EVALUATION OF PRESERVICE FOREIGN LANGUAGE TEACHERS' PERCEPTIONS ABOUT THEIR TECHNOLOGY COMPETENCIES

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Approval of the Graduate School of Natural and Applied Sciences

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ABSTRACT

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This study evaluated Department of Foreign Language Education students' perceptions on technology competence in regard to National Educational Technology Standards for Teachers (NETS-T) developed by International Society for Technology in Education (ISTE), in Middle East Technical University, in Ankara, Turkey. The NETS-T's six sub standards -technology operations and concepts; planning and designing learning environments and experiences; teaching, learning, and the curriculum; assessment and evaluation; productivity and professional practice; social, ethical, legal, and human issues- were investigated in the study.

383 students participated in the study. 103 of them were freshmen, 98 of them were sophomores, 96 of them were juniors, and 86 of them were seniors. Besides, 96 of them were males, while 287 of them were females.

This study was designed as a cross-sectional survey study. In order to collect the data, a survey, consisted of 44 Likert type, five point scale items, was developed by the researcher. The study results show that except for “technology operations and concepts” for which male students’ perceptions were higher than female students’ perceptions there was no significant difference between male and female students.

There was no significant difference in “technology operations and concepts” across grade levels. There were no significant differences between freshmen’s and sophomores’ perceptions for all of the sub-standards. In general, juniors’ perceptions on the competence of NETS-T were higher than freshmen’s and sophomores’ perceptions, and seniors’ perceptions were higher than all of the other grade levels’ perceptions. As a result, the findings of the study indicated that students’ perceptions related with their competencies in the NETS_T needs to be increased.

Keywords: National Educational Technology Standards for Teachers (NETS-T), International Society for Technology in Education (ISTE), Technology educational technology, student perception

ÖZ

İNGİLİZCE ÖĞRETMENLİĞİ BÖLÜMÜ ÖĞRENCİLERİNİN TEKNOLOJİK YETERLİLİKLERİNE İLİŞKİN ALGILARININ DEĞERLENDİRİLMESİ

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Bu araştırma, Orta Doğu Teknik Üniversitesi'nde Yabancı Diller Eğitimi Bölümü öğrencilerinin Uluslararası Eğitim Teknolojisi Organizasyonu (ISTE) tarafından geliştirilmiş Öğretmenler için Ulusal Eğitim Teknolojisi Ölçütlerindeki (NETS-T) yeterliliklerine ilişkin algılarını değerlendirmiştir. Bu çalışmada, NETS-T' in altı alt ölçüt grupları –teknoloji işlemleri ve kavramları; öğrenme ortamlarının ve deneyimlerinin planlanması ve geliştirilmesi; öğretim, öğrenme, ve müfredat; ölçme ve değerlendirme; verimlilik ve mesleki deneyim; sosyal, ahlaki, yasal, ve insani konular- incelenmiştir.

Araştırmada 383 öğrenci yer almıştır. Bunlardan 103'ü birinci sınıf, 98'i ikinci sınıf, 96' sı üçüncü sınıf, ve 86'sı dördüncü sınıf öğrencisidir. Ayrıca, öğrencilerin 287' si bayan 96'sı erkektir. Araştırma deseni enlemesine kesitsel anket çalışmasıdır. Anket 44 adet beş'li Likert tipi maddeden oluşmaktadır ve araştırmacı tarafından geliştirilmiştir.

Çalışma göstermiştir ki "teknoloji işlemleri ve kavramları" alt standart grubu için verilen cevaplara göre erkek öğrencilerin algılarının bayan öğrencilerin algılarına kıyasla daha yüksek olması dışında, erkek ve bayan öğrenciler arasında önemli bir fark yoktur.

"Teknoloji işlemleri ve kavramları" alt standart grubu için sınıflar arasında önemli bir fark yoktu. Tüm alt standart grupları için, birinci ve ikinci sınıf öğrencilerinin algıları arasında önemli bir fark bulunamamış ancak , üçüncü sınıfların ölçütlere ilişkin algıları birinci ve ikinci sınıfların algılarından, dördüncü sınıfların algıları ise diğer tüm sınıfların algılarından daha yüksektir. Sonuç olarak, çalışmanın sonuçları göstermiştir ki öğrencilerin NETS-T' ye ilişkin yeterliliklerinin artırılmasına ihtiyaç duyulmaktadır.

Anahtar Kelimeler: Öğretmenler için Ulusal Eğitim Teknolojisi Standartları (NETS-T), Uluslararası Eğitim Teknolojisi Organizasyonu (ISTE)), eğitim teknolojisi, öğrenci algısı

To My Parents

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INTRODUCTION

1.1 Background of the Study

In the era of information technology, we are surrounded by a variety of technological tools –sensory technology, communication, analytic technology and display technology. These technologies include digital cameras, sensors, digital gloves, the Internet, cellular telephones, local area networks, microcomputers, color liquid crystal display (LCD) screens, virtual reality display devices, high-definition television (HDTV), etc (Jao, 2001). As Laudon, Traver, and Laudon (cited in Jao, 2001, p.1) states, "Information technologies extend our vision of the world, just as the microscope makes it possible for us to see bacteria and the telescope helps us to discover new star systems and galaxies".

Rapid developments in the areas of computer and communication technology in recent years fuel further development and changing the nature and practices in education (Khine, 2001, p.147). Advances in educational technology and its increasing availability in schools make it incumbent upon colleges of education to look critically at how technology is integrated into teacher preparation programs. In seeking to prepare teachers for the next century, collage faculty are increasingly being expected to use and model the use of technology, to facilitate its use by their students, and to integrate technology into instruction (Parker, 1997). There is also growing awareness of the need to prepare both pre-service teachers and current classroom teachers so that they can use technology as an integral part of teaching (Corbanaro, 1997).

Today's teacher preparation programs provide a variety of alternative paths to initial licensure. They address economic conditions, needs of prospective teachers, and the demands of employing school districts. Regardless of the configuration of the program, all teachers must have opportunities for experiences that prepare them to meet technology standards. “The existence of many types of programs virtually ensures that there will not be one single method for providing learning experiences to meet these standards” (ISTE, n.d.a, para. I). International Society for Technology in Education (ISTE) has prepared a standard for all kinds of teachers called National Educational Technology Standards for Teachers (NETS-T). The last version of NETS-T (see Appendix A) was released in March 2003.

The ISTE NETS-T, which focuses on preservice teacher education, defines the fundamental concepts, knowledge, skills, and attitudes for applying technology in educational settings. All candidates seeking certification or endorsements in teacher preparation should meet these educational technology standards. “It is the responsibility of faculty across the university and at cooperating schools to provide opportunities for teacher candidates to meet these standards” (ISTE, n.d.b, para. I). NETS-T is being adjusted with the ever-continuing technological advancements and is widely regarded in many countries.

A number of colleges/schools of education have made and continue to make strides in integrating technology in their teacher education programs (Duhaney, 2001). Also, in the Faculty of Education (FEDU) at Middle East Technical University (METU), there is a trend to enable teacher candidates to use technology in their instructions effectively. For this purpose FEDU has spent a lot of money to keep up with the technological improvements each year. FEDU provides all of its members (including technicians, chief of accounts, clerk of assets, treasurer, etc...) with a personal multimedia-computer connected to the Internet via Local Area Network. There are six multimedia laboratories for students' usage in the faculty. There are five LCD screens contained in classrooms in the faculty. The Technology Resources Center was constructed to be used by FEDU members to prepare materials, and borrow tools to use in their academic studies.

In most teacher education institutions, computer-specific courses are offered as an initial attempt to prepare a student teacher's for computer technology (Yildirim, 2000). Inline with the restructuring efforts at teacher preparation programs in Turkey, Turkish Higher Education Council developed two consecutive technology courses, which are compulsory for the students enrolled in any teacher training program in all of the Faculty of Education in Turkey (Özoğul, 2002). The programs in FEDU have also been changing slightly to integrate educational technologies into instructions as well. For example, in the Foreign Language Education (FLE) Department basic computer literacy course called Computer Applications in Education was added to the curriculum. Later, the course called Instructional Technology and Material Development was included in the FLE's curriculum, as well. So, as Yildirim (1997) stated, in order for teachers to become fully capable of using technology in the classroom, follow up courses are necessary. Besides this, in fall semester 2001-2002 a multimedia laboratory (LCD screen, video player, DVD player, voice and image sharing programs, etc… are available for instructors use in their courses when they demand) has been set up to be used by FLE instructors in their courses. As needed, the facilities in the laboratory have been improved. The task force and college information technology committee continuously monitor resources and carry on additional efforts to address needs required to maintain, enhance, and expand information technology capabilities (Algozzine et al., 1999).

According to Paprzycki and Vidakovic (1994), despite current attempts to prepare student teachers to use computer technology in the classroom, significant amounts of research indicate, "teachers are more hesitant and less likely to embrace computer technology than other professionals" (cited in Yildirim, 2000, p.74). To be able to see the level of achievements of FEDU's curriculum compared with that of NETS-T, it should be looked into outputs of one of the FEDU's curriculum. By examining the outputs obtained, we can go over the contents of the curriculum to be able to meet NETS-T.

1.2 Statement of the problem

A large number of graduates from colleges of education feel ill-prepared to integrate technology into their curriculum (Beckett et al. 2001). As Wetzel et al. (1996) states, although students graduating from the College of Education at Arizona State University West (ASUW) have taken a course on teaching with technology, they did not feel prepared to implement what they had learned in their own classrooms.

The ISTE standards reflect professional studies in education that provide fundamental concepts and skills for applying information technology in educational setting. All candidates seeking initial certification or endorsements in teacher preparation programs should have opportunities to meet the educational technology standards for teachers (Larson, 1998). To have well equipped graduates, the Department of FLE has also implemented courses related with teaching through technology. However there was no study on the perceptions of students related with meeting the NETS-T. For this reason FLE students' perceptions for their competencies about NETS-T should be investigated.

1.3 Purpose of the Study

The purpose of this study is to investigate;

Prospective foreign language teachers' perceptions of their technology competence in regard to National Educational Technology Standards for Teachers (NETS-T) developed by International Society for Technology in Education (ISTE) in the United States.

So specifically, this study is guided by three major research questions with respective sub questions:

1. How do FLE students perceive themselves related with the standards stated in NETS-T?

    1.1 How do FLE students evaluate themselves related with the 'technology operations and concepts' standard stated in NETS-T?

    1.2 How do FLE students perceive themselves related with the 'planning and designing learning environments and experiences' standard stated in NETS-T?

    1.3 How do FLE students perceive themselves related with the 'teaching, learning, and the curriculum' standard stated in NETS-T?

    1.4 How do FLE students perceive themselves related with the 'assessment and evaluation' standard stated in NETS-T?

    1.5 How do FLE students perceive themselves related with the 'productivity and professional practice' standard stated in NETS-T?

    1.6 How do FLE students perceive themselves related with the 'social, ethical, legal, and human issues' standard stated in NETS-T?

2. Is there a significant difference between males and females in their perceptions of their competencies in the standards stated in NETS-T?

    2.1 Is there a significant difference between males and females in their perceptions of their competencies in the 'technology operations and concepts' standard stated in NETS-T?

2.2 Is there a significant difference between males and females in their perceptions of their competencies in the 'planning and designing learning environments and experiences' standard stated in NETS-T?

2.3 Is there a significant difference between males and females in their perceptions of their competencies in the 'teaching, learning, and the curriculum' standard stated in NETS-T?

2.4 Is there a significant difference between males and females in their perceptions of their competencies in the 'assessment and evaluation' standard stated in NETS-T?

2.5 Is there a significant difference between males and females in their perceptions of their competencies in the 'productivity and professional practice' standard stated in NETS-T?

2.6 Is there a significant difference between males and females in their perceptions of their competencies in the 'social, ethical, legal, and human issues' standard stated in NETS-T?

3. Is there a significant difference between grade levels in their perceptions of their competencies in the standards stated in NETS-T?

3.1 Is there a significant difference between the grade levels in their perceptions of their competencies in the 'technology operations and concepts' standard stated in NETS-T?

3.2 Is there a significant difference between the grade levels in their perceptions of their competencies in the 'planning and designing learning environments and experiences' standard stated in NETS-T?

3.3 Is there a significant difference between the grade levels in their perceptions of their competencies in the 'teaching, learning, and the curriculum' standard stated in NETS-T?

3.4 Is there a significant difference between the grade levels in their perceptions of their competencies in the 'assessment and evaluation' standard stated in NETS-T?

3.5 Is there a significant difference between the grade levels in their perceptions of their competencies in the 'productivity and professional practice' standard stated in NETS-T?

3.6 Is there a significant difference between the grade levels in their perceptions of their competencies in the 'social, ethical, legal, and human issues' standard stated in NETS-T?

The problems stated above were tested with the following hypotheses which are stated in null form.

Null Hypothesis 1

There is no significant difference between males and females in their perceptions of their competencies in the six groups of standards (1, technology operations and concepts, 2, planning and designing learning environments and experiences, 3, teaching, learning, and the curriculum, 4, assessment and evaluation, 5, productivity and professional practice, 6, social, ethical, legal, and human issues) stated in NETS-T

Null Hypothesis 2

There is no significant difference between grade levels in their perceptions of their competencies in the six groups of standards (1, technology operations and concepts, 2, planning and designing learning environments and experiences, 3, teaching, learning, and the curriculum, 4, assessment and evaluation, 5, productivity and professional practice, 6, social, ethical, legal, and human issues) stated in NETS-T

1.4 Significance of the Study.

There seems to be a consensus that technology is important in teacher education and in teaching practice. However, there is lack of research conducted in higher education settings to empirically assess the impact of technology in teacher education (Brownell, 1997). Administration of Faculty of Education in METU, Turkey is also aware of the importance of technology in teacher training. As Aksu (2003, para. 1), the dean of FEDU, stated, “the faculty functions as an integral part of the university in its insistence upon the highest of standards and systematic pursuit of educational improvement”. FEDU has spent a lot of its resources on supplying departments with technological improvements, as well.

FLE is the biggest department in FEDU in terms of the number of students enrolled and that of the personnel. Department of FLE has pioneered in Instructional Technology and Material Development course’s integration into its programs. And the instructors of FLE have been using various technological equipments (including video-camera, cassette-player, DVD films, VCD films, cassette films, LCD screens, pronunciation development programs, etc…) in their courses.

Despite the fact that FLE is the biggest department of FEDU with regard to the number of students and instructors and various technological equipments that are used, an inadequate number of studies have been previously conducted on any aspect of FLE students’ perceived competency in “technology operations and concepts”, in “planning and designing learning environments and experiences”, in “teaching, learning, and the curriculum”, in “assessment and evaluation”, in “productivity and professional practice”, and in “social, ethical, legal, and human issues”. This study aims to reveal the FLE students’ perceptions of their competencies in the standards stated in NETS-T. This study will make contributions to the related literature in Turkey with its findings. Moreover, this study will provide information to the stakeholders of Turkish teacher education institutions while they are trying to improve teacher education programs. Likewise, this study might give directions to the development of the FLE teacher education programs. This study will be one of the first studies conducted in Turkey on the perceptions of students' competencies in regard to an international educational technology standard.

1.5 Definition of Terms

Educational Technology (ET): Educational technology is a complex, integrated process involving people, procedures, ideas, devices, and organization for analyzing problems and devising, implementing, evaluating, and managing solutions to those problems, involved in all aspects of all learning (AECT, 1977/1996).

Instructional Technology (IT): Instructional technology is a sub-set of educational technology, based on the concept that instruction is a sub-set of education. IT is a complex, integrated process involving people, procedures, ideas, devices and organization, for analyzing problems and devising, implementing, evaluating and managing solutions to those problems, in situation in which learning is purposive and controlled (AECT, 1977/1996). The term instructional technology is often used interchangeably with the term educational technology. On the other hand, the term instructional technology presents refinements that are not included in the meanings of educational technology (Gentry, 1991).

International Society for Technology in Education (ISTE): ISTE is a nonprofit professional organization with a worldwide membership of leaders and potential leaders in educational technology. Home of the National Educational Technology Standards (NETS), the Center for Applied Research in Education Technology

(CARET), and the National Educational Computing Conference (NECC), ISTE meets its mission through knowledge generation, professional development, and advocacy. ISTE also represents and informs its membership regarding educational issues of national scope through ISTE–DC. ISTE supports a worldwide network of Affiliates and Special Interest Groups (SIGs), and ISTE offers its members the latest information through its periodicals and journals (ISTE, n.d.c).

National Educational Technology Standards for Teachers (NETS-T) in the USA: In early 2000 NETS-T were released. The preamble to the standards states, the ISTE Educational Technology Foundations Standards for All Teachers reflects professional studies in education providing fundamental concepts, knowledge, skills, and attitudes for applying information technology in educational setting. All candidates seeking initial certification or endorsements in teacher preparation programs will meet these educational technology foundation standards. It is the responsibility of teacher preparation programs to provide opportunities for their candidates to achieve these standards (Thomas & International Society for Technology in Education.2000.para.I, cited in Hayden, 2002)

CHAPTER 2

LITERATURE REVIEW

The purpose of this chapter is to investigate the literature related with technology standards in education, educational technology, and teachers' perception and competence levels towards the use of technology.

2.1 Technology in Education

Growing emphasis on enhancing students' self-directed learning focuses on individually and socially constructed meaning (White, 1996). The classroom becomes the place for student work and collaboration as knowledge is applied to authentic situations. As Houghton (1997) stated, teaching no longer centers around the transfer of knowledge from teacher to student; learning results from student inquiry, critical thinking, and problem solving based on information accessed through a variety of sources (cited in Scheffler & Logan, 1999). To foster and support critical thinking and reasoning, students must be given opportunities in the classroom to use technology (Merkley & Schmidt, 2001). Technology can facilitate the process of meaning making as well as the sharing of results (Bruce, 1999). As Houghton (1997) stated, computers give students tools for research, data analysis, knowledge application, communication, and collaborative writing (cited in Scheffler & Logan, 1999).Technology fosters and supports a constructivist approach to learning when used as a tool in the process of making meaning and supporting inquiry (Merkley & Schmidt, 2001).

As classroom access to communication and information technologies increases and as vast amounts of information become available in digital format, students will need to be literate across a variety of communication technologies (Pope & Golub, 2000). Knowing how to access information, evaluate knowledge sources, and apply knowledge to issues and problems are primary learning expectations for students in today's schools (Scheffler & Logan, 1999). Several reformers feel that teacher training is a key concept in promoting students' successful manipulation of multiple technologies in their studies (Harrington, 1991; Soetaert & Bonamie, 1999).

2.2 Faculties Responsibilities for Preparing Prospective Teachers

Preparing teachers for the classrooms is the responsibility of Faculties of Education (College of Education). As many researchers mention education faculties need to integrate technologies in their teacher education curricula. For example, Larson, (1998) stated:

> "Student teachers practice teaching with technology and are pushed to consider expanded conceptions of teaching and learning. When infused within courses throughout teacher education programs, technology then becomes a gateway to expanded and diversified experiences and has greater opportunities to further critical dispositions of pre-service teachers."

As Hill and Somers (1996) stated, there is a growing and continuing need for systematic efforts to infuse instructional technology in relevant ways in all professional education programs preparing administrators, teachers, and counselors.

Bailey et al. (1996) stated that the information age has created increasing needs for teachers and other school personnel at all levels of education to develop, use, and disseminate skills for including technology as the driving force behind integrated, cross-disciplinary learning experiences that prepare students for life in the "real" world.

Preservice teachers must be prepared to use current technologies to promote active student learning in classrooms. For this to occur, teacher education faculties need to integrate technology into methodology courses. Furthermore, the use of technology in these courses should exemplify how it can be used to support, expand, and enhance the curricula (Merkley & Schmidt, 2001)

Preservice teachers must appreciate the potential of technology as a cognitive instructional tool and must enter the teaching field ready to use technology to enhance student learning (Soloman, 1992). Nurturing this appreciation and readiness requires that preservice teachers experience technology as a natural part of their preparation environment (Pope & Golub, 2000). There is an overwhelming agreement that a required technology course in a teacher preparation program must be implemented by faculty who model effective use of technology for instructional and administrative tasks throughout the teacher preparation coursework (Pope & Golub, 2000).

Teacher preparation and professional development for computer technology should be based on competencies essential for designing, delivering, managing, and evaluating instruction (Kozma & Johnston, 1991).

The tremendous public investment in educational computing is evidence that society expects educators to integrate technology into the classroom (Johnson, 1997). As Houghton (1997) states, with computers and advanced telecommunications technology revolutionizing nearly every aspect of life and work, the question is not whether states and local districts should incorporate technology into teaching and learning but how they should do it (cited in Scheffler & Logan, 1999).

Faculties of Education responded to the need to integrate technology in their programs. Teacher education institutions have responded in a variety of ways to the need to integrate technology throughout a teacher preparation program (Office of Technology Assessment, 1995; Soloman, 1992). A set of integrated instructional modules has been prepared for use in developing and extending the information technology skills of graduate and undergraduate students (Algozzine et al., 1999).

As a result of these efforts, enhancement of the information technology competencies has increased in faculty members in a non-threatening manner (Algozzine et al., 1999). Likewise, the 1998 National Survey of Desktop Computing and Information Technology in Higher Education revealed that the percentage of college classes using technology continues to increase, with 44.4 percent using e-mail and 36 percent using presentation handouts (Green, 1999). Graduate and undergraduate students have been made aware of a range of educational applications of information technology, including the ones to which the schools may not as yet have access (Algozzine et al., 1999).

Although there are many improvements in the usage of technology in the programs of Faculties of Education, as Wiley and Chrispeels (1997) stated, helping teachers to obtain computers for personal use, providing time for teachers to learn about educational technology and plan effective uses, and providing technical support are, in themselves, not sufficient to ensure a higher percentage of teachers teaching with technology (cited in Merkley & Schmidt, 2001). For example, Office of Technology Assessment (1995) report has indicated that new teachers have limited knowledge of how to work in a technology-enriched classroom or how to use technology in their professional practice. One of the reasons as Chisholm, et al. (1998) stated, preservice teacher students do not see consistent or extensive modeling of the use of technology by faculty in preservice classes.

As Bailey et al. (1996) stated, most educators are provided little training in how to use new technologies so it is no surprise that many of them continue doing what they were doing rather than spending time learning how to use the innovations that are being provided for them.

Although there is an increasing volume of computer hardware and software in schools, few teachers routinely use computers for instructional purposes (Hunt & Bolin, 1995). It is necessary that educators be equipped to use technology not just as a personal tool but as a standard tool of teaching (Friske, Knezek, Taylor, Thomas, & Wiebe, 1996).

Fairly common uses of technology in the higher education classroom, however, still do not capitalize on the real power of technology to make available real-world situations, aid visualization, facilitate collaborative activity among students, support analysis and synthesis of information, simulate complex environments, and provide continual feedback (Kozma & Johnston, 1991).

2.3 Teachers' Technology Usage in Classroom

Teachers should have the basic knowledge about technology. As Becker et al. (1999) stated, it is certainly true that what makes a good computer-using teacher is more than any one thing: technical knowledge about computers helps, so does experience in using computers professionally, and it also seems reasonable to expect that an exemplary teacher has the kinds of objectives for student computer use and employs the types of software that most likely result in student engagement and thoughtful effort, outside of class time as well as during class.

Teachers should plan and design learning environments and experiences with the integration of technology. Scheffler & Logan (1999) stated, the most important computer competencies dealt with integration of computers into curricula and using computers in instruction. Likewise, according to Mayer-Smith et al. (1997), the connection between technology and teaching is most likely to happen when teachers are supported to draw on their teaching experience and knowledge of classroom contexts as a basis for designing successful technology implementation. The pacing of instruction must be modified in order to include technology experiences in a methodology course. It simply takes more preparation time and often more time to implement. In addition, the instructor needs to be ready for the unexpected: hardware that fails, software that won't open, servers that crash, computer labs that are double-booked, and so forth. The instructor needs to be comfortable with modeling flexibility, troubleshooting, and problem-solving approaches when technology difficulties arise (Merkley & Schmidt, 2001).

Advanced information technology competencies enable teachers and other education professionals to use multiple forms of technology to enhance learning in their classrooms (Algozzine et al., 1999). Skills of graduate and undergraduate students to use information technology as an instructional tool in the schools are no longer taught in isolation but are integrated into coursework across the teacher preparation curriculum (Algozzine et al., 1999).

Teachers should use technology to facilitate a variety of effective assessment and evaluation strategies. For example, a database management systems can be used to enter, store, update, access, and manipulate information. Most database management systems consist of three levels: a file or collection of information about a particular topic, a record that contains the information about one entry in a file, and a field that serves to organize the information on each record (Simonson & Thompson, 1994). A database management system is a valuable tool to help collect and analyze data and interpret the results, a performance indicator for the NETS-T "assessment and evaluation" technology standard (Merkley & Schmidt, 2001). Teachers should apply multiple methods of evaluation to determine students' appropriate use of technology resources. As Becker et al.(1999) stated, teachers who are most technically knowledgeable about computers are the ones who are most likely to have their students use presentation software and multimedia authoring software and to have as principal objectives goals like having students use computers to help them present their ideas before an audience and to communicate with other people.

Teachers should use technology to enhance their productivity and professional practice. Merkley and Schmidt (2001) in their study with the preservice teachers found that, the preservice teachers experienced the power and possibilities of distance education when they communicated their ideas and interacted with middle school students. This experience provided a risk-free environment for preservice teachers and middle school students to explore and learn together. Without using these technologies, this collaborative learning experience would not have been possible because of scheduling and logistical problems.

2.4 Teachers in classrooms

Teachers need time and preparation to understand technology for mainly three instructional purposes; learning from technology, technology as the object of instruction, and learning with technology. CEO report (1999, cited in Özoğul, 2002) stated, during the adoption process teachers should go through five stages.

1. Entry: At this stage teachers are aware of the benefits of technology but they can't be considered as technology users. Their students are learning to use technology. Their students are using technology in ways determined by someone other than the teacher or independently from the teacher. For example, the class may have designated computer lab time taught by the computer teacher or the classroom may have computers in the class and students may utilize from them independently from the teacher.

2. Adoption: At adoption stage, teachers are beginning to use technology usually for enhancing their own productivity. At this stage teachers use technology in limited ways such as, while conducting daily tasks, which they have done without using technology before. They experience the advantage of doing traditional tasks by using a new tool, and begin to see the power of the tool for other applications.

3. Adaptation: At this stage technology is used to enrich the curriculum and in ways that they are already familiar. They make use of their already existing practices and automate them. For example, a teacher who has located web sites, which reference materials relevant to the course content, present the lesson by using material from the WEB.

4. Appropriation: At this stage technology is integrated and used for its unique capabilities. Teachers view technology as a relevant tool for teaching and learning so that they design learning environments and experiences by taking the advantage of technologies capabilities to

master the desired outcomes. In appropriation stage, technology begins to reveal its potential to produce improvements in learning.

5. Invention: At this stage teachers start to redesign the learning environments and they create new learning experiences for their students.

Usage of technology in classroom brings many instructional benefits that may or may not be observed in measures of student learning such as motivating learners, bridging wider range of resources to the classroom, etc… OTA report (1995, cited in Özoğul, 2002) lists the promises of the technology for teachers as follows:

a) Bridging new sources to the classroom: As technologies have become widely available, teachers have chance to access to a broader range of resources that they can use in their classrooms. For instance, telecommunications enable teachers to extend the learning environments for students.

b) Developing new forms of instruction: Teachers may utilize from the technology, to create new teaching tools. For instance, instead of written reports teachers may require usage of multimedia sources to create reports which includes photographs, references from CD-ROM encyclopedia, etc…

c) Motivating learners: The nature of technology based resources suggests and discussions with teachers confirm that many technology based classroom activities can be motivating to students.

d) Individualizing student learning: This has been the greatest appeal of integration of technology to classroom setting. Integrated learning systems and software that corresponds to curricula may be presented to each student depending on students abilities.

e) Assisting teachers with the daily tasks of teaching: Technology offers alternative and time saving solutions to many tasks that require teachers' valuable time and energy such as keeping records, preparing curricular activities and reports, increasing communication with students.

2.5 Instructional Technology in Turkey

To examine the instructional technology studies done in Turkey, which organizations and institutions are responsible for those studies and how those institutions are organized should be clarified. Many institutions (universities, scientific research organizations, Ministry of National Education, and some various private organizations) are concerned with education in Turkey. It is a well-known fact that educational technology should be considered and developed continuously in our educational system. In this system, providing tools to educational institutions is the responsibility of the Ministry of National Education (MNE). The studies done in the field of instructional technology can be investigated from different points such as design of instructional materials, printed materials, audio-visual tools, radio and television education, computer-aided instruction, distance education, buildings and human resources (Alkan, 1990, cited in Onay, 2002).

Until the “Educational Tools and Technical Collaboration General Directorate” was established in 1962, the tools used in instructional settings were bought from other countries. After the establishment of the general directorate, Film Radio and Television Education Center and Course Tools Construction and Reparation Center units have been founded. The amount of media and materials such as films, photos, videocassettes, and instructional software were not adequate and radio and television did not have adequate features to support education. On the other hand, computer aided instruction; e-learning laboratories and programmed instruction are fairly new concepts for Turkey. Only after the 1970s was a rise given to the development of Instructional Technology that previously lacked adequate literature and was limited in terms of resources. (Alkan, 1990, cited in Onay, 2002).

In 1984, MNE started a project by establishing a committee related to computer education in order to keep up with the latest trends. The aim of the committee was to determine the fundamental principles for computer education and to determine the related hardware. This committee prepared a report, about integrating computers in secondary education, involved proposals for the transition program, selection of applicant schools, determining criterion on teacher education, training teachers, preparation of teaching tools, and selection of suitable computer hardware. In line with the report, MNE supplied 100 schools from 67 cities with hardware and provided training courses for teachers about computer literacy and basic programming language during the same year. Until 1987, MNE continued to buy computers, to train teachers, and to develop software. In 1987 context of teacher training was expanded and computer-aided instruction was included for the first time. According to studies conducted between 1984 and 1989, MNE gave priority to software development and teacher education. For this purpose, MNE invited different firms to help computer-aided instructions at schools and companies supported the development of software processing and teacher training in schools. Later, MNE discovered inadequacy of private firms in teacher training, so started to work with universities together with the firms. In 1990, the Ministry decided to include computer related courses in the curriculum of teacher training institutions. The MNE began to provide these trainings in two different areas called "teacher trainer" and "applicator teacher", the former referring to the person who would be responsible in the training of other teachers in computer literacy and the latter referring to the person who would be responsible for implementing the computer-aided teaching applications. For these purposes, since 1991, MNE has been working in cooperation with three universities and Tubitak (a scientific research institution) to integrate educational technology into instruction. Tübitak first prepared a "Turkey CD" and "CD of Kurtuluş Savaşı" for schools. After these,"CD of Piri Reis" for history education and for grammar education the "CD of Turkish Grammar" was developed (İmer, 2000, cited in Onay, 2002)

With the pass of the Basic Education Law in 1997, computer related courses in teacher training institutions were implemented and the compulsory education in Turkey was extended to eight years (Özoğul, 2002). The shortage of teachers in schools made the establishment of the National Education Development Project necessary which aided the redesign of the curricula of teacher training institutions and provided all basic education schools with at least an instructional technology room. Another dimension of this project was to improve the quality of the teacher training system. Each and every department in the faculties of education in Turkey began to offer two technology training courses, “Computer Applications in Education' and 'Instructional Technologies and Material Preparation” (HEC, 1998, cited in Onay, 2002).

2.6 Technology Standards for Teachers

As we mentioned before under the title of "Faculties Responsibilities for Preparing Prospective Teachers", preparing teachers for the classrooms is the responsibility of Faculties of Education (College of Education). As many researchers mentioned, education faculties need to integrate technologies in their curricula (Larson, 1998; Hill & Somers, 1996; Bailey, et al, 1996; Merkley & Schmidt, 2001). Faculties of Education responded to the need to integrate technology in their programs (Soloman, 1992). While they are integrating technologies into their teacher education curricula, they developed technology standards for their own teacher graduates. Some non-profit organizations also developed teacher technology standards.

For example, the National Council for Accreditation of Teacher Education (NCATE) in Washington, DC, USA stipulates that teacher-training institutes seeking accreditation in educational computing and technology will need to require their graduates to:

- operate a computer,
- support instruction with software;
- use word processing, database, spreadsheet and desktop publishing programs;
- apply appropriate assessment practices to the use of computers and related technologies;
- design and develop student learning activities that incorporate technology;
- use computer-based technologies to access information for class and professional development (Electronic Learning, 1992, cited in Movrer-Popiel & Pollard, 1994)

Education Professional Standards Board (1999) in Kentucky prepared a technology standard for teachers under the title "Kentucky Council on Experienced Teacher Standards for Preparation and Certification". According to this standard; the teacher uses technology to support instruction; access and manipulate data; enhance professional growth and productivity; communicate and collaborate with colleagues, parents, and the community; and conduct research. Standard also describes performance indicators which;

- Operate a multimedia computer and peripherals to install and use a variety of software.
- Use terminology related to computers and technology appropriately in written and verbal communication.
- Demonstrate knowledge of the use of technology in business, industry, and society.
- Demonstrate basic knowledge of computer/peripheral parts and attend to simple connections and installations.
- Create multimedia presentations using scanners, digital cameras, and video cameras.
- Use the computer to do word processing, create databases and spreadsheets, access electronic mail and the Internet, make presentations, and use other emerging technologies to enhance professional productivity and support instruction.
- Use computers and other technologies such as interactive instruction, audio/video conferencing and other distance learning applications to enhance professional productivity and support instruction.
- Request and use appropriate assistive and adaptive devices for students with special needs.
- Design lessons that use technology to address diverse student needs and learning styles.
- Practice equitable and legal use of computers and technology in professional activities.
- Facilitate the lifelong learning of self and others through the use of technology.

- Explore, use, and evaluate technology resources: software, applications, and related documentation.
- Apply research-based instructional practices that use computers and other technology.
- Use computers and other technology for individual, small group, and large group learning activities.
- Use technology to support multiple assessments of student learning.
- Instruct and supervise students in the ethical and legal use of technology.

Community High School District (2003) in Illinois also prepared a technology standard for teachers called as “Core Technology Standards for All Teachers”. This standard is categorized under five categories. These are (1) Basic Computer/Technology Operations and Concepts; (2) Telecommunications and Information Access; (3) Application of Technology in Instruction; (4) Social, Ethical and Human Issues; and (5) Personal and Professional Use of Technology.

Illinois State Board of Education (2002) prepared a teacher technology standard for teachers called as “Technology Standards for All Illinois Teachers”. This standard had eight sub-standards (1) Basic Computer/Technology Operations and Concepts; (2) Personal and Professional Use of Technology; (3) Application of Technology in Instruction; (4) Social, Ethical, and Human Issues; (5) Productivity Tools; (6) Telecommunications and Information Access; (7) Research, Problem Solving, and Product Development; (8) Information Literacy Skills

State Board of Educator Certification (SBEC) (2002) in Texas prepared a technology standard for teachers called as “Technology Applications Standards for all Beginning Teachers”. The standards consisted of five sub-standards. These are;

- All teachers use technology-related terms, concepts, data input strategies, and ethical practices to make informed decisions about current technologies and their applications.
- All teachers identify task requirements, apply search strategies, and use current technology to efficiently acquire, analyze, and evaluate a variety of electronic information.
- All teachers use task-appropriate tools to synthesize knowledge, create and modify solutions, and evaluate results in a way that supports the work of individuals and groups in problem-solving situations.
- All teachers communicate information in different formats and for diverse audiences.
- All teachers know how to plan, organize, deliver, and evaluate instruction for all students that incorporates the effective use of current technology for teaching and integrating the Technology Applications Texas Essential Knowledge and Skills (TEKS) into the curriculum.

State Board of Education / Department of Public Instruction (n.d.) established a competencies list for all North Carolina educators to attain in order to use information technologies to support effective teaching and enhance overall teacher productivity.

The competencies were divided into two large sections:

1. Basic Technology Competencies; to be able to support and enhance professional productivity, information access, collaboration, and communication among educators.
2. Advanced Technology Competencies; to enable educators to use multiple forms of technology to enhance learning in their classrooms.

The State of Queensland (Department of Education) (1999) prepared the "Minimum Standards for Teachers -Learning Technology" for teachers who wish to seek credit from a Queensland tertiary institution for their achievement of the minimum learning technology standards. Candidates must complete the following process to be accepted as a teacher:

- achieve the Education Queensland credential for Minimum Standards for Teachers — Learning Technology;
- complete all elements of the learning technology portfolio;
- submit the Education Queensland certificate and portfolio to the course lecturer.

Mandated contents of learning technology portfolio for tertiary credit;

IT skills

- Complete IT skills audit
- Work samples:
  - two examples of word-processed documents for personal or professional use;
  - printed copy of a World Wide Web page;
  - copy of an email message sent and received;
  - floppy disk demonstrating an understanding of personal folders or directories.

Curriculum applications

- Unit of work illustrating integration of learning technology
- Completed software evaluation

School planning

- This is demonstrated by achievement of Education Queensland credential.

Student-centred learning

- Two learning logs:
  - reflections on computer-based activity;
  - reflections on ELT principles

Optional — Teachers may also include student and/or teacher work samples.

Format — The portfolio may be presented in a format of the teacher's choice. While the contents of this portfolio are mandatory for the purposes of tertiary credit, they may be adapted for use as part of a school's assessment process.

2.7 Research Studies Related to Educational Technology

According to Hannafin (1999), in the past there was a clear distinction between the instructional technology programs and teacher education programs. The aims of instructional technology programs were to prepare graduates to be instructional designers and to do research in the field whereas the aim of teacher training was to train and supervise preservice teachers. However, political and economic realities have changed the situations of these two distinct areas in that training teachers to integrate technology into the classroom has acquired an increasingly prominent role in instructional technology.

Özoğul (2002) investigated the affects of the computer literacy course "Computer Applications in Education" in FEDU, in METU, Turkey. And found that, "… most of the students were satisfied with the course and majority of them stated that the course exceeded their expectations. After completing the course majority of the students stressed that they would use computers at instructional process when they become in-service teachers" (p. iv).

A study conducted by Movrer-Popiel & Pollard (1994) has shown that "although

> the demand to integrate technology within the educational setting has been emphasized nationally and internationally and accreditation requirements instituted, preservice teacher programs are not always able to provide the training necessary to insure the utilization of computer technology. These preservice educators, who will soon be teaching within the K-12 setting, are not gaining the technological expertise necessary to integrate computers in all aspects of curriculum and classroom management. Colleges of education must take a proactive stance in assuring that their

programs Contain technology training components, particularly instruction in using technology as a teaching tool and ways to effectively integrate advanced computer technologies in the classroom " (p.137).

A study conducted by Clift, Mullen, et al. (2000) investigated the elementary teacher education students' responses to the technology instruction after the completion of the technology course and found that for most of the students "the most useful skill that they acquired from the course was learning to use e-mail. Also the students enumerated some suggestions for the improvement of the technology training course such as; providing more connection to actual K-12 classrooms, forming level groups within the group, and offering more hand on learning activities" (Cited in Özoğul, 2002, p.33).

Marx (2000) investigated the Technology Innovation Challenge Grant masters program whose main goals were to improve the technology use of teachers, encourage the diffusion of program knowledge and create teacher change agents in his study. The program was successful in classroom use of technology and the diffusion of program knowledge. However, it had less success in encouraging broader curriculum reform ad creating teacher change agents. According to the respondents, the main reason for the failure of some of the goals was inadequacy of software and other resources, both through the master program and in teacher's schools. Marx gave some suggestions to overcome these kinds of problems. Such as;

- Universities should ensure that teachers in the program should have adequate, modern computing hardware and software available.
- Universities should provide a consistent theoretical framework and sets of goals strengthen the program, to ensure the success of their instructional technology programs.
- Classes and curricula should be aligned to these goals.

- Truly collaborative relationship should be provided between the university and the K-12 schools.

Jao (2001) investigated preservice teachers' perceptions of their competence with regard to educational technology standards. The preservice teachers were enrolled in the teaching certification course at the University of Toledo. The result of the study revealed that after formal training, preservice teachers have a more positive attitude toward educational technology standards, and increase their level of self- confidence in both performing the surveyed skills and in teaching them at grade level they planned to teach, and a more positive attitude toward a variety of instructional tools. Jao concluded that:

- The intervention of a formal training course using ISTE technology standards in the use of selected instructional technology can function as a primary factor in the development of a positive attitude toward established standards for preservice teachers.
- The intervention of a formal training course in the integration of selected instructional technology promotes an increase of confidence level bye preservice teachers.
- The integration of a formal training course created a higher skill level and a more positive attitude toward the use of scanners, digital cameras, audio recordings, video recordings, PowerPoint software applications, HyperStudio software applications, and the development of web pages.

Royer (2002) examined the "Teaching and Learning with Technology" master's track program in Salisbury University. She concluded that, programs should be developed based on a conceptual framework, which outlines program goals and outcomes based on research and review of the literature. While national technology standards may not serve as the primary elements that drive curriculum construction, they should certainly be addressed within the program. Royer concluded that the curriculum should be designed to model teaching with technology instead of focusing on the technology itself. The program should be based on current learning theories such as constructivism, teaching for understanding, social learning, and multiple intelligences and that assessment and evaluation must be integral part of program planning.

McCoy (1998) conducted a research study on the integration of technology in teacher preparation programs. The author concluded that technology standards must be incorporated into teaching. In addition, the author recommended that future research studies need to investigate preservice teacher's perceptions toward the use of technology and the integration of technology into teacher preparation programs (cited in Jao, 2001).

2.8 Summary

Teaching and learning are becoming an individual process. The role of teachers in this changing environment shifted from being the center of transfer of knowledge to being a guide for students while they are constructing their own learning. Technology offers many facilities for the process meaning making and sharing of results. For this reason, students should be technology literate to use these facilities. Teacher training is the key factor in increasing students' successful manipulation of multiple technologies.

Teacher education institutions are aware of the importance of technology integration into their teacher preparation programs. To integrate technology to their programs, they bought equipments, educated faculty members to use technology in their classrooms, adjusted their curricula to integrate technology, encouraged faculty members to use technology in their courses, and supplied students with current technologies. These efforts led to some changes such as the increase of the use of technology of faculty members and preservice teachers. However the integration of technology in their instructions is still not in the desired level. To solve this undesired situation educators should be equipped with using technology as a standard tool for teaching. More emphasize should be given to the use of technology in educational settings as an instrument.

Teachers have the key role in integrating technology into education. Teachers should have basic knowledge to accomplish technology integration. They should also be able to plan and design learning environment and experiences with the integration of technology. Moreover, they should be ready for unexpected situations and have alternative plan in case of unexpected situations. Planning and designing learning environment is important but using multiple forms of technology to enhance learning is also required for teachers. Teachers also should apply multiple methods of evaluation to determine students' appropriate use of technology resources. They should use technology to enhance their productivity and professional practice.

All countries in the world have several attempts to integrate computer into their educational systems. Turkey also has attempted in that direction since early 1980s. The Ministry of National Education supplied computers as well as trainings to teachers at schools. But soon it was realized that this inservice training was not enough to integrate technology fully into classroom as well as in the other countries. So some computer related courses have begun to be involved in the curriculum of all teacher education programs.

Teachers use technology for mainly three instructional purposes, learning from technology, technology as object of instruction, and learning with technology. During the adoption process, teachers pass five stages; entry, adoption, adaptation, appropriation, and invention. Technology can have some benefits in classrooms, such as bridging new sources to the classroom developing new forms of instruction, motivating learners, individualizing student learning, and assisting teachers with the daily tasks of teaching.

Integration of instructional technology into the teacher training programs is almost compulsory. So, teacher training institutions have been trying to integrate technology into their programs. According to studies conducted to evaluate these programs some improvements were observed. But, there are also some weak points that should be improved.

CHAPTER 3

METHOD

In this chapter, research questions, overall design of the study, population and sampling, description of variables, development of measuring tools, procedure, and methods used to analyze data, and assumptions are explained briefly.

3.1 Research Questions

This study is guided by three major research questions with respective sub questions:

1. How do FLE students perceive themselves related with the standards stated in NETS-T?

    1.1 How do FLE students evaluate themselves related with the 'technology operations and concepts' standard stated in NETS-T?

    1.2 How do FLE students perceive themselves related with the 'planning and designing learning environments and experiences' standard stated in NETS-T?

    1.3 How do FLE students perceive themselves related with the 'teaching, learning, and the curriculum' standard stated in NETS-T?

1.4 How do FLE students perceive themselves related with the ‘assessment and evaluation’ standard stated in NETS-T?

1.5 How do FLE students perceive themselves related with the ‘productivity and professional practice’ standard stated in NETS-T?

1.6 How do FLE students perceive themselves related with the ‘social, ethical, legal, and human issues’ standard stated in NETS-T?

2. Is there a significant difference between males and females in their perceptions of their competencies in the standards stated in NETS-T?

2.1 Is there a significant difference between males and females in their perceptions of their competencies in the ‘technology operations and concepts’ standard stated in NETS-T?

2.2 Is there a significant difference between males and females in their perceptions of their competencies in the ‘planning and designing learning environments and experiences’ standard stated in NETS-T?

2.3 Is there a significant difference between males and females in their perceptions of their competencies in the ‘teaching, learning, and the curriculum’ standard stated in NETS-T?

2.4 Is there a significant difference between males and females in their perceptions of their competencies in the ‘assessment and evaluation’ standard stated in NETS-T?

2.5 Is there a significant difference between males and females in their perceptions of their competencies in the ‘productivity and professional practice’ standard stated in NETS-T?

2.6 Is there a significant difference between males and females in their perceptions of their competencies in the ‘social, ethical, legal, and human issues’ standard stated in NETS-T?

3. Is there a significant difference between grade levels in their perceptions of their competencies in the standards stated in NETS-T?

3.1 Is there a significant difference between the grade levels in their perceptions of their competencies in the ‘technology operations and concepts’ standard stated in NETS-T?

3.2 Is there a significant difference between the grade levels in their perceptions of their competencies in the ‘planning and designing learning environments and experiences’ standard stated in NETS-T?

3.3 Is there a significant difference between the grade levels in their perceptions of their competencies in the ‘teaching, learning, and the curriculum’ standard stated in NETS-T?

3.4 Is there a significant difference between the grade levels in their perceptions of their competencies in the ‘assessment and evaluation’ standard stated in NETS-T?

3.5 Is there a significant difference between the grade levels in their perceptions of their competencies in the ‘productivity and professional practice’ standard stated in NETS-T?

3.6 Is there a significant difference between the grade levels in their perceptions of their competencies in the ‘social, ethical, legal, and human issues’ standard stated in NETS-T?

3.2 Overall Design of the Study

The purpose of this study is to investigate; prospective foreign language teachers' (in Faculty of Education, in METU, Turkey) perceptions of their technology competence in regard to National Educational Technology Standards for Teachers (NETS-T) developed by International Society for Technology in Education (ISTE) in the United States. This study was designed as a cross-sectional survey study. In order to collect the data, a survey, based on NETS_T, was developed by the researcher. The survey consisted of 44 Likert type, five point scale items. The collected data through the survey were subject to descriptive and inferential statistical analyses.

Descriptive studies aim to describe and to interpret the studied conditions. According to Best (1970),

> "Descriptive research is concerned with conditions or relationships that exist, practices that prevail; beliefs points of views or attitudes that are held; processes that are going on; effects that are being felt; or trends that are developing. At times descriptive research is concerned with how, what is or what exists is related to some preceding event that has influenced or affected a present condition or event" (cited in Cohen, Manion, and Morrison, 2000, p.169).

Descriptive studies investigate individuals, groups, institutions, methods and materials in order to describe, analyze and interpret the entities and the events (Cohen, et al, 2000). The rationale behind the use of descriptive statistics in this study was to obtain complete and detailed perceptions of FLE students' technology competence in regard to NETS-T.

Inferential statistics consist of procedures for making generalizations about a population by studying a sample from that population. It is used to draw conclusions about characteristics of the population based on corresponding characteristics of the sample (Hinkle, et al, 1988). These kinds of statistics were also used in the study to draw conclusions about the FLE students perceptions of their competencies on the standards stated in NETS-T.

3.3 Population and Sample

All of the first, second, third, and fourth year students of Foreign Language Education (FLE) Department in the Faculty of Education (FEDU) at the Middle East Technical University (METU) in Ankara, Turkey were identified as the target population of this study. As it is presented in detail in Table 3.1, 96 male students and 287 female students participated. A total of 495 students were enrolled (freshmen, sophomores, juniors, and seniors) at FLE at the time of the study. In the study, the convenience sampling method was used, and the researcher tried to reach as many students as possible. For this purpose, for each grade level a must-course was chosen from the 2002-2003 Spring semester FLE course schedule. Each course's sections were identified, in terms of numbers, instructor names, and time schedules. Specific hours were decided on with the instructor of each section in order to distribute the survey. Before the survey was distributed to the class, that course's instructor was explained the aim of the research and students were asked honest contribution. The researcher was in the class during the administration of the survey. The survey was distributed to students who attended the course that day.

The participants of this study had taken some technology courses. Freshmen had taken only IS 100 (Introduction to Information Technologies and Applications) course; sophomores had taken IS 100 and CEIT 300 (Computer Applications in Education) courses, and juniors and seniors had taken IS 100, CEIT (300), and CEIT 319 (Instructional Technology and Material Development) courses. The purpose of IS 100 course is to introduce all students to the basic information technology concepts and applications in their preparatory school / freshman year, preparing them to use these skills during their undergraduate studies in their respective disciplines, as well as professional lives. CEIT 300 course aims to inform students in computer ethics and security issues. Also, it aims to teach them MS applications such as Word, Excel, Power Point, and Internet Explorer. CEIT 319 course underlines the major implication of learning theories as they are applied into instructional material development. The course introduces all the major types of instructional media that are available.

Table 3.1 Subjects of the study

Year	Male (# and percentages)	Female (# and percentages)	Total	Technology related courses (taken by the subjects)		
				IS 100	CEIT 300	CEIT 319
1st year	36 (35%)	67 (65%)	103	√		
2nd year	15 (15.3%)	83 (84.7%)	98	√	√	
3rd year	20 (20.8%)	76 (79.2%)	96	√	√	√
4th year	25 (29.1%)	61 (70.9%)	86	√	√	√
Total	96 (25.1%)	287 (74.9%)	383			

3.4 Variables

There were eight variables involved in this study, which were categorized as dependent and independent variables:

3.4.1 Dependent variables

The dependent variables were students' perceptions on; (1) technology operations and concepts, (2) planning and designing learning environments and experiences, (3) teaching, learning, and the curriculum, (4.) assessment and evaluation, (5) productivity and professional practice, and (6) social, ethical, legal, and human issues. There were totally 6 dependent variables in the study.

3.4.2 Independent variables

The independent variables in the present study were gender and grade level. Grade levels included first year students (freshmen), second year students (sophomores), third year students (juniors), and fourth year students (seniors).

3.5 Instruments

In this study, Educational Technology Standards Perception Survey for Teachers was used to gather data about FLE students' perceptions of their competencies in regard to Educational Technology Standards determined by ISTE (See Appendix B).

3.5.1 Educational Technology Standards Perception Survey for Teachers (ETSPST)

The instrument used in this study was developed by the researcher to assess prospective teachers' perceptions of their competencies in NETS-T. The survey covers all of the six standards of NETS for teachers (1, technology operations and concepts, 2, planning and designing learning environments and experiences, 3, teaching, learning, and the curriculum, 4, assessment and evaluation, 5, productivity and professional practice, 6, social, ethical, legal, and human issues) and consists of 44 Likert type, five point scale items. There are seven items (1....7) related to technology operations and concepts, 10 items (8…17) related to planning and designing learning environments and experiences, six items (18…23) related to teaching, learning, and the curriculum, eight items (24…31) related to assessment and evaluation, six items (32…37) related to productivity and professional practice, seven items (38…44) related to social, ethical, legal, and human issues.

Some of the items in the survey were adopted from the existing surveys developed by Jao (2001), Hayden (2002).

At the beginning of the development process, related literature was examined and instruments developed by other researchers in former studies were collected. Then, the NETS indicators were divided into simple sentences each of which covers only one ability. Items found in the existing surveys (Jao 2001, Hayden 2002) were examined one by one and categorized according to the abilities in the NETS indicators and some of the items from Jao's and Hayden's were adopted for this survey. The first draft of the survey was developed by referencing to the items found from the literature. Three research assistants from FLE department checked the language of the first draft of the survey. Then one expert from the department of Computer Education and Instructional Technologies (CEIT) department assessed the survey and necessary changes were made such as addition or omission of some subjects. After revision, the survey was examined by three experts from FLE department, three experts from CEIT department, and one expert form Educational Sciences (EDS) department. The survey was revised according to the feedback gathered from these experts. To check the clarity of the survey, internal consistency of the survey items and the time required to fill it out, a pilot study was conducted. 30 students from three different departments (Department of Secondary Science and Mathematics Education, Department of CEIT, and Department of Elementary Education) of FEDU (10 students from each department) participated in the pilot study. The feedback related to readability, understandability, and clarity of the survey items, collected from these 30 students was analyzed, and some slight changes were made on the survey items with the help of three experts from FLE department and CEIT department. Reliability of this scale was .9667. The subscales reliability for "technology operations and concepts" was .8989, for "planning and designing learning environments and experiences" was .9051, for "teaching, learning, and the curriculum" was .8805, for "assessment and evaluation" was .8878, for “productivity and professional practice” was .8712, and for “social, ethical, legal, and human issues” was .8890.

3.6 Procedure

The study started with a comprehensive review of the literature. After determining the keyword list, Educational Resources Information Center (ERIC), Ebscohost, Science Direct, Proquest Dissertations Site and Internet (e.g., Google) were searched systematically. During the examination of the studies conducted abroad, MS and PhD theses written in Turkey were also searched from Higher Education Council (YÖK), Hacettepe Journal of Education, Eğitim ve Bilim Dergisi, and Çağdaş Eğitim Dergisi. Photocopies of available documents were taken from METU library, library of Bilkent University and TUBİTAK Ulakbim. Moreover, some of the documents that could not be reached were ordered from abroad.

After examining the resources, the measuring instruments were developed by making use of the findings from the literature. The survey was tested in the pilot study in May 2003. Results of the pilot study were analyzed and evaluated and with the help of experts necessary changes were made. Following the selection of subjects, necessary permission has been granted for the administration of the survey to all classes for the selected courses. Then, the final form of the survey was administered to the preservice teachers from FLE department of Faculty of Education at METU, in Ankara, Turkey, who were present during the course on that day.

The researcher administered the survey to the majority of the first, second, third and fourth year students during the third week in May 2002-2003 Spring semester (the week before the last week of 2002-2003 Spring semester). Students spent at most 20 minutes to complete the survey, although there was no time limitation. Directions were read and necessary explanations about the survey were made by the researcher. No problems were encountered during the administration of the survey.

The data gathered by the survey was analyzed through descriptive and inferential statistics.

3.7 Analysis of Data

Data list which consists of gender, grade level and answers of each subject to each question was prepared by using Excel in which columns show variables and rows show students participating in the study. The statistical analyses were done by using both Excel and SPSS. The data obtained in the study were analyzed through descriptive and inferential statistics.

Through descriptive statistics, the mean, standard deviation, valid percentage of each choice, total number of answers for each question were analyzed according to the students' gender and grade level.

In order to test the hypotheses, a statistical technique named inferential statistics such as MANOVA was used. MANOVA is a procedure to test the significance effects of one or more categorical independent variables on two or more continuous variables (Grimm & Yarnold, 1995). According to the literature, there are many confounding variables, which may affect the results of this study. Two of these variables used in this study were students' gender and students' grade level. Table 3.2 shows all variables that were used in the statistical analyses.

Table 3.2 MANOVA variables set

Variable Type	Category	Variable name
Independent variables	Gender	Male
		Female
	Grade Level	First Year
		Second Year
		Third Year
		Fourth Year
Dependent Variables	Technology operations and concepts	
	Planning and designing learning environments and experiences	
	Teaching, learning, and the curriculum	
	Assessment and evaluation	
	Productivity and professional practice	
	Social, ethical, legal, and human issues	

The statistical analyses of this study were performed by using the Statistical Package Program for Social Sciences (SPSS). The significance level was set to the .05 since it is the mostly used value in educational studies. In other words, the probability of rejecting the true null hypothesis (probability of making Type 1-error) was set to .05 as a priori to hypothesis testing.

3.8 Assumptions

1. The survey was conducted under standard conditions.
2. All subjects of this study responded sincerely to the items on the survey.

CHAPTER 4

RESULTS

In this chapter, the findings of the study are presented in four sections. First section presents FLE students' perceptions of their competencies in regard to standards stated in National Educational Technology Standards for Teachers (NETS-T). The second section presents males and females FLE students' perceptions of their competencies in regard to standards stated in NETS-T. The third section presents FLE students' (across grade levels) perceptions of their competencies in regard to standards stated in NETS-T. Finally, the last section presents comparisons of the results.

In this study the first seven items in the survey were related to the "technology operations and concepts" standard stated in the NETS-T. The items from eight to 17 in the survey were related to the "Planning and Designing Learning Environments and Experiences" standard stated in the NETS-T. The items from 18 to 23 in the survey are related to the "teaching, learning, and the curriculum" standard stated in the NETS-T. The items from 24 to 31 in the survey are related to the "assessment and evaluation" standard stated in the NETS-T. The items from 32 to 37 in the survey are related to the "productivity and professional practice" standard stated in the NETS-T. The items from 38 to 44 in the survey are related to the “social, ethical, legal, and human issues” standard stated in the NETS-T.

In this study Likert type five-point scales, from one to five, was used. In this chapter “poor” stands for the means between 1.00 and 1.80, “below average” stands for the means between 1.81 and 2.60, “average” stands for the means between 2.61 and 3.40, “good” stands for the means between 3.41 and 4.20, and “excellent” stands for the means between 4.21 and 5.00 as indicated in Figure 4.1.

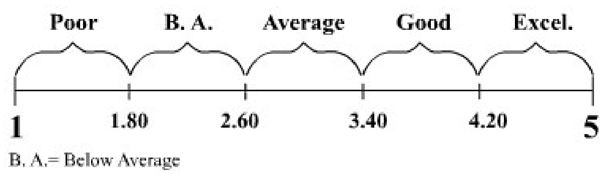

Figure 4.1 Indicators

4.1 FLE Students Perceptions of Competence in Regard to Standards Stated in (NETS-T)

FLE students’ perceptions of their competencies in the standards stated in NETS-T will be explained in six different sections. The sections are; (1) technology operations and concepts, (2) planning and designing learning environments and experiences, (3) teaching, learning, and the curriculum, (4.) assessment and evaluation, (5) productivity and professional practice, and (6) social, ethical, legal, and human issues.

4.1.1 Students’ perceptions of their competencies in “technology operations and concepts” category

The Table 4.1 shows all students’ perceptions of their competencies for the “technology operations and concepts” category. Overall mean score for these seven items for 375 students was 2.76, which stands for the descriptor “average”. The range of mean scores for this group of survey items were between 2.33 (use imaging device) and 3.24 (have basic knowledge of technology). Only 25.9 % of the students placed their level as good or excellent for the "technology operations and concepts" category.

Table 4.1 Results for the "technology operations and concepts" category

Survey item	Mean	S. D.	Frequencies (Valid Percent) %					Total (N)
			P	B A	A	G	E	
Q1(have basic knowledge of technology)	3,24	0,97	5,7	12	43,6	30	8,6	383
Q2 (install a variety of software packages)	2,38	1,28	30,8	27,2	22,2	12,5	7,3	383
Q3 (use a variety of software packages)	2,64	1,21	20,4	28,5	25,3	18,3	7,6	383
Q4 (use imaging devices)	2,33	1,21	33,3	24,1	23,9	13,4	5,2	381
Q5 (use appropriate terminology)	2,92	1,03	9,4	24,1	36,9	24,3	5,2	382
Q6 (update technology related skills)	2,90	1,01	9,7	21,6	42,4	21,3	5	380
Q7 (update technology related knowledge)	2,87	1,00	9,5	24,5	40,5	21,1	4,5	380
Overall mean	2,76	0,87	15,5	33,6	25,1	20,8	5,1	375

S.D. = Standard Deviation, P =Poor, BA =Below Average, A =Average, G =Good, E =Excellent

4.1.2 Students' perceptions of their competencies in "planning and designing learning environments and experiences" category

The Table 4.2 shows the results for the "planning and designing learning environments and experiences" category. Overall mean scores for those 10 items for 372 students was 3.29 which stands for the descriptor "average". Only 17.7 % of the students placed their level as below average or poor for this group of survey items. The range of mean scores for this group of survey items were between 2.89 and 3.49. The lowest mean was obtained for survey item 13 (evaluate computer/technology resources for their accuracy). The highest mean was obtained for survey item 16 (make plans to manage the use of technology resources for learning activities). Except for two survey items, the means for the rest were higher than 3.00.

Table 4.2 Results for the "Planning and Designing Learning Environments and Experiences" category

Survey item	Mean	S.D.	Frequencies (Valid Percent) %					Total (N)
			P	B	A	G	E	
Q8 (integrate technology in order to meet diverse needs of students)	3,34	0,97	4,7	13,4	32,4	41,6	7,9	380
Q9 (integrate technology in accordance with students' developmental level)	3,42	0,94	3,9	10,7	34,6	41,1	9,7	382
Q10 (plan the learning environments by making use of technology)	3,48	0,93	3,1	11,0	31,3	43,9	10,7	383
Q11 (plan the learning experiences by making use of technology)	3,29	0,94	5,0	12,6	38,2	37,4	6,8	382
Q12 (identify and locate computer/technology resources)	2,97	1,03	9,4	20,9	38,0	26,4	5,2	383
Q13 (evaluate computer/technology resources for their accuracy)	2,89	1,03	11,0	23,0	36,0	26,6	3,4	383
Q14 (evaluate suitability of computer/technology resources for the learning tasks)	3,18	0,97	5,8	15,6	38,7	34,0	5,8	377
Q15 (evaluate suitability of computer/technology resources for students' needs and developmental levels)	3,43	0,89	3,1	10,7	34,2	44,4	7,6	383
Q16 (make plans to manage the use of technology resources for learning activities)	3,49	0,97	4,7	8,4	32,1	42,8	12,0	383
Q17 (make plans to manage technology enhanced environment)	3,38	0,95	5,0	11,0	32,9	43,9	7,3	383
Overall mean	3,29	0,71	3,2	14,5	38,2	38,2	5,9	372

S.D. = Standard Deviation, P =Poor, BA =Below Average, A =Average, G =Good, E =Excellent

4.1.3 Students' perceptions of their competencies in "teaching, learning, and the curriculum" category

The Table 4.3 shows results for the "teaching, learning and the curriculum" category. Overall mean scores for those six items for 381 students was 3.47 which stands for the descriptor "good". Only 11 % of the students placed their level as below average or poor for this group of survey items. For all the items in this section, at least four out of five students seemed to feel competent. The range of mean scores for this group of survey items were between 3.29 and 3.55. The lowest mean was obtained for survey item 18 (enrich the technological aspect of the learning activities for language teaching). The highest mean was obtained for survey item 22 (integrate technology to develop students' creativity).

Table 4.3 Results for the "teaching, learning, and the curriculum" category

Survey item	Mean	S.D.	Frequencies (Valid Percent) %					Total (N)
			P	B	A	G	E	
Q18 (enrich the technological aspect of the learning activities for language teaching)	3,29	0,94	4,2	14,1	37,7	36,6	7,3	382
Q19 (facilitate learning activities to increase students' knowledge of technology)	3,53	0,9	3,1	8,6	30,5	47,8	9,9	383
Q20 (use technology to support learner-centered strategies)	3,52	0,87	1,8	9,9	32,6	45,7	9,9	383
Q21 (integrate technology to develop students' higher-order skills)	3,47	0,94	3,4	99,0	34,5	41,0	11,2	383
Q22 (integrate technology to develop students' creativity)	3,55	0,89	1,8	11,0	28,5	47,8	11,0	383
Q23 (manage students' learning activities in a technology-enhanced environment)	3,42	0,87	2,1	9,9	40,8	37,7	9,4	382
Overall mean	3,47	0,71	1,6	9,4	30,7	47,8	10,5	381

S.D. = Standard Deviation, P =Poor, BA =Below Average, A =Average, G =Good, E =Excellent

4.1.4 Students' perceptions of their competencies in "assessment and evaluation" category

The Table 4.4 presents results for the "assessment and evaluation" category. Overall mean scores for those eight items for 373 students was 3.55 which stands for the descriptor good. Only 9.1 % of the students placed their level as below average or poor for this group of survey items. The range of mean scores for this group of survey items were between 3.22 (integrate technology-based assessment strategies) and 3.78 (use technology to collect data to improve instructional practice). The lowest mean was obtained for survey item 24 (integrate technology-based assessment strategies). The highest mean was obtained for survey item 25 (use technology to collect data to improve instructional practice).

Table 4.4 Results for the "assessment and evaluation" category

Survey item	Mean	S.D.	Frequencies (Valid Percent) %					Total (N)
			P	B	A	G	E	
Q24 (integrate technology-based assessment strategies)	3,22	0,99	5,8	15,5	37,6	33,4	7,6	380
Q25 (use technology to collect data to improve instructional practice)	3,78	0,91	1,8	6,8	23,2	47,8	20,4	383
Q26 (use technology to collect data to maximize student learning)	3,77	0,9	2,1	6,3	22,8	50,0	18,8	382
Q27 (use technology resources to interpret student-related data)	3,28	0,96	4,7	13,4	39,7	33,4	8,7	380
Q28 (use technology resources to communicate information)	3,61	0,95	2,9	8,4	29,8	43,3	15,7	383
Q29 (evaluate students' use of appropriate technology resources for their learning)	3,67	0,82	1,6	5,7	28,5	52,2	12,0	383
Q30 (evaluate students' use of appropriate resources for communication).	3,52	0,9	2,6	8,9	33,0	44,8	10,7	382
Q31 (evaluate students' use of appropriate resources to improve their productivity)	3,53	0,91	2,4	9,7	32,0	44,1	11,8	381
Overall mean	3,55	0,68	2,6	6,5	30,5	44,9	15,4	373

S.D. = Standard Deviation, P =Poor, BA =Below Average, A =Average, G =Good, E =Excellent

4.1.5 Students' perceptions of their competencies in "productivity and professional practice" category

The results related with the "productivity and professional practice" category are presented in Table 4.5. Overall mean scores for those six items for 374 students was 3.51 which stands for the descriptor "good". Only 10.7 % of the students placed their level as below average or poor for this group of survey items. The range of mean scores for this group of survey items were between 3.26 and 3.71. The lowest mean score was obtained for survey item 33 (follow the developments in integrating technology to improve professional practice). The highest mean score was obtained for survey item 35 (use computer to communicate and collaborate with colleagues).

Table 4.5 Results for the "productivity and professional practice" category

Survey item	Mean	S.D.	Frequencies (Valid Percent) %					Total (N)
			P	B	A	G	E	
Q32 (use technology to enhance professional development and lifelong learning)	3,44	0,95	3,4	10,7	35,8	38,4	11,7	383
Q33 (follow the developments in integrating technology to improve professional practice)	3,26	0,97	4,7	15,9	36,3	35,2	7,8	383
Q34 (use productivity tools to increase productivity in profession)	3,6	0,96	2,4	10,2	29,1	41,4	17,0	382
Q35 (use computer to communicate and collaborate with colleagues)	3,71	0,99	2,4	9,5	24,5	42,1	21,6	380
Q36 (use technology to communicate and collaborate with parents)	3,66	0,99	4,0	6,9	27,0	43,4	18,8	378
Q37 (use technology to communicate and collaborate with the larger community)	3,43	1,02	4,4	13,1	31,1	38,1	13,3	383
Overall mean	3,51	0,77	2,4	8,3	31,4	40,2	17,7	374

S.D. = Standard Deviation, P =Poor, BA =Below Average, A =Average, G =Good, E =Excellent

4.1.6 Students' perceptions of their competencies in "social, ethical, legal, and human issues" category

The Table 4.6 shows results for the "social, ethical, legal, and human issues" category. Overall mean scores for those seven items for 375 students was 3.46 which stands for the descriptor "good". 61 % of the students placed their level as good or excellent for this group of survey items. The means for this group of survey items were between 3.37 and 3.73. The lowest mean was obtained for survey item 44 (provide students with an equal access to technology resources) and only 17.5 % of students placed their level as below average or poor for this item. The highest mean was obtained for survey item 40 (apply technology resources to support individual differences).

Table 4.6 Results for the "social, ethical, legal, and human issues" category

Survey item	Mean	S.D.	Frequencies (Valid Percent) %					Total (N)
			P	B	A	G	E	
Q38 (act as a role model on legal and ethical use of technology)	3,43	0,97	4,4	10,4	34,2	39,7	11,2	383
Q39 (teach legal and ethical use of technology)	3,55	1,01	4,2	9,9	28,2	42,0	15,7	383
Q40 (apply technology resources to support individual differences)	3,73	0,93	2,9	11,7	35,8	38,9	10,7	383
Q41 (use various technology-supported activities that consider students' characteristics)	3,45	0,91	2,9	10,0	36,4	40,1	10,6	379
Q42 (assist students for safe use of technology)	3,47	0,96	2,9	12,6	31,4	41,1	12,0	382
Q43 (assist students for healthy use of technology)	3,49	0,94	2,1	12,9	31,5	41,2	12,3	381
Q44 (provide students with an equal access to technology resources)	3,37	1,02	5,2	12,3	35,6	34,3	12,6	382
Overall mean	3,46	0,74	2,4	10,4	26,1	46,9	14,1	375

S.D. = Standard Deviation, P =Poor, BA =Below Average, A =Average, G =Good, E =Excellent

4.2 Males and Females FLE students Perceptions of Competence in Regard to Standards Stated in NETS-T

Male and female FLE students' perceptions of their competencies in the standards stated in NETS-T will be explained in six different sections. The sections are; (1) technology operations and concepts, (2) planning and designing learning environments and experiences, (3) teaching, learning, and the curriculum, (4.) assessment and evaluation, (5) productivity and professional practice, and (6) social, ethical, legal, and human issues.

4.2.1 Differences between male and female students' perceptions of their competencies in "technology operations and concepts" category

The Table 4.7 shows males and females students' perceptions of their competencies for the "technology operations and concepts" category. Overall mean score for male students was 3.30 and 2.57 for female students respectively. The mean score for male students stands for the descriptor "average" and "below average" for female students. While 54.7 % of the male students placed their level as good or excellent, this was only 16.1 % for the female students. For all the survey items in this group, males' means were higher than females' means.

Except for survey item four (use imaging devices), all males' means were higher than 3.00. On the other hand, except for survey item one (have basic knowledge of technology); all females' means were less than 3.00.

Table 4.7 Results for gender differences in the "technology operations and concepts" category

Survey item	Gender	Mean	S.D.	Frequencies (Valid Percent) %					Total (N)
				P	BA	A	G	E	
Q1 (have basic knowledge of technology)	Male	3,70	1,10	6,3	6,3	22,9	40,6	24,0	96
	Female	3,08	0,87	5,6	13,9	50,5	26,5	3,5	287
Q2 (install a variety of software packages)	Male	3,15	1,37	16,7	15,6	25,0	21,9	20,8	96
	Female	2,13	1,09	35,5	31,0	21,3	9,4	2,8	287
Q3 (use a variety of software packages)	Male	3,46	1,21	9,4	11,5	24,0	34,4	20,8	96
	Female	2,37	1,08	24,0	34,1	25,8	12,9	3,1	287
Q4 (use imaging devices)	Male	2,93	1,29	18,9	15,8	32,6	18,9	13,7	95
	Female	2,13	1,12	38,1	26,9	21,0	11,5	2,4	286
Q5 (use appropriate terminology)	Male	3,31	1,14	9,4	9,4	37,5	28,1	15,6	96
	Female	2,79	0,96	9,4	29,0	36,7	23,1	1,7	286
Q6 (update technology related skills)	Male	3,31	0,99	6,3	8,3	43,8	31,3	10,4	96
	Female	2,76	0,98	10,9	26,1	41,9	18,0	3,2	284
Q7 (update technology related Knowledge)	Male	3,20	0,95	6,3	11,5	44,8	31,3	6,3	96
	Female	2,75	0,99	10,6	28,9	39,1	17,6	3,9	284
Overall means	Male	3,30	0,93	9,5	14,7	21,1	40,0	14,7	95
	Female	2,57	0,77	17,5	40	26,4	14,3	1,8	280

S.D. = Standard Deviation, P =Poor, BA =Below Average, A =Average, G =Good, E =Excellent

4.2.2 Differences between male and female students' perceptions of their competencies in "planning and designing learning environments and experiences" category

The Table 4.8 shows males and females students' perceptions of their competencies for the "planning and designing learning environments and experiences" category. Overall mean score of male students was 3.37 and 3.26 for female students. The mean score for both of the male and female students stands for the descriptor "average". The range of mean scores for this group of survey items for male students was between 3.17 and 3.55; however, it was 2.79 and 3.49 for female students. Except three of the survey items (item nine, item 16, and item 17), male students' means were higher than females' means. For survey item 16 (make plans to manage the use of technology resources for learning activities), male and female students' means were equal.

Table 4.8 Results for gender differences in the "planning and designing learning environments and experiences" category

Survey item	Gender	Mean	S.D.	Frequencies (Valid Percent) %					Total (N)
				P	B	A	G	E	
Q8 (integrate technology in order to meet diverse needs of students)	Male	3,55	0,94	2,1	11,5	29,2	43,8	13,5	96
	Female	3,27	0,97	5,6	14,1	33,5	40,8	6,0	284
Q9 (integrate technology in accordance with students' developmental level)	Male	3,33	0,91	3,1	13,5	37,5	38,5	7,3	96
	Female	3,45	0,95	4,2	9,8	33,6	42,0	10,5	286
Q10 (plan the learning environments by making use of technology)	Male	3,52	0,98	3,1	11,5	30,2	40,6	14,6	96
	Female	3,47	0,92	3,1	10,8	31,7	44,9	9,4	287
Q11 (plan the learning experiences by making use of technology)	Male	3,32	0,90	3,1	13,5	37,5	39,6	6,3	96
	Female	3,27	0,96	5,6	12,2	38,5	36,7	7,0	286
Q12 (identify and locate computer/technology resources)	Male	3,29	1,05	6,3	14,6	33,3	35,4	10,4	96
	Female	2,86	1,00	10,5	23,0	39,7	23,3	3,5	287
Q13 (evaluate computer/technology resources for their accuracy)	Male	3,17	1,03	6,3	20,8	29,2	37,5	6,3	96
	Female	2,79	1,01	12,5	23,7	38,3	23,0	2,4	287
Q14 (evaluate suitability of computer/technology resources for the learning tasks)	Male	3,26	0,97	6,3	10,5	41,1	34,7	7,4	95
	Female	3,16	0,96	5,7	17,4	37,9	33,7	5,3	282
Q15 (evaluate suitability of computer/technology resources for students' needs and developmental	Male	3,47	0,97	4,2	10,4	31,3	42,7	11,5	96
	Female	3,41	0,87	2,8	10,8	35,2	44,9	6,3	287
Q16 (make plans to manage the use of technology resources for learning activities)	Male	3,49	1,09	7,3	6,3	34,4	34,4	17,7	96
	Female	3,49	0,93	3,8	9,1	31,4	45,6	10,1	287
Q17 (make plans to manage technology enhanced environment)	Male	3,36	1,02	7,3	9,4	31,3	43,8	8,3	96
	Female	3,38	0,93	4,2	11,5	33,4	43,9	7,0	287
Overall means	Male	3,37	0,71	2,1	12,6	31,6	46,3	7,4	95
	Female	3,26	0,71	3,6	15,2	40,4	35,4	5,4	277

S.D. = Standard Deviation, P =Poor, BA =Below Average, A =Average, G =Good, E =Excellent

4.2.3 Differences between male and female students' perceptions of their competencies in "teaching, learning, and the curriculum" category

Male and female students' perceptions for the "teaching, learning and the curriculum" category are presented in Table 4.9. Overall mean score of male students for this category was 3.49 and 3.46 for female students. The overall mean score for both of the male and female students stands for the descriptor "good". For this group of survey items, 62.5 % of the male students placed their level as good or excellent; likewise, 56.9 % of the female students placed their level as good or excellent. As to the items in this section, there were not any big differences between male and female students' means.

Table 4.9 Results for gender differences in the "teaching, learning, and the curriculum" category

Survey item	Gender	Mean	S.D.	Frequencies (Valid Percent) %					Total (N)
				P	B	A	G	E	
Q18 (enrich the technological aspect of the learning activities for language teaching)	Male	3,39	1,04	5,2	12,5	34,4	34,4	13,5	96
	Female	3,26	0,91	3,8	14,7	38,8	37,4	5,2	286
Q19 (facilitate learning activities to increase students' knowledge of technology)	Male	3,50	0,97	5,2	7,3	31,3	44,8	11,5	96
	Female	3,54	0,88	2,4	9,1	30,3	48,8	9,4	287
Q20 (use technology to support learner-centered strategies)	Male	3,56	0,83	1,0	8,3	34,4	45,8	10,4	96
	Female	3,51	0,88	2,1	10,5	32,1	45,6	9,8	287
Q21 (integrate technology to develop students' higher-order skills)	Male	3,50	0,95	2,1	12,5	32,3	39,6	13,5	96
	Female	3,46	0,93	3,8	9,1	35,2	41,5	10,5	287
Q22 (integrate technology to develop students' creativity)	Male	3,48	0,96	3,1	12,5	29,2	43,8	11,5	96
	Female	3,57	0,87	1,4	10,5	28,2	49,1	10,8	287
Q23 (manage students' learning activities in a technology-enhanced environment)	Male	3,52	0,89	2,1	8,3	37,5	39,6	12,5	96
	Female	3,39	0,86	2,1	10,5	42,0	37,1	8,4	286
Overall means	Male	3,49	0,77	4,2	7,3	26	51	11,5	96
	Female	3,46	0,70	0,7	10,2	32,3	46,7	10,2	285

S.D. = Standard Deviation, P =Poor, BA =Below Average, A =Average, G =Good, E =Excellent

4.2.4 Differences between male and female students' perceptions of their competencies in "assessment and evaluation" category

The Table 4.10 shows male and female students' perceptions on their competencies for the "assessment and evaluation" category. Overall mean score of male students for these eight items was 3.65 and 3.52 for female students. Both of the male and female students overall mean score stands for the descriptor "good". For this group of survey items 69.8 % of the male students placed their level as good or excellent, where as, only 57.1 % of the female students placed their level as good or excellent. For all the survey items in this group, males' means were higher than females' means, in spite of the fact that their overall mean falls in the predictor "good". The lowest mean for these survey items was 3.14 and it was obtained by female students for survey item 24 (integrate technology-based assessment strategies). The highest mean for these survey items was 3.81 and it was obtained by male students for survey item 25 (use technology to collect data to improve instructional practice).

Table 4.10 Results for gender differences in the "assessment and evaluation" category

Survey item	Gender	Mean	S.D.	Frequencies (Valid Percent) %					Total (N)
				P	B	A	G	E	
Q24 (integrate technology-based assessment strategies)	Male	3,46	1,02	5,2	9,6	33,0	38,3	13,8	94
	Female	3,14	0,97	5,9	17,5	39,2	31,8	5,6	286
Q25 (use technology to collect data to improve instructional practice)	Male	3,81	0,98	2,1	7,3	24,0	40,6	26,0	96
	Female	3,77	0,89	1,7	6,6	23,0	50,2	18,5	287
Q26 (use technology to collect data to maximize student learning)	Male	3,79	0,86	1,0	7,3	20,8	53,1	17,7	96
	Female	3,77	0,91	2,4	5,9	23,4	49,0	19,2	286
Q27 (use technology resources to interpret student-related data)	Male	3,47	0,99	4,2	10,4	33,3	38,5	13,5	96
	Female	3,21	0,95	4,9	19,4	41,9	31,7	7,0	284
Q28 (use technology resources to communicate information)	Male	3,78	0,90	2,1	4,2	28,1	44,8	20,8	96
	Female	3,55	0,96	3,1	9,8	30,3	42,9	13,9	287
Q29 (evaluate students' use of appropriate technology resources for their learning)	Male	3,68	0,72		5,2	31,3	54,2	9,4	96
	Female	3,67	0,85	2,1	5,9	27,5	51,6	12,9	287
Q30 (evaluate students' use of appropriate resources for communication).	Male	3,60	0,84	1,0	9,4	28,1	51,0	10,4	96
	Female	3,49	0,91	3,1	8,7	34,6	42,7	10,8	286
Q31 (evaluate students' use of appropriate resources to improve their productivity)	Male	3,60	0,90	1,0	11,5	27,1	46,9	13,5	96
	Female	3,51	0,91	2,8	9,1	33,7	43,2	11,2	285
Overall means	Male	3,65	0,68	3,1	5,2	21,9	50,0	19,8	94
	Female	3,52	0,68	2,4	7,0	33,4	43,2	13,9	279

S.D. = Standard Deviation, P =Poor, BA =Below Average, A =Average, G =Good, E =Excellent

4.2.5 Differences between male and female students' perceptions of their competencies in "productivity and professional practice" category

The Table 4.11 shows male and female students' results for the "productivity and professional practice" category. Overall mean score of the male students for these six items was 3.59 and 3.50 for female students. The mean scores for both of the male students and female students stand for "good". Only 8.5 % of the male students and 11.6 % of the female students placed their level as below average or poor. For all the survey items in this group, males' means were higher than females' means. The lowest mean for these survey items was 3.25 and it was obtained by female students for survey item 33 (follow the developments in integrating technology to improve professional practice). For this survey item, 41.1 % of the female students placed their level as good or excellent. The highest mean for these survey items was 3.80 and it was obtained by male students for survey item 35 (use computer to communicate and collaborate with colleagues). For this survey item, just 13.5 % of the male students placed their level as below average or poor.

Table 4.11 Results for gender differences in the "productivity and professional practice" category

Survey item	**Gender**	**Mean**	**S.D.**	**Frequencies (Valid Percent) %**					**Total (N)**
				P	B	A	G	E	
Q32 (use technology to enhance professional development and lifelong learning)	Male	3,54	1,07	6,3	6,3	33,3	35,4	18,8	96
	Female	3,41	0,91	2,4	12,2	36,6	39,4	9,4	287
Q33 (follow the developments in integrating technology to improve professional practice)	Male	3,27	1,03	6,3	16,7	28,1	41,7	7,3	96
	Female	3,25	0,96	4,2	15,7	39,0	33,1	8,0	287
Q34 (use productivity tools to increase productivity in profession)	Male	3,71	0,97	2,1	9,5	24,2	44,2	20,0	95
	Female	3,57	0,96	2,4	10,5	30,7	40,4	16,0	287
Q35 (use computer to communicate and collaborate with colleagues)	Male	3,80	0,98	1,0	12,5	15,6	46,9	24,0	96
	Female	3,68	0,99	2,8	8,5	27,5	40,5	20,8	284
Q36 (use technology to communicate and collaborate with parents)	Male	3,69	1,00	5,2	6,3	19,8	52,1	16.7	96
	Female	3,65	0,99	3,5	7,1	29,4	40,4	19,5	282
Q37 (use technology to communicate and collaborate with the larger community)	Male	3,52	0,93		15,6	31,3	38,5	14,6	96
	Female	3,40	1,05	5,9	12,2	31,0	38,0	12,9	287
Overall means	Male	3,59	0,77	3,2	5,3	27,4	44,2	20,0	95
	Female	3,50	0,76	2,2	9,4	32,7	38,8	16,9	279

S.D. = Standard Deviation, P =Poor, BA =Below Average, A =Average, G =Good, E =Excellent

4.2.6 Differences between male and female students' perceptions of their competencies in "social, ethical, legal, and human issues" category

The Table 4.12 shows the results for male and female students for the "social, ethical, legal, and human issues" category. Overall mean score of male students for these seven items was 3.45 and 3.46 for female students. The overall mean score for both of the male and female students stands for the predictor "good". 66.7 % of the male students and 59.2 % of the female students placed their level as good or excellent for this category. For this group of survey items, there were not any big differences between male and female students' means.

Table 4.12 Results for gender differences in the "social, ethical, legal, and human issues" category

Survey item	Gender	Mean	S.D.	Frequencies (Valid Percent) %					Total (N)
				P	B	A	G	E	
Q38 (act as a role model on legal and ethical use of technology)	Male	3,41	0,98	4,2	11,5	35,4	37,5	11,5	96
	Female	3,44	0,97	4,5	10,1	33,8	40,4	11,1	287
Q39 (teach legal and ethical use of technology)	Male	3,59	1,04	4,2	11,5	22,9	43,8	17,7	96
	Female	3,54	1,00	4,2	9,4	30,0	41,5	15,0	287
Q40 (apply technology resources to support individual differences)	Male	3,42	0,93	4,2	10,4	32,3	45,8	7,3	96
	Female	3,43	0,94	2,4	12,2	36,9	36,6	11,8	287
Q41 (use various technology-supported activities that consider students' characteristics)	Male	3,42	0,94	4,2	11,5	30,2	46,9	7,3	96
	Female	3,47	0,91	2,5	9,5	38,5	37,8	11,7	283
Q42 (assist students for safe use of technology)	Male	3,50	1,08	6,3	11,5	22,9	44,8	14,6	96
	Female	3,46	0,92	1,7	12,9	34,3	39,9	11,2	286
Q43 (assist students for healthy use of technology)	Male	3,44	0,96	2,1	15,6	30,2	40,6	11,5	96
	Female	3,51	0,93	2,1	11,9	31,9	41,4	12,6	285
Q44 (provide students with an equal access to technology resources)	Male	3,42	1,10	7,3	10,4	31,3	35,4	15,6	96
	Female	3,35	1,00	4,5	12,9	37,1	33,9	11,5	286
Overall means	Male	3,45	0,78	4,2	10,4	18,8	52,1	14,6	96
	Female	3,46	0,73	1,8	10,4	28,7	45,2	14,0	279

S.D. = Standard Deviation, P =Poor, BA =Below Average, A =Average, G =Good, E =Excellent

4.3 FLE Students (Across Grade Level) Perceptions of Competence in Regard to Standards Stated in NETS-T

FLE students' (across grade level) perceptions of their competencies in the standards stated in NETS-T will be explained in six different sections. The sections are; (1) technology operations and concepts, (2) planning and designing learning environments and experiences, (3) teaching, learning, and the curriculum, (4.) assessment and evaluation, (5) productivity and professional practice, and (6) social, ethical, legal, and human issues.

4.3.1 Differences between students' (across grade levels) perceptions of their competencies in "technology operations and concepts" category

The table 4.13 shows subjects' perceptions of their competencies in the "technology operations and concepts" category for each grade level. The overall mean score values for each grade level were very close. They stand for the predictor "average". For these survey items there was no dominant group; the highest means were gained by different classes for different survey items. There was only one survey item (have basic knowledge of technology) in this group for which all classes had mean values higher than 3.00. For survey items three (use a variety of software packages) and five (use appropriate terminology), the mean values increased as the grade level increased across classes. The lowest mean for this group of survey items was 2.22 and it was obtained by the sophomores for survey item four (use imaging devices). For this survey item, 63.9 % of sophomores placed their level as below average or poor. The highest mean for these survey items was 3.50 and it was obtained by juniors for the survey item one (have basic knowledge of technology). For this survey item, 93.8 % of juniors placed their level as average or better.

Table 4.13 Results for grade level differences in the "technology operations and concepts" category

Survey item	Grade	Mean	S.D.	Frequencies (Valid Percent) %					Total (N)
				P	B	A	G	E	
Q1 (have basic knowledge of technology)	1st Year	3,01	1,10	11,7	16,5	38,8	25,2	7,8	103
	2nd Year	3,13	0,87	5,1	12,2	51,0	27,6	4,1	98
	3rd Year	3,50	0,86	3,1	3,1	45,8	36,5	11,5	96
	4th Year	3,34	0,97	2,3	16,3	38,4	31,4	11,6	86
Q2 (install a variety of software packages)	1st Year	2,24	1,14	31,1	32,0	24,3	6,8	5,8	103
	2nd Year	2,27	1,20	33,7	28,6	20,4	12,2	5,1	98
	3rd Year	2,55	1,30	27,1	25,0	22,9	15,6	9,4	96
	4th Year	2,50	1,34	31,4	22,1	20,9	16,3	9,3	96
Q3 (use a variety of software packages)	1st Year	2,47	1,19	24,3	32,0	22,3	15,5	5,8	103
	2nd Year	2,49	1,14	22,4	31,6	24,5	17,3	4,1	98
	3rd Year	2,80	1,18	15,6	26,0	28,1	22,9	7,3	96
	4th Year	2,85	1,31	18,6	23,3	26,7	17,4	14,0	86
Q4 (use imaging devices)	1st Year	2,23	1,07	35,0	25,2	24,3	12,6	2,9	103
	2nd Year	2,22	1,15	34,0	29,9	19,6	13,4	3,1	97
	3rd Year	2,32	1,21	34,7	21,1	27,4	11,6	5,3	95
	4th Year	2,59	1,34	29,1	19,8	24,4	16,3	10,5	86
Q5 (use appropriate terminology)	1st Year	2,73	1,07	15,5	23,3	37,9	19,4	3,9	103
	2nd Year	2,81	0,98	7,1	34,7	31,6	23,5	3,1	98
	3rd Year	3,06	0,98	6,3	21,1	36,8	31,6	4,2	95
	4th Year	3,12	1,07	8,1	16,3	41,9	23,3	10,5	86
Q6 (update technology related skills)	1st Year	3,00	1,05	10,9	16,8	38,6	28,7	5,0	101
	2nd Year	2,76	0,99	11,3	25,8	41,2	18,6	3,1	97
	3rd Year	2,94	0,96	7,3	21,9	45,8	19,8	5,2	96
	4th Year	2,91	1,02	9,3	22,1	44,2	17,4	7,0	86
Q7(update technology related Knowledge)	1st Year	2,87	0,98	10,0	21,0	45,0	20,0	4,0	100
	2nd Year	2,80	0,99	10,2	27,6	37,8	21,4	3,1	98
	3rd Year	2,97	1,00	7,3	22,9	41,7	21,9	6,3	96
	4th Year	2,83	1,03	10,5	26,7	37,2	20,9	4,7	86
Overall means	1st Year	2,66	0,86	18,2	33,3	24,3	19,2	5,1	99
	2nd Year	2,64	0,78	12,5	44,8	22,8	16,7	3,1	96
	3rd Year	2,87	0,87	14,9	29,8	23,4	29,8	2,1	94
	4th Year	2,88	0,96	16,3	25,6	30,2	17,4	10,5	86

S.D. = Standard Deviation, P =Poor, BA =Below Average, A =Average, G =Good, E =Excellent

4.3.2 Differences between students' (across grade levels) perceptions of their competencies in "planning and designing learning environments and experiences" category

The Table 4.14 presents results for the "planning and designing learning environments and experiences" category for each grade level. Overall mean scores for freshmen (3.02) and sophomores (3.11) were "average", whereas they were "good" for juniors (3.51) and seniors (3.56) respectively level. Almost 32 % of the freshmen and sophomores placed their level as good or excellent; however, almost 60 % of the juniors and seniors placed their level as good or excellent. For five of these survey items (item 12, item 13, item 15, item 16, and item 17), freshmen's means were higher than sophomores' means. On the other hand, sophomores' means were higher than freshmen's means for the other five survey items (item eight, item nine, item 10, item 11, and item 14). Juniors' and seniors' means were all higher than freshmen's and sophomores' means. Except for three of these survey items (item 13, item 14, and item 17), seniors' means were higher than juniors' means. The lowest mean for these survey items was 2.55 and it was obtained by sophomores for survey item 13 (evaluate computer/technology resources for their accuracy). For this survey item, 44.9 % of sophomores placed their level as below average or poor. The highest mean for these survey items was 3.84 and it was obtained by seniors for survey item 16 (make plans to manage the use of technology resources for learning activities). For this survey item, 73.3 % of senior students placed their level as good or excellent.

Table 4.14 Results for grade level differences in the "planning and designing learning environments and experiences" category

Survey item	Grade	Mean	S.D.	Frequencies (Valid Percent) %					Total (N)
				P	B	A	G	E	
Q8 (integrate technology in order to meet diverse needs of students)	1st Year	2,95	1,06	10,7	21,4	35,0	28,2	4,9	103
	2nd Year	3,27	0,91	4,2	13,5	38,5	38,5	5,2	96
	3rd Year	3,54	0,95	3,2	13,7	18,9	54,7	9,5	95
	4th Year	3,69	0,74	30,0	3,5	37,2	46,5	12,8	86
Q9 (integrate technology in accordance with students' developmental level)	1st Year	3,01	1,08	10,8	19,6	32,4	32,4	4,9	102
	2nd Year	3,31	0,88	2,0	11,2	46,9	33,7	6,0	98
	3rd Year	3,61	0,92	2,1	8,3	31,3	42,7	15,6	96
	4th Year	3,81	0,68	0,0	2,3	26,7	58,1	12,8	86
Q10 (plan the learning environments by making use of technology)	1st Year	3,03	1,01	8,7	20,4	33,0	35,0	2,9	103
	2nd Year	3,52	0,88	2,0	8,2	36,7	41,8	11,2	98
	3rd Year	3,68	0,86	1,0	8,3	27,1	49,0	14,6	96
	4th Year	3,76	0,78	0,0	5,8	27,9	51,2	15,1	86
Q11 (plan the learning experiences by making use of technology)	1st Year	3,05	0,93	7,8	14,6	45,6	29,1	2,9	103
	2nd Year	3,10	0,90	4,1	19,4	42,9	29,6	4,1	98
	3rd Year	3,47	0,94	5,3	7,4	30,5	48,4	8,4	95
	4th Year	3,57	9,00	2,3	8,1	32,6	44,2	12,8	86
Q12 (identify and locate computer/technology resources)	1st Year	2,87	0,97	11,7	15,5	49,5	20,4	2,9	103
	2nd Year	2,80	0,94	10,2	25,5	38,8	25,5	0,0	98
	3rd Year	3,11	1,10	7,3	21,9	34,4	25,0	11,5	96
	4th Year	3,13	1,08	8,1	20,9	27,9	36,0	7,0	86
Q13 (evaluate computer/technology resources for their accuracy)	1st Year	2,76	0,97	8,7	34,0	32,0	23,3	1,9	103
	2nd Year	2,55	1,00	17,3	27,6	39,8	13,3	2,0	98
	3rd Year	3,23	0,97	6,3	14,6	33,3	41,7	4,2	96
	4th Year	3,03	1,07	11,6	14,0	39,5	29,1	5,8	86
Q14 (evaluate suitability of computer/technology resources for the learning tasks)	1st Year	2,94	1,09	12,7	18,6	35,3	28,4	4,9	102
	2nd Year	2,97	0,92	4,2	25,0	46,9	17,7	6,3	96
	3rd Year	3,46	0,89	3,2	8,5	36,2	43,6	8,5	94
	4th Year	3,41	0,81	2,4	9,4	36,5	48,2	3,5	85
Q15 (evaluate suitability of computer/technology resources for students' needs and developmental levels)	1st Year	3,17	0,91	4,9	15,5	41,7	34,0	3,9	103
	2nd Year	3,13	0,93	6,1	15,3	40,8	34,7	3,1	98
	3rd Year	3,68	0,80	1,0	8,3	21,9	59,4	9,4	96
	4th Year	3,79	0,72	0,0	2,3	31,4	51,2	15,1	86
Q16 (make plans to manage the use of technology resources for learning activities)	1st Year	3,25	1,05	7,8	11,7	38,8	31,1	10,7	103
	2nd Year	3,17	1,01	8,2	13,3	36,7	36,7	5,1	98
	3rd Year	3,76	0,82	1,0	4,2	29,2	49,0	16,7	96
	4th Year	3,84	0,78	1,2	3,5	22,1	57,0	16,3	86
Q17 (make plans to manage technology enhanced environment)	1st Year	3,14	1,03	7,8	15,5	39,8	29,1	7,8	103
	2nd Year	3,10	0,94	8,2	11,2	45,9	31,6	3,1	98
	3rd Year	3,67	0,83	0,0	12,5	18,8	58,3	10,4	96
	4th Year	3,65	0,82	3,5	3,5	25,6	59,3	8,1	86
Overall means	1st Year	3,02	0,72	6,9	21,8	39,6	28,7	3,0	101
	2nd Year	3,11	0,67	4,3	21,3	42,6	28,7	3,2	94
	3rd Year	3,51	0,69	1,1	8,7	34,8	44,6	10,9	92
	4th Year	3,56	0,57		4,7	35,3	52,9	7,1	85

S.D. = Standard Deviation, P =Poor, BA =Below Average, A =Average, G =Good, E =Excellent

4.3.3 Differences between students' (across grade levels) perceptions of their competencies in "teaching, learning, and the curriculum" category

The Table 4.15 shows results for the "teaching, learning and the curriculum" category for each grade level. The overall mean score values for freshmen (3.27) and sophomores (3.27) were "average", whereas they were "good" for juniors (3.64) or seniors (3.72). Almost 50 % of the freshmen and sophomores placed their level as good or excellent, whereas, almost 65 % of the juniors and seniors placed their level as good or excellent. Except for two of these survey items (item 18 and item 22), freshmen's means were higher than sophomores' means. All the juniors' means were higher than freshmen's and sophomores' means. Except for freshmen's mean for question 24 (integrate technology-based assessment strategies), seniors' means were higher than freshmen's and sophomores' means, too. Except for two of these survey items (item 22 and item 24), seniors' means were higher than juniors' means. The lowest mean for these survey items was 2.93 and it was obtained by freshmen for survey item 18 (enrich the technological aspect of the learning activities for language teaching). For this survey item, 67 % of the sophomores placed their level as average or better. The highest mean for these survey items was 3.79 and it was obtained by the seniors for survey item 19 (facilitate learning activities to increase students' knowledge of technology). For this survey item, 95.3 % of the seniors placed their level as average or better.

Table 4.15 Results for grade level differences in the "teaching, learning, and the curriculum" category

Survey item	Grade	Mean	S.D.	Frequencies (Valid Percent) %					Total (N)
				P	B	A	G	E	
Q18 (enrich the technological aspect of the learning activities for language teaching)	1st Year	2,93	1,05	8,7	24,3	39,8	19,4	7,8	103
	2nd Year	3,06	0,92	5,2	20,6	40,2	30,9	3,1	97
	3rd Year	3,52	0,81	2,1	7,3	33,3	51,0	6,3	96
	4th Year	3,71	0,72	0,0	2,3	37,2	47,7	12,8	86
Q19 (facilitate learning activities to increase students' knowledge of technology)	1st Year	3,35	0,99	5,8	10,7	35,0	39,8	8,7	103
	2nd Year	3,32	0,90	5,1	11,2	33,7	46,9	3,1	98
	3rd Year	3,70	0,82	0,0	8,3	28,1	49,0	14,6	96
	4th Year	3,79	0,77	1,2	3,5	24,4	57,0	14,0	86
Q20 (use technology to support learner-centered strategies)	1st Year	3,40	1,00	4,9	11,7	34,0	37,9	11,7	103
	2nd Year	3,33	0,83	1,0	15,3	38,8	39,8	5,1	98
	3rd Year	3,65	0,83	1,0	7,3	30,2	49,0	12,5	96
	4th Year	3,74	0,71	0,0	4,7	26,7	58,1	10,5	86
Q21 (integrate technology to develop students' higher-order skills)	1st Year	3,42	0,98	4,9	10,7	32,0	42,7	9,7	103
	2nd Year	3,13	0,92	5,1	15,2	45,9	28,6	5,1	98
	3rd Year	3,61	0,89	1,0	9,4	31,3	43,8	14,6	96
	4th Year	3,74	0,86	2,3	3,5	27,9	50,0	16,3	86
Q22 (integrate technology to develop students' creativity)	1st Year	3,22	0,98	2,9	21,4	35,0	32,0	8,7	103
	2nd Year	3,52	0,86	2,0	10,2	29,6	50,0	8,2	98
	3rd Year	3,78	0,78	1,0	5,2	21,9	58,3	13,5	96
	4th Year	3,72	0,82	1,2	5,8	26,7	52,3	14,0	86
Q23 (manage students' learning activities in a technology-enhanced environment)	1st Year	3,32	0,97	4,9	12,6	36,9	36,9	8,7	103
	2nd Year	3,21	0,79	1,0	15,5	49,5	29,9	4,1	97
	3rd Year	3,59	0,80	1,0	3,1	44,8	37,5	13,5	96
	4th Year	3,60	0,84	1,2	8,1	31,4	47,7	11,6	86
Q24 (integrate technology-based assessment strategies)	1st Year	3,31	0,98	5,9	10,9	37,6	37,6	7,9	101
	2nd Year	2,96	0,92	7,1	20,4	43,9	26,5	2,0	98
	3rd Year	3,32	0,99	3,1	17,7	33,3	35,4	10,4	96
	4th Year	3,28	1,05	7,1	12,9	35,3	34,1	10,6	85
Overall means	1st Year	3,27	0,81	4,9	13,6	34,0	37,9	9,7	103
	2nd Year	3,27	0,65	1,0	13,5	35,4	44,8	5,2	94
	3rd Year	3,64	0,64		5,2	29,2	53,1	12,5	96
	4th Year	3,72	0,62		4,7	23,3	57,0	15,1	86

S.D. = Standard Deviation, P =Poor, BA =Below Average, A =Average, G =Good, E =Excellent

4.3.4 Differences between students' (across grade levels) perceptions of their competencies in "assessment and evaluation" category

The Table 4.16 shows results for "assessment and evaluation" category for each grade level. Overall mean scores of freshmen (3.36) and sophomores (3.38) were average, whereas, they were good for juniors (3.65) and seniors (3.86). 54.4 % of the freshmen and 47 % of the sophomores placed their level as good or excellent; however, 64.6 % of the juniors and 77.9 % of the seniors placed their level as good or excellent for this category. Except for three of these survey items (item 24, item 25, and item 26), sophomores' means were higher than freshmen's means. All juniors' means for these survey items were higher than all the freshmen's and sophomores' means. And also all seniors' means were higher than the others' means. The lowest mean for these survey items was 2.94 and it was obtained by the freshmen for survey item 27 (use technology resources to interpret student-related data). For this survey item, 73.5 % of the freshmen placed their level as average or better. The highest mean for these survey items was 4.15 and it was obtained by the seniors for survey item 26 (use technology to collect data to maximize student learning). For this survey item, 98.8 % of the seniors placed their level as average or better. For survey item 31 (evaluate students' use of appropriate resources to improve their productivity), all of the seniors placed their level as average or better.

Table 4.16 Results for grade level differences in the "assessment and evaluation" category

Survey item	Grade	Mean	S.D.	Frequencies (Valid Percent) %					Total (N)
				P	B	A	G	E	
Q24 (integrate technology-based assessment strategies)	1st Year	3,31	0,98	5,9	10,9	37,6	37,6	7,9	101
	2nd Year	2,96	0,92	7,1	20,4	43,9	26,5	2	98
	3rd Year	3,32	0,99	3,1	17,7	33,3	35,4	10,4	96
	4th Year	3,28	1,05	1,2	8,1	35,3	34,1	10,6	85
Q25 (use technology to collect data to improve instructional practice)	1st Year	3,77	1,04	3,9	9,7	15,5	47,6	23,3	103
	2nd Year	3,49	0,91	2,0	12,2	30,6	44,9	10,2	98
	3rd Year	3,84	0,80	0,0	4,2	28,1	46,9	20,8	96
	4th Year	4,06	0,76	1,2	0,0	18,6	52,3	27,9	86
Q26 (use technology to collect data to maximize student learning)	1st Year	3,64	0,98	2,9	9,7	25,2	44,7	17,5	103
	2nd Year	3,55	0,99	5,2	9,3	22,7	51,5	11,3	97
	3rd Year	3,80	0,73	0,0	4,2	26,0	55,2	14,6	96
	4th Year	4,15	0,73	0,0	1,2	16,3	48,8	33,7	86
Q27 (use technology resources to interpret student-related data)	1st Year	2,94	0,96	8,8	17,6	49,0	19,6	4,9	102
	2nd Year	3,19	0,95	4,2	18,8	37,5	33,3	6,3	96
	3rd Year	3,41	0,92	4,2	8,3	39,6	38,5	9,4	96
	4th Year	3,64	0,88	1,2	8,1	31,4	44,2	15,1	86
Q28 (use technology resources to communicate information)	1st Year	3,28	1,07	8,7	10,7	34,0	36,9	9,7	103
	2nd Year	3,42	0,91	2,0	12,2	37,8	37,8	10,2	98
	3rd Year	3,79	0,83	0,0	7,5	25,0	49,0	18,8	96
	4th Year	4,00	0,75	0,0	2,3	20,9	51,2	25,6	86
Q29 (evaluate students' use of appropriate technology resources for their learning)	1st Year	3,46	0,93	3,9	9,7	32,0	45,6	8,7	103
	2nd Year	3,48	0,88	2,0	8,2	40,8	37,8	11,2	98
	3rd Year	3,80	0,61	0,0	2,1	24,0	65,6	8,3	96
	4th Year	4,01	0,68	0,0	2,3	15,1	61,6	20,9	86
Q30 (evaluate students' use of appropriate resources for communication).	1st Year	3,27	1,00	5,8	13,6	36,9	35,0	8,7	103
	2nd Year	3,41	0,87	3,1	8,2	41,8	38,8	8,2	98
	3rd Year	3,65	0,77	0,0	8,4	27,4	54,7	9,5	95
	4th Year	3,80	0,82	1,2	4,7	24,4	52,3	17,4	86
Q31 (evaluate students' use of appropriate resources to improve their productivity)	1st Year	3,25	1,01	5,9	15,7	34,3	36,3	7,8	102
	2nd Year	3,37	0,88	2,1	13,4	37,1	40,2	7,2	97
	3rd Year	3,66	0,87	1	8,3	29,2	46,9	14,6	96
	4th Year	3,92	0,67	0,0	0,0	26,7	54,7	18,6	86
Overall means	1st Year	3,36	0,80	6,8	8,7	30,1	42,7	11,7	99
	2nd Year	3,38	0,65	2,0	12,2	38,8	37,8	9,2	94
	3rd Year	3,65	0,59		3,1	32,3	47,9	16,7	95
	4th Year	3,86	0,53	1,2	1,2	19,8	52,3	25,6	85

S.D. = Standard Deviation, P =Poor, BA =Below Average, A =Average, G =Good, E =Excellent

4.3.5 Differences between students' (across grade levels) perceptions of their competencies in "productivity and professional practice" category

The Table 4.17 presents results for the "productivity and professional practice" category for each grade level. In this category, only freshmen placed their level as average in terms of overall mean scores (3.19); however, sophomores (3.45), juniors (3.63), and seniors (3.86) placed their level as good. Gradual increase in overall mean scores is observed as grade level increases. Related with the items in this category, all sophomores' mean were higher than freshmen's means. Meanwhile, all juniors' means were higher than sophomores' means. And also all seniors' means were higher than the others' means. The lowest mean for these survey items was 2.85 and it was obtained by freshmen for survey item 33 (follow the developments in integrating technology to improve professional practice). For this survey item, 66 % of freshmen students placed their level as average or better. The highest mean for these survey items was 4.02 and it was obtained by seniors for survey item 35 (use computer to communicate and collaborate with colleagues). For this survey item, 94.1 % of seniors placed their level as average or better.

Table 4.17 Results for grade level differences in the "productivity and professional practice" category

Survey item	Grade	Mean	S.D.	Frequencies (Valid Percent) %					Total (N)
				P	B	A	G	E	
Q32 (use technology to enhance professional development and lifelong learning)	1st Year	3,17	1,07	7,8	19,4	27,2	38,8	6,8	103
	2nd Year	3,35	0,87	2,0	11,2	45,9	31,6	9,2	98
	3rd Year	3,51	0,88	2,1	9,4	34,4	43,8	10,4	96
	4th Year	3,80	0,84	1,2	1,2	36,0	39,5	22,1	86
Q33 (follow the developments in integrating technology to improve professional practice)	1st Year	2,85	1,04	12,6	21,4	36,9	26,2	2,9	103
	2nd Year	3,26	0,88	2,0	16,3	41,8	33,7	6,1	98
	3rd Year	3,44	0,90	2,1	11,5	37,5	38,5	10,4	96
	4th Year	3,53	0,93	1,2	14,0	27,9	44,2	12,8	86
Q34 (use productivity tools to increase productivity in profession)	1st Year	3,19	1,06	7,8	15,5	35,0	33,0	8,7	103
	2nd Year	3,64	0,83	1,0	7,2	30,9	48,5	12,4	97
	3rd Year	3,69	0,94	0,0	12,5	27,1	39,6	20,8	96
	4th Year	3,97	0,83	0,0	4,7	22,1	45,3	27,9	86
Q35 (use computer to communicate and collaborate with colleagues)	1st Year	3,40	1,13	7,8	12,7	25,5	39,2	14,7	102
	2nd Year	3,63	0,95	1,0	11,3	29,9	39,2	18,6	97
	3rd Year	3,84	0,84	0,0	7,3	21,9	50,0	20,8	96
	4th Year	4,02	0,89	0,0	5,9	20,0	40,0	34,1	85
Q36 (use technology to communicate and collaborate with parents)	1st Year	3,37	1,09	8,7	9,7	29,1	40,8	11,7	103
	2nd Year	3,59	1,02	4,2	7,4	32,6	36,8	18,9	95
	3rd Year	3,78	0,91	2,1	5,3	25,5	46,8	20,2	94
	4th Year	3,97	0,80	0,0	4,7	19,8	50,0	25,6	86
Q37 (use technology to communicate and collaborate with the larger community)	1st Year	3,08	1,08	9,7	18,4	33,0	32,0	6,8	103
	2nd Year	3,24	1,03	5,1	16,3	38,8	28,6	11,2	98
	3rd Year	3,60	9,50	2,1	9,4	31,3	40,6	16,7	96
	4th Year	3,86	0,81	0,0	7,0	19,8	53,5	19,8	86
Overall means	1st Year	3,19	0,84	6,9	14,9	35,6	31,7	10,9	102
	2nd Year	3,45	0,71	1,1	9,7	34,4	41,9	12,9	93
	3rd Year	3,63	0,69	1,1	4,3	31,9	40,4	22,3	94
	4th Year	3,86	0,64		3,5	22,4	48,2	25,9	85

S.D. = Standard Deviation, P =Poor, BA =Below Average, A =Average, G =Good, E =Excellent

4.3.6 Differences between students' (across grade levels) perceptions of their competencies in "social, ethical, legal, and human issues" category

The Table 4.18 shows the results for the "social, ethical, legal, and human issues" category for each grade level. Overall mean scores of freshmen (3.23) and sophomores (3.35) were average, whereas, they were good for juniors (3.55) and seniors (3.75). Gradual increase in overall mean scores is observed as grade level increases. Except for two of these survey items (item 42 and 43), sophomores' means were higher than freshmen's means. All the juniors' means for these survey items were higher than all of freshmen's means and sophomores' means. And also all seniors' means were higher than the others' means. The lowest mean for these survey items was 3.13 and it was obtained by the freshmen for survey item 44 (provide students with an equal access to technology resources). For this survey item, 74.8 % of freshmen placed their level as average or better. The highest mean for these survey items was 3.97 and it was obtained by the seniors for survey item 41 (use various technology-supported activities that consider students' characteristics). For this survey item, 95.4 % of seniors placed their level as average or better.

Table 4.18 Results for grade level differences in the "social, ethical, legal, and human issues" category

Survey item	Grade	Mean	S.D.	Frequencies (Valid Percent) %					Total (N)
				P	B	A	G	E	
Q38 (act as a role model on legal and ethical use of technology)	1st Year	3,18	1,01	6,8	14,6	39,8	31,1	7,8	103
	2nd Year	3,36	0,94	4,1	12,2	35,7	39,8	8,2	98
	3rd Year	3,50	0,98	5,2	7,3	32,3	42,7	12,5	96
	4th Year	3,72	0,88	1,2	7,0	27,9	46,5	17,4	86
Q39 (teach legal and ethical use of technology)	1st Year	3,32	1,03	6,8	11,7	34,0	37,9	9,7	103
	2nd Year	3,37	1,01	4,1	15,3	31,6	37,8	11,2	98
	3rd Year	3,61	1,01	5,2	7,3	24,0	47,9	15,6	96
	4th Year	3,97	0,83	0,0	4,7	22,1	45,3	27,9	86
Q40 (apply technology resources to support individual differences)	1st Year	3,11	1,06	7,8	20,4	32,0	33,0	6,8	103
	2nd Year	3,36	0,94	3,1	13,3	38,8	34,7	10,2	98
	3rd Year	3,53	0,78	0,0	8,3	39,6	42,7	9,4	96
	4th Year	3,78	0,77	0,0	3,5	32,6	46,5	17,4	86
Q41 (use various technology-supported activities that consider students' characteristics)	1st Year	3,19	1,02	8,8	10,8	40,2	33,3	6,9	102
	2nd Year	3,34	0,89	1,1	16,8	37,9	35,8	8,4	95
	3rd Year	3,52	0,79	1,0	7,3	38,5	44,8	8,3	96
	4th Year	3,83	0,80	0,0	4,7	27,9	47,7	19,8	86
Q42 (assist students for safe use of technology)	1st Year	3,35	1,05	5,9	14,7	28,4	40,2	10,8	102
	2nd Year	3,31	0,87	2,0	14,3	40,8	36,7	6,1	98
	3rd Year	3,60	0,96	1,0	13,5	26,0	42,7	16,7	96
	4th Year	3,64	0,91	2,3	7,0	30,2	45,3	15,1	86
Q43 (assist students for healthy use of technology)	1st Year	3,34	0,97	3,9	14,7	33,3	39,2	8,8	102
	2nd Year	3,31	0,95	2,1	18,6	35,1	35,1	9,3	97
	3rd Year	3,60	0,96	2,1	11,5	26,0	44,8	15,6	96
	4th Year	3,73	0,80	0,0	5,8	31,4	46,5	16,3	86
Q44 (provide students with an equal access to technology resources)	1st Year	3,13	1,11	10,7	14,6	35,0	31,1	8,7	103
	2nd Year	3,31	0,99	3,1	17,5	36,1	32,0	11,3	97
	3rd Year	3,47	0,99	4,2	9,4	36,5	35,4	14,6	96
	4th Year	3,60	0,92	2,3	7,0	34,9	39,5	16,3	86
Overall means	1st Year	3,23	0,79	7,0	11,0	31,0	44,0	7,0	100
	2nd Year	3,35	0,73		19,4	26,9	43,0	10,8	93
	3rd Year	3,55	0,72	2,1	7,3	24,0	50,0	16,7	96
	4th Year	3,75	0,62		3,5	22,1	51,2	23,3	86

S.D. = Standard Deviation, P =Poor, BA =Below Average, A =Average, G =Good, E =Excellent

4.4 Inferential Statistics

This section has four different subsections. The first subsection deals with the missing data. Then the second subsection dealing with the determination of the variances comes. Assumptions of MANOVA are given in the next subsection. Finally, statistical model of MANOVA and the analyses of the hypotheses are given. To be able to use survey items' scores on the MANOVA, all of the six dependent variables' means were calculated for each student.

4.4.1 Missing Data Analysis

Before starting the inferential statistics, the missing data analysis was examined. The total missing data for the survey were 39 participants (10 % of all respondents). For this reason, missing data were excluded from the calculation of variances.

4.4.2 Determination of variances

Two independent variables (gender and grade level) were pre-determined as potential confounding factors of the study. All pre-determined independent variables have been correlated with the dependent variables; (1) technology operations and concepts, (2) planning and designing learning environments and experiences, (3) teaching, learning, and the curriculum, (4) assessment and evaluation, (5) productivity and professional practice, and (6) social, ethical, legal, and human issues.

4.4.3 Assumptions on MANOVA

Multiple Analysis of Covariance (MANOVA) has three assumptions; multivariate normality, homogeneity of the variance matrices, and independence of observations (Grimm & Yarnold, 1995).

Normality of variables is assessed by either statistical or graphical methods (Tabachnik & Fidell, 1996). The normality was checked for gender and grade level scores. Table 4.19 shows male and female students' means, standard deviations, variances, skewness, kurtosis, and the total number of answers for each category. Except for the ASSE_EVAL category's kurtosis for male students, values of both skewness and kurtosis for male and female students could be accepted as normal. Table 4.20 shows means, standard deviations, variances, skewness, kurtosis, and the total number of answers for each category for each grade level. Values of both skewness and kurtosis for classes could be accepted as normal.

Table 4.19 Descriptive Statistics for Survey Scores According to Gender

	Gender	N	Mean	Standard Deviation	Variance	Skewness	Kurtosis
TECH_OPE	Male	95	3,2947	,9328	,870	-,383	-,389
	Female	280	2,5735	,7669	,588	,329	-,312
PLAN_DES	Male	95	3,3789	,7065	,499	-,405	-,040
	Female	277	3,2552	,7035	,495	-,413	,237
TEACH_LE	Male	96	3,4913	,7652	,586	-,519	,409
	Female	277	3,2552	,7035	,495	-,413	,237
ASSE_EVAL	Male	94	3,6543	,6833	,467	-,849	1,189
	Female	279	3,5202	,6805	,463	-,653	,999
PRODUCTI	Male	95	3,5877	,7733	,598	-,614	,333
	Female	279	3,4946	,7617	,580	-,464	,500
SOCIAL	Male	96	3,4554	,7762	,602	-,679	,839
	Female	279	3,4608	,7330	,537	-,315	,222

Table 4.20 Descriptive Statistics for Survey Scores According to Grade Level

	Grade	N	Mean	Standard Deviation	Variance	Skewness	Kurtosis
TECH_OPE	1st Year	99	2,6638	,8575	,735	,206	-,401
	2nd Year	96	2,6369	,7827	,613	,595	-,096
	3rd Year	94	2,8663	,8683	,754	,036	-,713
	4th Year	86	2,8754	,9569	,916	,225	-,625
PLAN_DES	1st Year	101	3,0198	,7178	,515	-,499	-,110
	2nd Year	94	3,1053	,6727	,453	-,165	-,264
	3rd Year	92	3,5109	,6849	,469	-,594	,825
	4th Year	85	3,5624	,5661	,320	,009	-,164
TEACH_LE	1st Year	103	3,2735	,8094	,655	-,397	-,027
	2nd Year	96	3,2674	,6482	,420	-,236	-,150
	3rd Year	96	3,6424	,6384	,408	-,272	,564
	4th Year	86	3,7190	,6110	,373	-,087	,657
ASSE_EVAL	1st Year	99	3,3573	,8010	,642	-,871	,547
	2nd Year	94	3,3830	,6467	,418	-,336	,210
	3rd Year	95	3,6513	,5851	,342	-,388	,181
	4th Year	85	3,8632	,5330	,284	,097	-,042
PRODUCTI	1st Year	102	3,1895	,8368	,700	-,570	,048
	2nd Year	93	3,4516	,7086	,502	-,336	,226
	3rd Year	94	3,6330	,6937	,481	-,285	,081
	4th Year	85	3,8588	,6354	,404	-,037	-,672
SOCIAL	1st Year	100	3,2271	,7849	,616	-,738	,397
	2nd Year	93	3,3456	,7291	,532	-,047	-,501
	3rd Year	96	3,5491	,7241	,524	-,394	,539
	4th Year	86	3,7525	,6149	,378	,158	-,238

To test the homogeneity of the variance matrices Levene's Test of Equality of Error variances was used. Table 4.21 shows the Levene's Test of Equality of Error Variances. All the Sig. values are greater than α =, 05. Thus, we did not violate the assumption of homogeneity of observed variance matrices.

Table 4.21 Levene's Test of Equality of Error Variances

	F	df1	df2	Sig.
TECH	1,356	7	336	,223
PLAN	1,220	7	336	,291
TEACH	1,732	7	336	,101
ASSESS	1,845	7	336	,078
PRODUCT	1,265	7	336	,267
SOCIAL	1,782	7	336	,090

As a last assumption, independency of observation was examined. Assumption was met with the observations of the researcher. It was observed that all participants filled out the survey on their own.

4.4.4 Analysis and Hypothesis

4.4.4.1 Null Hypothesis 1 (Differences between Male and Female Students)

The first null hypothesis was; 'There is no significant difference between males and females in their competencies in the six groups of standards stated in NETS-T."

A multivariate analysis of variance (MANOVA) was conducted to determine the effect of gender and grade levels on the six dependent variables. Significant differences were found among gender and grade levels on the dependent variables as indicated in Table 4.22. Wilk's λ=.826, F (18, 936.695) = 3.645, p<.000.

Table 4.22 Multivariate Test Results

	Value	F	Hypothesis df	Error df	Sig.
Wilks' lambda	,826	3,645	18,000	936,695	,000

Multivariate analysis of variance was conducted to determine the effect of gender on the six dependent variables. Significant mean differences were found between male and female students in their perceptions of competencies of dependent measures as indicated in Table 4.23 (F (6, 331) = 13.255, p=.000). Hence, analyses of variances (ANOVA) on each dependent variable were conducted as follow-up tests to the MANOVA.

Table 4.23 MANOVA results for null hypothesis

Effect		F	Hypothesis df	Error df	Sig.
Gender	Wilks' Lambda	13,255	6,000	331,000	,000

The ANOVA results showed that there is a significant difference (α<0.5) between male and female students on "technology operations and concepts" scores in favor of male students. However, there are no significant differences (α>0.5) between male and female students on the other standards as shown in Table 4.24.

Table 4.24 Follow up results for null hypothesis 1 (Differences between male and female students

Source	Dependent variables	Df	F	Sig.
Gender	Technology operations and concepts	1	51,644	,000
	Planning and designing learning environments and experiences	1	1,803	,180
	Teaching, learning, and the curriculum	1	,163	,687
	Assessment and evaluation	1	1,560	,212
	Productivity and professional practice	1	,238	,626
	Social, ethical, legal, and human issues	1	,011	,918

Table 4.25 Estimated means for variables related to null hypothesis 1 (Differences between male and female students

Dependent variable	Gender	Mean
Technology operations and concepts	Male	3,2947
	Female	2,5735
Planning and designing learning environments and experiences	Male	3,3789
	Female	3,2552
Teaching, learning, and the curriculum	Male	3,4913
	Female	3,2552
Assessment and evaluation	Male	3,6543
	Female	3,5202
Productivity and professional practice	Male	3,5877
	Female	3,4946
Social, ethical, legal, and human issues	Male	3,4554
	Female	3,4608

4.4.4.2 Null Hypothesis 2 (Differences between Grade Levels)

The second null hypothesis was; ‘There is no significant difference between grade levels in their competencies in the six groups of standards stated in NETS-T.”

A multivariate analysis of variance (MANOVA) was conducted to determine the effect of gender and grade levels on the six dependent variables. Significant differences were found among gender and grade levels on the dependent variables as indicated in Table 4.22. Wilk's λ=.826, F (18, 936.695) = 3.645, p<.000

Multivariate analysis of variance was conducted to determine the effect of grade level on the six dependent variables. Significant mean differences were found between grade levels in the competencies of dependent measures as indicated in Table 4.26, (F (18, 937) = 3.645, p=.000). Hence, analyses of variances (ANOVA) on each dependent variable were conducted as follow-up tests to the MANOVA.

Table 4.26 MANOVA results for null hypothesis 2 (Differences between grade levels)

Effect		Value	F	Hypothesis df	Error df	Sig.
Class	Wilks' Lambda	,826	3,645	18,000	936,695	,000

As indicated in Table 4.27, the ANOVA test result showed significant mean differences between the grade levels on the six technology standards.

Table 4.27 Follow up results for null hypothesis 2 (Differences between grade levels)

Source	Dependent variables	Df	F	Sig.
Grade Level	Technology operations and concepts	3	3,047	,029
	Planning and designing learning environments and experiences	3	16,136	,000
	Teaching, learning, and the curriculum	3	8,960	,000
	Assessment and evaluation	3	11,309	,000
	Productivity and professional practice	3	9,018	,000
	Social, ethical, legal, and human issues	3	8,299	,000

It was established that a factor has a significant effect on the dependent variables so that a significant difference exists in the means. Post Hoc Analyses to the univariate ANOVA for each dependent variable consisted of pairwise comparisons to find which grade levels had better results. Each comparison was tested at the 0.05 level. For each dependent variable Bonferroni test was used as pairwise comparison (Multiple comparisons).

Table 4.28 shows Bonferroni test results for the “technology operations and concepts” across grade levels. Although follow up ANOVA result shows a significant mean difference for the technology operations and concepts across grades levels, Bonferroni test shows that there was no significant mean difference across grade levels for the “technology operations and concepts”.

Table 4.28 Bonferroni test results for “technology operations and concepts” across grade levels

Grade	Mean	Grade	Sig.
First Year	2,771	Second	1,000
		Third Year	,846
		Fourth Year	1,000
Second Year	2,826	First Year	1,000
		Third Year	,726
		Fourth Year	,898
Third Year	3,108	First Year	,846
		Second	,726
		Fourth Year	1,000
Fourth Year	3,082	First Year	1,000
		Second	,898
		Third Year	1,000

Table 4.29 shows Bonferroni test results for the “planning and designing learning environments and experiences” across grade levels. There was no significant mean difference between freshmen and sophomores, and also, there was no significant mean difference between juniors and seniors. But, juniors’ and seniors’ perceptions about planning and designing learning environments and experiences were found to be significantly higher than freshmen’s and sophomores’ perceptions.

Table 4.29 Bonferroni test results for "planning and designing learning environments and experiences" across grade levels

Grade	Mean	Grade	Sig.
First Year	3,014	Second Year	,722
		Third Year	,000
		Fourth Year	,000
Second Year	3,063	First Year	,722
		Third Year	,006
		Fourth Year	,000
Third Year	3,539	First Year	,000
		Second Year	,006
		Fourth Year	1,000
Fourth Year	3,637	First Year	,000
		Second Year	,000
		Third Year	1,000

As it is presented in Table 4.30, Bonferroni test results for the "teaching, learning, and the curriculum" across grade levels indicated that there was no significant mean difference between freshmen and sophomores. Similarly, there was no significant mean difference between juniors and seniors. However, juniors' and seniors' perceptions about "teaching, learning and the curriculum" were found to be significantly higher than freshmen's and sophomores' perceptions.

Table 4.30 Bonferroni test results for "teaching, learning, and the curriculum" across grade levels

Grade	Mean	Grade	Sig.
First Year	3,288	Second Year	1,000
		Third Year	,011
		Fourth Year	,000
Second Year	3,237	First Year	1,000
		Third Year	,036
		Fourth Year	,000
Third Year	3,612	First Year	,011
		Second Year	,036
		Fourth Year	,767
Fourth Year	3,759	First Year	,000
		Second Year	,000
		Third Year	,767

Table 4.31 shows Bonferroni test results for the "assessment and evaluation" standards across grade levels. As indicated in the table there was no significant mean difference among freshmen, sophomores, and juniors. But there was a significant mean difference between seniors and others. The perceptions of seniors on "assessment and evaluation" standard was found to be significantly higher than that of others.

Table 4.31 Bonferroni test results for "assessment and evaluation" across grade levels

Grade	Mean	Grade	Sig.
First Year	3,397	Second Year	1,000
		Third Year	,100
		Fourth Year	,000
Second Year	3,324	First Year	1,000
		Third Year	,456
		Fourth Year	,000
Third Year	3,690	First Year	,100
		Second Year	,456
		Fourth Year	,039
Fourth Year	3,909	First Year	,000
		Second Year	,000
		Third Year	,039

Table 4.32 shows Bonferroni test results for the "productivity and professional practice" standards across grade levels. There was no significant mean difference between freshmen and sophomores, sophomores and juniors, juniors and seniors. But, there was a significant mean difference between juniors and freshmen. In addition, seniors' perceptions were found to be significantly higher than freshmen's and sophomores' perceptions.

Table 4.32 Bonferroni test results for "productivity and professional practice" across grade levels

Grade	Mean	Grade	Sig.
First Year	3,274	Second Year	,250
		Third Year	,017
		Fourth Year	,000
Second Year	3,389	First Year	,250
		Third Year	1,000
		Fourth Year	,014
Third Year	3,692	First Year	,017
		Second Year	1,000
		Fourth Year	,156
Fourth Year	3,878	First Year	,000
		Second Year	,014
		Third Year	,156

As Table 4.33 presents, Bonferroni test results for the "social, ethical, legal, and human issues" standards shows that there was no significant mean difference among freshmen, sophomores, and juniors. There was also no significant mean difference between juniors and seniors. On the other hand, there was a significant mean difference between seniors and sophomores, and between seniors and freshmen. As a result, the seniors' perceptions of ethical, social, legal and human issues were found to be significantly higher than freshmen's and sophomores' perceptions.

Table 4.33 Bonferroni test results for "social, ethical, legal, and human" across grade levels

Grade	Mean	Grade	Sig.
First Year	3,234	Second Year	,900
		Third Year	,119
		Fourth Year	,000
Second Year	3,329	First Year	,900
		Third Year	1,000
		Fourth Year	,010
Third Year	3,563	First Year	,119
		Second Year	1,000
		Fourth Year	,107
Fourth Year	3,775	First Year	,000
		Second Year	,010
		Third Year	,107

CHAPTER 5

CONCLUSIONS AND IMPLICATIONS

The findings of the study were presented in detail in the previous chapter under the title of results. In the light of the findings, a discussion of conclusions, implications and recommendations were presented in this chapter.

5.1 Conclusions

5.1.1 The students' perceptions related with the 'technology operations and concepts' standard stated in NETS-T

The NETS-T implies that teachers demonstrate a sound understanding of technology operations and concepts. Similarly, Jao (2001) in his study found that a teacher;

- Needs to be able to develop simple hypermedia and multimedia products that apply basic instructional design principles,
- Needs to be able to use a computer projection device to support and deliver oral presentations,
- Needs to be able to identify basic principles of instructional design associated with the development of multimedia and hypermedia learning materials,

- Needs to know how to use imaging devices such as scanners, digital cameras, and video systems and software,
- Needs to know how to use advanced features of word processing, desktop publishing, graphic programs and utilities to develop professional products and a teacher needs to know how to use terminology related to computers as well,
- Needs to be able to design and publish simple online documents that present information and include links to critical resources.

On the other hand, feedback from school representatives and the public in general indicates that competence in information technologies is important, but all too often lacking in teachers, counselors, and administrators in public and private schools (Algozzine et. al., 1999). Likewise, Merkley and Schmidt (2001) stated, many preservice teachers remain wary of, and uncomfortable with technology. Similarly, for the "technology operation and concepts" items in the survey, at least two out of three of the FLE students placed their level as average or worse. From these results, it can be said that, they did not feel competent demonstrating introductory knowledge, skills, and understanding of concepts related to technology. Likewise, they did not feel competent in demonstrating continual growth in technology knowledge and skills to stay abreast of current and emerging technologies.

Males are supposed to be more accustomed to computers than females (Keller & Cernerud, 2002). As expected, in the "technology operations and concepts" survey items, male FLE students felt more confident than FLE female students. But, there was no significant difference between grade levels for the survey items related with the "technology operations and concepts' standards stated in NETS-T.

The reason for male students' superiority in these standards might be as Watson (1997) stated, "females are far more likely than males to express negative feelings about instructional technology and have lower computer self efficacy" (p.266). Another reason for low competencies in this category can be that the courses aiming at rising students basic technology knowledge to the desired level may be inadequately conducted or not sufficient.

Even though they learn how to use technology and related concepts, they might not have a chance to apply their technology related to knowledge in other courses. The faculty members might be using technology in their courses but the assignments they have given to the students might not be requiring the use of technology.

The prospective teachers might be given assignments and learning activities that can be done with the help of technology. This process may develop their knowledge and skills in technology operations and concepts. When preservice teachers get more experienced, their technology application levels increase as well. It can be said that throughout their preservice teacher education, they might have a chance to apply technology knowledge in the other levels of the standards.

Another solution might be as Watson (1997) recommended, preservice teachers' instructional technology education needs to be tailored to allow for different levels of perceived competence in new students and gender differences in the way students feel about instructional technology. Willis (2001) recommended a solution that "technology should be integrated across the entire curriculum, and participants in all areas of teacher education should help to develop and implement an integrated plan that provides student with the models, content, practice, and experiences needed" (par. 15). If students do not have technology-related skills, basic courses should be provided to have students gain skills in using technology, but at the same time, as Willis stated technology should be integrated into the whole FLE curriculum to have students implement their knowledge in technology.

5.1.2 The students' perceptions related with the 'planning and designing learning environments and experiences' standard stated in NETS-T

The NETS-T implies that teachers plan and design effective learning environments and experiences supported by technology. Similarly Jao (2001) stated that a teacher needs to know how to use teacher utility and classroom management tools to design solutions for a specific purpose. Besides, a teacher might need to identify, select and integrate video and digital images in varying formats for use in presentations, publications and other products. In addition, a teacher might need to conduct research and evaluate online sources of information that support and enhance the curriculum.

In this study, almost seven out of 10 of the FLE students felt average or worse for the items 'identify and locate computer/technology resources' and 'evaluate computer/technology resources for their accuracy'. And also for the other items in the survey, related to 'planning and designing learning environments and experiences', almost 50 % of them placed their level as average or worse. As a result, it can be said that for 'planning and designing learning environments and experiences' at least half of them placed their level as average or worse.

There was no significant difference between male and female FLE students' perceptions regarding their level in "planning and designing learning environments and experiences". There was no significant difference between sophomores' and freshmen's perceptions, and between juniors' and seniors' perceptions, either. But, juniors' and seniors' perceptions regarding their level in "planning and designing learning environments and experiences" were higher than freshmen's and sophomores' perceptions. According to these data, it can be said that, in the third year and the fourth year programs of FLE Department, FLE students have gained more competency in 'planning and designing learning environments and experiences' standards stated in NETS-T. The reason for this result might be that in their teaching profession courses, they might have some chance to learn and apply such kind of knowledge.

The reason "why preservice teachers are not integrating technology into their classrooms" might be, as Hope (1998) stated, the lack of prior experiences in using technology as a productivity tool and for teaching.

In addition, as Hope (1998) indicated, teacher students may lack access to the technology they are expected to integrate into practice, or they might not be given chance to practice for designing technology based learning environments. At the beginning of the teacher education program, by integrating technology into method and School Experience courses, the students may be provided with intensive practice which may lead to the development of their "planning and designing learning environments and experiences" skills.

Teacher students may have the opportunity to use technology in classes if certain changes are done in the general curriculum of the FLE Department.

5.1.3 The students' perceptions related with the 'teaching, learning, and the curriculum' standard stated in NETS-T.

The NETS-T implies that teachers implement curriculum plans that include methods and strategies for applying technology to maximize student learning. Similarly, Jao (2001) stated, a teacher needs to know how to observe demonstrations or use broadcast instruction, audio/video conferencing, and other distance learning applications. Also Killion (1999) stated, "Educational technology requires the assistance of educators who integrate technology into the curriculum, align it with student learning goals, and use it for engaged learning projects" (par. 1). Preservice teachers should be aware of numerous forms of teaching and learning such as teacher-centered or direct instruction, as well as the many forms of student-centered instruction (Willis, 2001)

On the other hand, a large number of graduates from colleges of education fell ill-prepared to integrate technology into their curriculum (Beckett et al., 2001). Only about a third of in-service teachers assign work on computers regularly. Of teachers who do assign computer work, few use analytic and project-oriented software on a regular basis (Becker et al. 1999).

In this study, more than half of the FLE students felt good or excellent in 'teaching, learning, and the curriculum'. Between male and female FLE students' perceptions regarding their level in "teaching, learning, and curriculum", there was no significant difference. There was no significant difference between sophomores' and freshmen's perceptions, either. Juniors' perceptions regarding their level in "teaching, learning, and curriculum" were higher than freshmen's and sophomores' perceptions. And, seniors' perceptions were higher than the other grade levels' perceptions. Almost three out of five of the senior students placed their competence level as good or excellent. From these data, it can be said that, except for sophomores, as grade level increased, FLE students seemed to have gained more competency in 'teaching, learning, and curriculum' standards stated in NETS-T.

This result can be due to content of the curriculum of the FLE department. Number of teaching profession and integration of technology into teaching / learning related courses may be increasing toward the end of the program; and preservice teachers become more oriented to integrating technology into teaching, learning and curriculum.

5.1.4 The students' perceptions related with the 'assessment and evaluation' standard stated in NETS-T

The NETS-T implies that teachers apply technology to facilitate a variety of effective assessment and evaluation strategies. Likewise, Beckett (2001) stated, many teachers need additional help in developing appropriate assessments. As Algozzine et al. (1999) stated innovative computer-assisted assessment methods have been developed to determine the mastery of specific information technology competencies.

In this study, only two out of five of the FLE students felt competent in "using technology resources to interpret student-related data" and "integrating technology-based assessment strategies". At least half of the preservice students felt good or excellent in the other items in the survey related with "assessment and evaluation" standards stated in NETS-T.

There was no significant difference between the perceptions of male and female FLE students with respect to "assessment and evaluation" standards. There was also no significant difference between freshmen's and sophomores' perceptions, between freshmen's and juniors' perceptions, and between sophomores' and juniors' perceptions. But, seniors' perceptions were higher than the others' perceptions. At least half of the senior students felt competent in "assessment and evaluation" items stated in the survey. According to these results, we can conclude that FLE students have gained more of their competencies related with the "assessment and evaluation" standards stated in NETS-T in their fourth year. The courses in the FLE department's last year program (e.g. Materials Adaptation and Evaluation (FLE 405), English Language Testing and Evaluation (FLE 413), School Experience II (FLE 417), etc…) might be contributing to the development of the senior students' higher perception in "assessment and evaluation" standards and this may lead to result of higher level competencies.

5.1.5 The students' perceptions related with the 'productivity and professional practice' standard stated in NETS-T

The NETS-T implies that teachers use technology to enhance their productivity and professional practice. Likewise, Jao (2001) stated, a teacher needs to be able to collaborate in online workgroups to build bodies of knowledge around specific topics. While doing this, the instructor must be prepared for added emphasis on the concept of student and teacher learning together. Students frequently suggest technology options, modifications, or shortcuts, and there is typically at least one student in the class who is more skilled and confident with technology than the instructor (Merkley & Schmidt, 2001).

In this study, 43 % of FLE students felt competent in the survey items related with "using technology to enhance professional development and lifelong learning". Moreover, for the other survey items related with the "productivity and professional practices" standards stated in NETS-T, at least half of FLE students felt competent.

For this group of items, there was no significant difference between male and female FLE students' perceptions regarding "productivity and professional practices". And also, there was no significant difference between freshmen's and sophomore's perceptions, between sophomores' and juniors' perceptions, and between juniors' and seniors' perceptions. But, the seniors' perceptions with respect to their level in "productivity and professional practices" were higher than freshmen's and sophomores' perceptions. At least 57 % of senior students felt good or excellent for this group of survey items related with the "productivity and professional practice" standards stated in NETS-T. In this category gradual increase in the means was observed as grade level increases. This result shows that parallel to the preservice teaching maturity levels in regard to teaching profession, their perceptions of competencies in "productivity and professional practice" increase. This may be due to the curriculum of FLE department or the increase in the number of courses over the years.

To increase preservice teachers "productivity and professional practice" during their education, they might be encouraged and engaged to use technology to communicate and collaborate with peers, and larger community, to study some subjects using technology, search and collect information by using technology.

5.1.6 The students' perceptions related with the 'social, ethical, legal, and human issues' standard stated in NETS-T

The NETS-T implies that teachers understand the social, ethical, legal, and human issues surrounding the use of technology in K-12 schools and apply those principles in practice. Likewise, Merkley and Schmidt (2001) stated, the instructor must be very sensitive to the concept of accommodating for individual differences and must continually monitor instructional pace, explanation, and feedback when implementing and requiring technology use. Inequitable access needs to be considered when technology use is embedded in an assignment.

In this study, for the item "provide students with an equal access to technology resources" in the survey, 47 % of FLE students placed their level as good or excellent. For the other survey items related with the "social, ethical, legal, and human issues" standards stated in NETS-T, at least 50 % of FLE students placed their level as good or better.

There was no significant difference between male and female FLE students' perceptions in the survey items related with "social, ethical, legal, and human issues". And also there was no significant difference between freshmen's and sophomores' perceptions, freshmen's and juniors' perceptions, sophomores' and juniors' perceptions, and juniors' and seniors' perceptions. For each item in this section of the survey, at least 57 % of senior FLE students placed their level as good or better.

One of the reasons for gradual increase in "social, ethical, legal, and human issues" might be the instructors' insistence on these issues as grade level increases. Students' maturation may be another factor that causes this gradual increase. In addition, in technology related courses these issues take place as the content. This might help preservice teachers to be aware of these types of issues. To increase preservice teachers' awareness of these issues, they should be informed to obey these rules, and to consider legal issues in their practices.

5.2 Implications for Research and Practice

The reason for evaluating a program is to determine the effectiveness of it (Kirkpatrick, 1994, cited in Onay, 2003). On the other hand many people believe that evaluation is about proving the success or failure of the program. This myth assumes that success is implementing the perfect program that has no problem and runs perfectly. But this does not happen in real life usually. Success of any program depends on the continuous feedback and developments done, according to the results of evaluation (McNamara, n.d.). Even though, this study is not an evaluation study, it examined FLE students' perceptions of technology competence with respect to NETS-T developed by ISTE, and it provides valuable information related with the FLE program's product. In this respect, the results of this study may provide with feedback to improve or strengthen the FLE program.

Firstly, since there are no studies related to the perceptions of FLE students in regard to NETS-T, this study will provide valuable input for the literature related with perceptions of FLE students in their competencies with respect to technology standards.

Educational organizations and educators are striving to integrate technology into teaching and learning processes all over the world. Similarly, Turkey has started this process at the beginning of 1980s. Even though there are efforts to accomplish this task, this process is too slow in Turkey. The results of this study will make valuable contributions to this process in Turkey in regard to how prospective teachers perceive their technology competencies. In addition, the findings of this study will provide information to curriculum designers and practitioners of FLE field in regard to integration of technology into teaching and learning process.

Integration of technology into teaching and learning process is important for the effectiveness of the teacher education programs. The results of this study will help understanding the state of the FLE students/prospective teachers in integrating technology into teaching/learning process. The administrators of the related faculties and the departments may use the results of this study to increase their students' technology competencies.

FLE students did not feel competent in "technology operations and concepts" standards stated in NETS-T. Especially female students' perceptions on this topic were too low. So, FLE Department should train its students, especially female students, about "technology operations and concepts" standard stated in NETS-T. This may be achieved by improving the content of basic computer literacy courses and applying knowledge and skills gained from basic computer literacy courses into other courses.

Although FLE students didn't feel competent in "technology operations and concepts" standards stated in NETS-T, their competency levels were higher in "planning and learning environments and experiences", " teaching, learning, and the curriculum", " assessment and evaluation", "productivity and professional practice", and "social, ethical, legal, and human issues" standards stated in NETS-T. Also, there was an increase in students' competency level as students' grade level increased in “planning and learning environments and experiences”, “ teaching, learning, and the curriculum”, “assessment and evaluation”, “productivity and professional practice”, and “social, ethical, legal, and human issues” standards stated in NETS-T. But, these increases in students’ competency level may not be enough to integrate technology into teaching and learning processes. The students’ perceptions of competencies in the related categories might be increased by considering the content of related courses.

5.3 Recommendations for Further Research

This study can be regarded as the first study conducted in Turkey investigating FLE students’ perceptions regarding educational technology. The results of the literature review indicate that teachers should apply technology in their instruction effectively. This study revealed that there is a gap between FLE students’ perceptions of their competencies and NETS-T. A follow-up study can be done to reveal students’ application of their technological knowledge and skills in real-life situations.

As this study covers only the department of the FLE in METU, there is also a need to investigate the other FLE and other teacher education departments in all over the country to see the whole picture. Further research can be conducted with the previous graduates of this department who are currently working as teachers at schools, to see whether they make use of educational technology in their classroom applications. Moreover, there are some courses related with technology and implications of technology in education. Thus, as part of another study, whether the contents of these courses meet the technology standards can be investigated.

NETS-T has been developed for the United States, and the survey used in this study was constructed based on it. A study can be conducted to evaluate suitability of NETS-T for Turkey teacher education system. Or suitable NETS-T for Turkey teacher education system can be developed based on new research findings.

REFERENCES

Aksu, M. (2003). *Welcome message of the dean. Retrieved* November 20, 2003, from http://www.fedu.metu.edu.tr/en1/welcome.html

Algozzine, F., Antonak, R., Flowers, C. P., Gretes, J. A. & Hughes, C. (1999). A Processor for Developing Technology Competencies in a College of Education. *Contemporary Education*, Vol. 70, Issue 4

Alkan, C. (1990). Eğitim teknolojisinde kuramsal yönden gelişmeler. *Eğitim Bilimleri Birinci Ulusal Kongresi* Ankara: 24-28 Eylül 1990 Bildiriler 1 (pp. 9-27). Ankara: Milli Eğitim Basımevi

Association for Educational Communications and Technology (1996) The Definition of educational technology: a summary. In D. P. Ely & T. Plomp (Eds.), *Classic writings on instructional technology* (p. 3-15) Englewood CO: Libraries Unlimited Inc. (Reprinted from the definition of educational technology, p 1-16, 1977, Washington D.C.: AECT)

Bailey, G. D., Ross, T., & Griffin, D. L. (1996). Barriers to curriculum-technology integration in education. *Educational Considerations*, 23(2), 14-17.

Becker, H., Ravitz, J. & Wong, Y. (1999). *Teacher and Teacher-Directed Student Use of Computers and Software. Center for Research on Information Technology and Organizations: University of California, Irvineand University of Minnesota.* Retrieved August 18, 2003, from http://www.crito.uci.edu/tlc/findings/computeruse/

Beckett, E., K. Wetzel, R. Buss, I. Chisholm, E. Misdoubted, H. P. (2001). *Preservice and In-service Teachers Collaborate to Integrate Technology Into K-8 Classrooms.* Paper presented at the meeting of the SITE Conference, Norfolk, VA.

Brownell, K. (1997). Technology in Teacher Education: Where Are We and Where Do We Go from Here. *Journal of Technology in Teacher Education, 5*(2/3), 133.

Bruce, B. (1999). Challenges for the evaluation of new information and communication technologies. *Journal of Adolescent & Adult Literacy, 42,* 450-455.

Chisholm, I., Carey, J., & Hernandez, A. (1998, March). *University Minority Students: Cruising Down the Superhighway or Standing at the Off-Ramp?.* Paper presented at the meeting of the Presented at SITE 98: Society for Information Technology and Teacher Education International Conference, Washington, D.C.

Clift, R. T., Mullen, L, Levin, J. & Larson, A. (2000). Technologies in context: Implications for teacher education, *Teacher and Teacher Education*, Vol. 17, p. 33-50

Cohen, L., Manion, L. and Morrison, K. (2000). *Research methods in education (5th ed.)* London: RoutledgeFalmer

Community High School District (2003). *Core Technology Standards for All Teachers*, Retrieved November 17, 2003, from http://www.district128.org/staffdevelopment/Tech%20Competencies%20for%20Web%20Site.htm

Corbanaro, M. (1997). Making Technology an Integral part of Teaching: The Development of a Constructionist Multimedia Course for Teacher Education. *Journal of Technology in Teacher Education, 5*(4), 277.

Duhaney, D.C. (2001) Teacher education: preparing teachers to integrate technology. *International Journal of Instructional Media,* Vol. 28(1), p.23

Education Professional Standards Board. (1999). *Kentucky Council on Experienced Teacher Standards for Preparation and Certification,* Retrieved November 17, 2003, from http://www.kyepsb.net/standards/exp_teach_stds.html

Electronic Learning (1992). New standards for teacher technology education. *Electronic Learning*, Vol. 11, Issue 8, p.7.

Friske, J., Knezek, D., Taylor, H., Thomas, L., & Wiebe, J. (1996). ISTE's technology foundation standards for all teachers: Time for a second look? *Journal of Computing in Teacher Education, 12*(2), 9-12.

Gentry, C. G.. *Educational technology a question of meaning. In. G.J. Anglin (Eds.), Instructional Technology Past, Present and Future.* Colarado: Libraries Unlimited Inc. (Original work published Reprinted from Educational Media and Technology Yearbook, 1987, Littleton: CO Libraries Unlimited)

Green, K. C. (1999). "Campus computing 1998: the Ninth National Survey of Desktop Computing and Information Technology in American Higher Education". Encino, CA*: Campus Computing*. (ERIC No. ED 428 645)

Grimm & Yarnold. (1995). Reading *and understanding multivariate statistics*. Wash., D.C.: APA

Harrington, H. (1991). Normal style technology in teacher education: Technology & the education of teachers. *Computers in Schools, 8*(1-3), 49-57.

Hannafin, R. (1999). Introduction to Special Issue on Instructional Technology and Teacher Education, *Educational Technology Research and Development*, vol.47(4), p.27-28.

Hayden, J. J. (2002). The development and formative evaluation of an assessment instrument based on the National Educational Technology Standards for Teachers. *Unpublished doctorate dissertation.* Georgia State University.

HEC Report. (1998). *Reorganization of teaching training programs of faculties of education.* Ankara, Turkey

Hill, R. B., & Somers, J. A. (1996). A process for initiating change: Developing technology goals for a college of education. *Journal of Teacher Education, 47,* 300-306.

Hinkel, D. E., Wiersma, W. and Jurs, S. G. (1998) *Applied statistics for the behavioral sciences*, Boston: Houghton Mifflin Company

Hope, W. C. (1998). The next step: Integrating computers and related technologies into practice. *Contemporary Education*, Vol.9, Issue 3, p137-141

Houghton, M. (1997). State strategies for incorporating technology into education. Washington, DC: *National Governers' Association*. (ERIC No. ED 412 930)

ISTE. (n.d.a) *Profiles for Technology-Literate Teachers.* Retrieved August 18, 2003, from http://cnets.iste.org/teachers/t_profiles.html

ISTE. (n.d.b) *Educational Technology Standards and Performance Indicators for All Teachers.* Retrieved August 18, 2003, from http://cnets.iste.org/teachers/t_stands.html

ISTE. (n.d.c) *Providing leadership and service to improve teaching and learning by advancing the effective use of technology in education.* Retrieved August 18, 2003, from http://www.iste.org/about/

İmer, G. (2000). *Eğitim fakültelerinde öğretmen adaylarının bilgisayarı eğitimde kullanmaya yönelik nitelikler*. *Eskişehir : T.C. Anadolu Üniversitesi Yayınları* No:1212, Eğitim Fakültesi Yayınları No:70

Illinois State Board of Education (2002). *Technology Standards for All Illinois Teachers,* Retrieved November 17, 2003, from http://www.isbe.net/profprep/CASCDvr/pdfs/24_coreteacherstd.pdf

Jao, F. (2001). An investigation of Pre-service Teachers' Attitudes and Confidence Levels Toward Educational Technology Standards and Selected Instructional Software Applications. *Unpublished doctoral dissertation*, The University of Toledo.

Johnson, D. L. (1997). Integrating technology in the classroom: The time has come. *Computers in the Schools, 13*(1/2), 1-5.

Keller, C. & Cernerud, L. (2002). Students' Perceptions of E-learning in University Education. *Journal of Educational Media, 27,* 1-2.

Khine M. S. (2001). Attitudes toward Computers among Teacher Education Students in Brunei Darussalam. *British Journal of Education Technology,* Vol. 28, Issue 2, p147

Killion, J. (1999) *Critical Issue: providing professional development for effective technology use*, Retrieved October 17, 2003, from http://www.ncrel.org/sdrs/areas/issues/methods/technlgy/te1000.htm

Kozma, R. B. & Johnston, J. (1991). The Technological Revolution Comes to the Classroom," Change. *Journal CAUSE/EFFECT,* 10-23.

Kirkpatrick, D.L. (1994). *Evaluating training programs: The four levels.* San Francisco, CA: Berrett-Koehler Publishers.

Larson, A. E. (1998). A Qualitative Study of Elementary Teacher Education Students' Experiences with Computer Technology in Learning to Teach. *Unpublished doctoral dissertation.* University of Illinois at Urbana-Champaign.

Laudon, K.C. Traver, C.G. & Laudon, J.P. (1996). *Information technology and society*. Cambridge: Course Technology.

Mayer-Smith, J., Pedretti, E., & Woodrow, J. (1997, March). Learning from teaching with technology: An examination of how teachers' experiences in a culture of collaboration inform technology implementation. *Paper presented at the annual meeting of the American Educational Research Association*, Chicago.

Marx, S. J. (2000). Case study of a masters program in instructional technology: its effectiveness and impact on teachers. *Unpublished doctoral dissertation*, New Mexico State University, New Mexico

McCoy, A. H. (1998) Integration of technology into higher education teacher preparation program. *Unpublished doctoral dissertation*, University of Idaho, Idaho

McNamara, C. (n.d.). Basic guide to program evaluation. In *The management assistance program for nonprofits 1999.* Retrieved August 12, 2003, from http://www.mapnp.org/library/evaluatn/fnl_eval.htm

Merkley, D. J. & Schmidt, D. A. (2001). Addressing the English Language Arts Technology Standard in Secondary Reading Methodology Course. *Journal of Adolescent & Adult Literacy, 45*(3).

Movrer-Popiel, E. & Pollard, C. (1994). An analysis of the perceptions of preservice teachers toward technology and its use in the classroom, *Journal of Instructional Psychology,* Vol. 21, Issue 2, p.137

Multiple Comparisons (n.d.) Retrieved August 18, 2003, from http://users.wmin.ac.uk/~baldwim/2cog205/COG205CH9.htm

Office of Technology Assessment. (1995). *Teachers and technology: Making the connection. (Report No. OTA-EHR-616).*. Washington, DC: U.S. Government Printing Office.

Onay, P. (2003). Evaluation of Computer Education and Instructional Technology Programs: Students' and Faculty Members' Perception. *Unpublished Master Thesis.* Middle East Technical University, Ankara.

Özoğul, G. (2002). A Qualitative Assessment of a Technology Training Course Offered to Prepare Pre-service English Language Teachers: A Case Study. *Unpulished Master Thesis.* Middle East Technical University, Ankara.

Parker, Randall R. (1997). Increasing Faculty Use of Technology in Teaching and Teacher Education, Journal of Technology in Teacher Education. *Journal of Technology in Teacher Education, 5*(2/3), 105.

Paprzycki, M., & Vidakovic, D. (1994). Prospective teachers' attitudes toward computers. In D. Willis, B. Robin, & J. Willis (Eds.), *Technology and teacher education annual--1994* (pp. 74-76). Charlottesville, VA: Association for the Advancement of Computing in Education.

Pope, C., & Golub, J. (2000). Preparing tomorrow's English language arts teachers today: Principles and practices for infusing technology. *Contemporary Issues in Technology and Teacher Education*, 1(1), 89-97.

Royer, R. (2002). Teaching and learning with technology: A master's program design. *Unpublished doctoral dissertation*, University of Delaware, Delaware

Scheffler, F. L. & Logan, J. P. (1999). Computer Technology in Schools: What teachers should know and be able to do. *Journal of Research on Computing in Education, 31*(3).

Soetaert, R., & Bonamie, B. (1999). Reconstructing the teaching of language: A view informed by the problems of traditional literacy in a digital age. *Journal of Information Technology for Teacher Education, 8*(2), 123-147.

Soloman, G. (1992). The computer as electronic doorway: Technology and the promise of empowerment. *Phi Delta Kappan, 74,* 327-329.

Simonson, M., & Thompson, A. (1994). *Educational computing applications.* New York: Macmillan College Publishing.

State Board of Education / Department of Public Instruction (n.d.) *NC Technology Competencies for Educators*, Retrieved November 17, 2003, from http://www.ncpublicschools.org/tap/techcomp.htm

State Board of Educator Certification (2002). *Technology Applications Standards for all Beginning Teachers,* Retrieved November 17, 2003, from http://www.sbec.state.tx.us/SBECOnline/standtest/standards/techapps_allbegtch.pdf

State of Queensland (Department of Education). (1999). *Minimum Standards for Teachers - Learning Technology,* Retrieved November 17, 2003, from http://education.qld.gov.au/itt/learning/docs/min-standards.pdf

Tabachnick, B. G. & Fidell, L. S. (1996). *Using Multivariate Statistics, Third Edition.* California State University, Northridge: Harper Collins College Publisher.

Thomas, L. & International Society for Technology in Education. (2000). *ISTE NETS performance profiles for preparing tomorrow's teachers to use technology* (chap. 3). Retrieved April 10, 2000, from http://cnets.iste.org/TeacherStandards.html

Watson, G. (1997) Preservice Teachers' Views on their Information Technolog Education*,* *Journal of Information Technology for Teacher Education*, 6(3)

Wetzel, R., Zambo, R. & Arbaugh, N. (1996). Innovations in Integrating Technology into Student Teaching Experiences. *Journal of Research on Technology in Education, 29*(2), 196-214.

White, C. (1996). Merging technology and constructivism in teacher education. *Teacher Education and Practice, 12*(1), 62-70.

Wiley, S. D., & Chrispeels, J. (1997, March). *Elements of organizational support that affect implementation of teaching and learning with educational technologies.* Paper presented at annual meeting of the American Research Association, Chicago.

Willis, J., & Mehlinger, H. (1994). *Information technology and teacher education. Handbook on research in teacher education.* New York:: Macmillan.

Willis, J. (2001). Foundational assumptions for informational technology and teacher education. *Contemporary Issues in Technology and Teacher Education*, Vol. 1, Issue 3

Yildirim, S. (2000). COMPUTER literacy -- California, Southern; TEACHERS -- Training of -- California, Southern; EDUCATIONAL technology -- California, Southern; SCHOOL improvement programs -- California, Southern. [Electronic Version] *Journal of Research on Computing in Education, 32*(4), 479.

Yildirim, S. I. (1997). Effects of an Educational Computing Course on Pre-service and In-service Teachers' Attitudes toward Computers. *Unpublished doctoral dissertation,* University of Southern California.

APPENDIX A

Educational Technology Standards and Performance Indicators for all Teachers

Building on the NETS for Students, the ISTE NETS for Teachers (NETS•T), which focus on preservice teacher education, define the fundamental concepts, knowledge, skills, and attitudes for applying technology in educational settings. All candidates seeking certification or endorsements in teacher preparation should meet these educational technology standards. It is the responsibility of faculty across the university and at cooperating schools to provide opportunities for teacher candidates to meet these standards.

The six standards areas with performance indicators listed below are designed to be general enough to be customized to fit state, university, or district guidelines and yet specific enough to define the scope of the topic. Performance indicators for each standard provide specific outcomes to be measured when developing a set of assessment tools. The standards and the performance indicators also provide guidelines for teachers currently in the classroom .

I. TECHNOLOGY OPERATIONS AND CONCEPTS

Teachers demonstrate a sound understanding of technology operations and concepts. Teachers:

A. demonstrate introductory knowledge, skills, and understanding of concepts related to technology (as described in the ISTE National Education Technology Standards for Students)

B. demonstrate continual growth in technology knowledge and skills to stay abreast of current and emerging technologies.

II. PLANNING AND DESIGNING LEARNING ENVIRONMENTS AND EXPERIENCES.

Teachers plan and design effective learning environments and experiences supported by technology. Teachers:

A. design developmentally appropriate learning opportunities that apply technology-enhanced instructional strategies to support the diverse needs of learners.

B. apply current research on teaching and learning with technology when planning learning environments and experiences.

C. identify and locate technology resources and evaluate them for accuracy and suitability.

D. plan for the management of technology resources within the context of learning activities.

E. plan strategies to manage student learning in a technology-enhanced environment.

III. TEACHING, LEARNING, AND THE CURRICULUM.

Teachers implement curriculum plans, that include methods and strategies for applying technology to maximize student learning. Teachers:

A. facilitate technology-enhanced experiences that address content standards and student technology standards.

B. use technology to support learner-centered strategies that address the diverse needs of students.

C. apply technology to develop students' higher order skills and creativity.

D. manage student learning activities in a technology-enhanced environment.

IV. ASSESSMENT AND EVALUATION.

Teachers apply technology to facilitate a variety of effective assessment and evaluation strategies. Teachers:

A. apply technology in assessing student learning of subject matter using a variety of assessment techniques.

B. use technology resources to collect and analyze data, interpret results, and communicate findings to improve instructional practice and maximize student learning.

C. apply multiple methods of evaluation to determine students' appropriate use of technology resources for learning,communication,and productivity.

V. PRODUCTIVITY AND PROFESSIONAL PRACTICE.

Teachers use technology to enhance their productivity and professional practice. Teachers:

A. use technology resources to engage in ongoing professional development and lifelong learning.

B. continually evaluate and reflect on professional practice to make informed decisions regarding the use of technology in support of student learning.

C. apply technology to increase productivity.

D. use technology to communicate and collaborate with peers, parents, and the larger community in order to nurture student learning.

VI. SOCIAL, ETHICAL, LEGAL, AND HUMAN ISSUES.

Teachers understand the social,ethical,legal,and human issues surrounding the use of technology in PK-12 schools and apply those principles in practice. Teachers:

A. model and teach legal and ethical practice related to technology use.

B. apply technology resources to enable and empower learners with diverse backgrounds, characteristics, and abilities.

C. identify and use technology resources that affirm diversity

D. promote safe and healthy use of technology resources.

E. facilitate equitable access to technology resources for all students.

APPENDIX B

Survey of Educational Technology Standards for Teachers

This survey is developed to reveal how Foreign Language Education students evaluate themselves against NETS (National Educational Technology Standards) for teachers.

Instructions:

- While you are filling the survey, **assume that you are a teacher in a public primary/high school, or private primary/high school.**
- Please read **all** the statements, and mark the most appropriate option that fits you.

Important Note:

- The researcher is a research assistant in FEDU, and a master student in CEIT department.
- This survey is prepared based on NETS for teachers, and will be used in Master Thesis.
- Your responses will be kept confidential.

Thanks for your honest contribution.

Name :. . . . .
Class :. . . . .
Gender : ....

	Please rate, how you perceive your technology knowledge/skills going from poor to excellent.	**Poor**	**Below Average**	**Average**	**Good**	**Excellent**
1	I have basic **knowledge** of concepts related to technology (such as CPU, hard disk, RAM, computer-mediated communication, web-based learning, animation, etc.)					
2	I can successfully **install** a variety of software packages related to foreign language teaching and other basic programs (such as Windows Media Player, Better Accent -a pronunciation development program-, and an Antivirus program when I need to).					
3	I can successfully **use** a variety of software packages related to foreign language teaching and use basic programs (such as Windows Media Player, Better Accent (a pronunciation development program), and an Antivirus program when I need to).					
4	I can **use** imaging devices such as scanners, digital cameras, and/or video cameras with computer systems and software.					
5	I can **use** appropriate terminology related to computers and technology in written and oral communications.					
6	I continually develop my technology related **knowledge** to keep up to date with current and emerging technologies.					
7	I continually develop my technology related **skills** to keep up to date with current and emerging technologies.					
8	I can design various learning activities that integrate technology into instruction in order to meet **diverse needs of students** (i.e. visual, audio, etc.).					
9	I can design various learning activities that integrate technology into instruction in accordance with **students' developmental level** (such as cognitive, physical, emotional) (e.g. bright colors and single simple images for younger children).					
10	I can apply current research on teaching and learning with technology when planning **learning environments** (e.g. for a power point presentation: alignment of the objects, background-foreground contrast, proximity of the items, etc.).					
11	I can apply current research on teaching and learning with technology when planning **learning experiences** (e.g. the results of the research show that, we remember 10 % of what we hear, 20% of what we see, 50 % of what we hear and see, etc.).					
12	I can **identify and locate** computer/technology resources available in schools or other locations to use in my class (e.g. application tools, educational software and associated documentation, video camera, video, digital images, etc.).					

	Please rate, how you perceive your technology knowledge/skills going from poor to excellent.	Poor	Below Average	Average	Good	Excellent
13	I can evaluate computer/technology resources for their **accuracy** (e.g. evaluate correctness of the web resources- in terms of content, source, etc.).					
14	I can evaluate computer/technology resources for their suitability for the instructional/learning **tasks.**					
15	I can evaluate computer/technology resources for their suitability for students' **needs and developmental levels** (such as cognitive, physical, emotional).					
16	I make plans beforehand to be able to manage the use of technology resources within the context of **learning activities** (e.g. previewing the material/resources, prepare them before the class, prepare the learning environment for the suitability, etc.).					
17	I make plans beforehand to be able to manage student learning in a technology enhanced **environment** (e.g. analyzing learners' background knowledge and skills related to the technology, specify benefits and rationale for the learners, deciding on how to prepare learners for the lesson, etc.).					
18	I can facilitate technology-enriched learning activities that are in line with foreign language teaching **content** (i.e. the curriculum that you should cover).					
19	I can facilitate technology-enhanced learning experiences to increase students' **knowledge of technology** (e.g. to ask the students to bring detailed information about a museum by searching the Internet, work of art, a historical document, including pictures, movies from the museum, a tape of an interview with the museum manager, etc.).					
20	I can use technology to support **learner-centered strategies** (such as individualized assignments) to meet the **diverse needs of students** (e.g. have students prepare technology based portfolio like combination of audio type, printed material, power point presentation, list of online resources, etc.).					
21	I can integrate technology to develop students' **higher order skills** (such as analyzing, synthesizing, critical thinking, etc.)(e.g. give an assignment that requires search from the Internet, evaluate the usability of the search results, criticize the information, use the gathered information for the assignment, etc.).					
22	I can integrate technology to develop students' **creativity** (e.g. give a passage and have students visualize it by using technology, provide a power point presentation and have students modify it, ask students to design a web page as a final project, etc.).					
23	I can **manage** students learning activities in a technology-enhanced environment (e.g. use the equipments and accessories in laboratories to show a video).					
24	I can integrate technology-based assessment strategies and tools into plans for assessing specific **learning activities** (e.g. assessing students' pronunciation using a computer program to record and compare it with the native speaker pronunciation).					
25	I can use technology resources (e.g. using Internet resources like online journals and web sites to gather data, using e-mail to consult an expert, etc.) to collect data **to improve my instructional practice.**					
26	I can use technology resources (e.g. using Internet resources like online journals and web sites to gather data, using foreign language teaching related listserv for - e mail group - professional development) to collect data in order **to maximize student learning.**					
27	I can use technology resources to **interpret student-related data** (such as students' test results) to improve instructional practice and maximize student learning (e.g. design and manipulate databases -Access- or spreadsheets -Excel- and generate customized reports).					
28	I can use technology resources to communicate information to improve instructional practice and maximize student learning (e.g. sharing information through e-mail, preparing a power point presentation about the gathered information, preparing handouts about the related resources etc.)					

	Please rate, how you perceive your technology knowledge/skills going from poor to excellent	Poor	Below Average	Average	Good	Excellent
29	I can evaluate if students use appropriate technology resources for their **learning** (e.g. have students search about a subject in the Internet by using "search engines").					
30	I can evaluate if students use appropriate technology resources for **communication** (e.g. controlling if students have subscribed to a foreign language teaching related listserv - e mail group - and have become an active member of it, etc.).					
31	I can evaluate if students use appropriate technology to improve their **productivity** (e.g. have students prepare a presentation, handouts or diagram about a given subject; have students prepare a table about propositions and directions by using word processor or spreadsheet -Excel- application).					
32	I can use computer-based technologies including telecommunications to access information and enhance **my professional development and lifelong learning** (e.g. subscribe to special interest groups, follow online journals related to the foreign language teaching, join on-line programs, courses, workshops, etc.).					
33	I follow the developments in the field of "integration of technology in foreign language teaching" to improve **my professional practice.**					
34	I can use productivity tools (e.g. using word processor to produce handouts, using spreadsheet -Excel- for grading etc.) to increase **my productivity** in my profession.					
35	I can use computer-mediated communication (like e-mail, chat, forum, bulletin board) to communicate and collaborate with **colleagues** in order to nurture student learning.					
36	I can use technology to communicate and collaborate **with parents** in order to nurture student learning (like e-mail).					
37	I can use technology to communicate and collaborate with the **larger community** (e.g. the Ministry of Education, TESOL, INGED, British Council through e-mail, web resources, etc.) in order to nurture student learning.					
38	I can **act as a role model** on legal and ethical use of technology in teaching/learning environments (e.g. giving references to internet sources that I use for instructional purpose, not using specific resources without permission, etc.).					
39	I can **teach** my students legal and ethical issues in relation with use of technology (e.g. teach my students how to give references to internet sources that they use, to use specific resources with permission, etc.).					
40	I can apply technology resources in instruction/learning settings to support individual differences due to the **diverse backgrounds, characteristics and abilities** of students (e.g. use power point for visual, audio material for audio learners, using computer for autonomous -self- study).					
41	I can use a variety of technology-supported learning activities that **consider** students' cultural backgrounds ethnics, socio-economic status, etc.					
42	I can assist the students for **safe** use of technology resources (e.g. teach learners not to move a working computer suddenly as it may cause bad-sectors on the hard disk).					
43	I can assist the students for **healthy** use of technology resources (e.g. teach learners how to sit in front of a computer with the right body position).					
44	I can create technological environments where there is **an equal access** to technology resources for all students (e.g. files -lecture notes and examples- on my home page for download).					

If you think anything is left out, please write it down in the space provided.