational purposes [11]	3.44	.73	14	3.8	11	3.0	142	38.8	199	54.4
The administration supports use of computers in education [12*]	2.94	.87	30	8.5	54	15.2	178	50.1	93	26.2

Note: Mean score scales: 1=Strongly Disagree; 2= Disagree; 3= Agree; 4=Strongly Agree

[a] Grand mean= 2.60 *SD*=.35 There are 377 valid and 21 missing responses.

[1] There are 351 valid and 47 missing responses.

[2] There are 364 valid and 34 missing responses.

[3] There are 362 valid and 36 missing responses.

[4] There are 371 valid and 27 missing responses.

[5] There are 367 valid and 31 missing responses.

[6] There are 360 valid and 38 missing responses

[7] There are 365 valid and 33 missing responses.

[8] There are 363 valid and 35 missing responses.

[9] There are 361 valid and 37 missing responses.

[10] There are 343 valid and 55 missing responses.

[11] There are 366 valid and 32 missing responses.

[12] There are 355 valid and 43 missing responses

* These items are reverse-coded.

Table K.62. Reasons Teachers Do Not Use the Computer for Educational Purposes

	Mean [a]	SD	Not important		Slightly important		Important		Very Important	
			n	%	n	%	n	%	n	%
Teachers do not know how to use a computer [1]	2.94	.98	34	9.1	88	23.6	118	31.6	133	35.7
Teachers have no desire to use a computer [2]	2.82	1.04	57	15.6	65	17.8	130	35.6	113	31.0
Teachers have a fear of the computer [3]	2.10	1.01	135	37.2	89	24.5	106	29.2	33	9.1
Teachers can prepare instructional materials/lessons without a computer [4]	2.51	.83	42	11.6	132	36.5	150	41.4	38	10.5
Teacher can teach more efficiently without a computer [5]	2.33	.84	67	18.6	128	35.5	145	40.2	21	5.8
Teachers have no time to prepare instructional materials/lessons using a computer [6]	2.51	.98	70	19.1	101	27.6	134	36.6	61	16.7
Teachers have no time to learn how to prepare instructional materials/ lessons using computer [7]	2.57	.95	59	16.4	95	26.4	149	41.4	57	15.8
Teachers need more computer training [6]	3.26	.80	16	4.4	35	9.6	154	42.1	161	44.0

Note: Mean score scales: 1=Not important; 2= Slightly important; 3= Important; 4= Very important
[a] Grand mean= 2.84 *SD*=.49 There are 382 valid and 16 missing responses.
[1] There are 373 valid and 25 missing responses.
[2] There are 365 valid and 33 missing responses.
[3] There are 363 valid and 35 missing responses.
[4] There are 362 valid and 36 missing responses.
[5] There are 361 valid and 37 missing responses.
[6] There are 366 valid and 32 missing responses
[7] There are 360 valid and 38 missing responses.
[8] There are 352 valid and 46 missing responses.

Table K.62. (cont'd)

	Mean [a]	SD	Not important		Slightly important		Important		Very Important	
			n	%	n	%	n	%	n	%
Teachers have no computer at home [5]	3.20	1.05	49	13.6	22	6.1	96	26.6	194	53.7
Teachers can't afford to buy a computer [4]	3.23	.96	30	8.3	45	12.4	99	27.3	188	51.9
Teachers do not have easy access to a computer at school [7]	2.75	1.03	59	16.4	69	19.2	136	37.8	96	26.7
Teachers do not have timely help for technical problems [8]	2.74	.95	43	12.2	87	24.7	142	40.3	80	22.7
Teachers do not have a computer in classroom [2]	3.37	.84	15	4.1	40	11.0	105	28.8	205	56.2
Teachers do not have enough computers in classroom [9]	3.33	.85	17	4.9	36	10.3	110	31.4	187	53.4
Teachers do not have enough equipment and supplies [10]	3.20	.85	15	4.2	54	15.3	129	36.4	156	44.1
Teachers do not have an overhead/LCD or computer projector [8]	3.23	.90	22	6.3	45	12.8	115	32.7	170	48.3
There is no support from administration and other teachers [8]	2.68	1.87	66	18.8	84	23.9	126	35.8	75	21.3

Note: Mean score scales: 1=Not important; 2= Slightly important; 3= Important; 4= Very important
[a] Grand mean= 2.84 *SD*=.49 There are 382 valid and 16 missing responses.
[1] There are 373 valid and 25 missing responses.
[2] There are 365 valid and 33 missing responses.
[3] There are 363 valid and 35 missing responses.
[4] There are 362 valid and 36 missing responses.
[5] There are 361 valid and 37 missing responses.
[6] There are 366 valid and 32 missing responses
[7] There are 360 valid and 38 missing responses.
[8] There are 352 valid and 46 missing responses.

Table K.62. (cont'd)

	Mean [a]	SD	Not important		Slightly important		Important		Very Important	
			n	%	n	%	n	%	n	%
Teachers teach in too many classrooms [9]	2.76	.99	47	13.4	81	23.1	132	37.7	90	25.7
The students have no desire to use a computer [11]	2.44	1.03	82	23.9	86	25.1	117	34.1	58	16.9
Teachers do not have available software in science subject [11]	3.15	.80	14	4.1	47	13.7	157	45.8	125	36.4
Teachers do not think that science subject is appropriate for using a computer [12]	2.59	1.01	62	18.5	81	24.1	126	37.5	67	19.9
Teachers do not know how to integrate computers in science subject area [13]	3.04	.81	15	4.5	57	17.0	161	48.1	102	30.4
Computer response time is too slow [14]	2.54	.96	58	17.2	95	28.1	129	38.2	56	16.6
Teachers don't have computers connected to Internet [14]	2.80	.98	45	13.3	67	19.8	135	39.9	91	26.9
Computers are not up-to-dated [15]	2.87	.95	31	9.3	80	24.0	123	36.8	100	29.9
There is no enough Turkish educationally-relevant websites [16]	2.91	.92	29	8.8	67	20.4	136	41.3	97	29.5

[9] There are 350 valid and 48 missing responses.
[10] There are 354 valid and 44 missing responses.
[11] There are 343 valid and 55 missing responses
[12] There are 336 valid and 62 missing responses.
[13] There are 335 valid and 63 missing responses.
[14] There are 338 valid and 60 missing responses.
[15] There are 334 valid and 64 missing responses.
[16] There are 329 valid and 69 missing responses.

Table K.63. Number of Students in the Classroom

Size of classroom	Mean	SD	Median	Mode	Min	Max	Percentiles 25%	50%	75%
Small[1]	20.04	9.55	20	20	4	100	13	20	25
Large[2]	34.25	10.41	33	30	10	100	28	33	40

[1]There are 397 valid and 1 missing responses. [2]There are 394 valid and 4 missing responses.

Table K.64. Student-to-Computer Ratio

	Mean	SD	Median	Mode	Min	Max	Percentiles 25%	50%	75%
Student-to-computer ratio for smallest class[1]	1.25	.86	1	1	.09	5.17	.61	1	1.67
Student-to-computer ratio for largest class[2]	2.14	1.34	1.8	2	.31	7.20	1.1	1.8	2.8

[1]There are 311 valid and 87 missing responses. [2]There are 308 valid and 90 missing responses.

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