# COMPETENCIES OF INSTRUCTIONAL TECHNOLOGISTS GRADUATED FROM COMPUTER EDUCATION AND INSTRUCTIONAL TECHNOLOGY DEPARTMENT AS REQUIRED BY INFORMATION TECHNOLOGY FIRMS

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**I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.**

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# ABSTRACT


**COMPETENCIES OF INSTRUCTIONAL TECHNOLOGISTS GRADUATED FROM COMPUTER EDUCATION AND INSTRUCTIONAL TECHNOLOGY DEPARTMENT AS REQUIRED BY INFORMATION TECHNOLOGY FIRMS**

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The purpose of the study was to investigate the current status and competencies of CEIT graduates working in IT firms from the employers' point of view. In addition, the cases were evaluated to see whether the graduates have gained competency in their undergraduate education or while working for the firms. In the end the main goal was to identify how well CEIT departments are preparing students for professional practice.

The participants of this study were thirteen employers of CEIT graduates working in IT firms in a technopolis. A mixed methods research approach including both quantitative and qualitative research methods was employed as the primary method in order to reach the purpose of this study. Within the scope of this mixed method study, firstly, the quantitative technique was employed in which the data were gathered through a questionnaire to examine the competencies of CEIT graduates. Then, the qualitative part of the study was

employed through a follow-up semi-structured interview to confirm and complement the quantitative findings.

According to the results of this study, CEIT graduates are average competent at pedagogical, technical and communcation issues. They are more competent within communication and teamwork, and least competent within technical issues according to the employers.

**Keywords**: Instructional technology, competency, instructional technology competencies, competencies of CEIT graduates working in IT firms, CEIT graduates working in IT firms

# ÖZ

## ÖĞRETİM TEKNOLOĞU OLARAK GÖREV YAPAN BİLGİSAYAR VE ÖĞRETİM TEKNOLOJİLERİ EĞİTİMİ BÖLÜMÜ MEZUNLARININ ÖĞRETİM TEKNOLOJİLERİ FİRMALARINCA GEREKSİNİM DUYULAN YETERLİKLERİ

Durmaz, Tuba
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Bu çalışmanın amacı, öğretim teknolojileri firmalarında çalışan BÖTE bölümü mezunlarının yeterlik durumlarını araştırmaktır. Diğer bir deyişle BÖTE mezunlarının firmaların gereksinim duyduğu özellikleri üniversite öğretimi sırasında ne derecede kazandıklarını, BÖTE bölümünün öğrencileri bilişim sektörüne ne kadar iyi hazırladığını saptamaktır.

Çalışmaya bir teknokentte yer alan ve BÖTE mezunu çalıştıran 13 firma yetkilisi katılmıştır. Çalışmada, çalışmanın amacına ulaşabilmek için nitel ve nicel yöntemleri içeren karma araştırma yöntemi kullanılmıştır. Karma araştırma yöntemi kapsamında ilk olarak verilerin anket aracılığıyla toplandığı nicel çalışma yöntemi uygulanmıştır. Daha sonra da nicel yöntemlerle elde edilen verileri desteklemek amacıyla görüşme sorularının yer aldığı nitel yönteme yer verilmiştir.

Çalışma bulgularından elde edilen sonuçlara göre, BÖTE mezunlarının pedagojik, teknik ve iletişim becerileri ve takım çalışmaları açısından orta derecede yeterli oldukları gözlenmiştir. Firma yetkililerinin gözlemlerine göre BÖTE mezunlarının en çok iletişim ve işbirliği becerileri açısından, en az teknik açıdan yeterli oldukları saptanmıştır.

**Anahtar Kelimeler:** Öğretim teknolojisi, yeterlik, öğretim teknolojileri yeterlikleri, öğretim teknologlarının yeterlikleri, bilişim sektöründe çalışan BÖTE mezunlarının yeterlikleri, bilişim sektöründe çalışan BÖTE mezunları

To my family and friends…

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# LIST OF ABBREVIATIONS

**%** : Percent sign

**AECT** : Association for Educational Communication and Technology

**CEIT** : Computer Education and Instructional Technology

**CAI** : Computer Assisted Instruction

**F** : Frequency

**HEC** : Higher Education Council (YÖK)

**IBSTPI** : International Board of Standards for Training and Performance Instruction

**ICT** : Information and Communication Technologies

**ID** : Instructional Design

**ISD** : Instructional Systems Development

**ISTE** : International Society for Technology in Education

**IT** : Information Technology

**K-12** : Kindergarden through the twelfth grade

**M** : Mean

**MoNE** : Ministry of National Education of Turkey

**NCATE** : National Commission on Accreditation of Teacher Education

**NETS** : National Educational Technology Standards

**SD** : Standard Deviation

# CHAPTER 1

# INTRODUCTION

This chapter presents the background of the study, purpose of the study, research questions, significance of the study, and finally definitions of the terms and the concepts used in the study.

## 1.1. Background of the Study

It is obvious that we live in an information era. Both the scope of information and technology rapidly evolve and spread. These developments and changes affect several aspects of our lives, our habits, as well as our teaching-learning methods (Seferoğlu, 2007). Moreover, due to the rapid increase of the technological developments in every field, the integration of technology into education is unavoidable (Çakır & Yıldırım, 2006). Integrating technology into education has been described with a limited scope as educational technology or instructional technology (Hızal, 1992).

Over the years, there have been many attempts to define the field of Instructional Technology. Not only has the definition changed but also the label of the field has varied such as audiovisual instruction, audiovisual communications, educational technology, instructional design, instructional design and technology (Reiser, 2002). This is because of the dynamism of the field – it has lots of components that affect the field such as media in education, psychology of instruction and systematic approaches to education (Seels, 1989; Seels and Richey, 1994). The most recent definiton of the field was put forth by the Association for Educational Communication and Technology (AECT) which stated that “educational technology is the study and ethical practice of facilitating learning and improving performance by creating,

using, and managing appropriate technological processes and resources" (Januszewski & Molenda, 2008, p. 1).

The field of Instructional Technology has come into prominence over the years both in Turkey and other countries. Educated manpower is one of the critical factors in order to obtain successful results in instructional technology applications (Hızal, 1983). Moreover, the indispensability of instructional technology in designing, developing, implementing and evaluating instructional materials has forced educators to search for new theories and look for new ways of practices. As a result departments of Computer Education and Instructional Technology (CEIT) were founded in 1998 (Seferoğlu, 2007).

CEIT departments' primary aim is to train prospective teachers who will teach computer courses in both public and private schools and to equip them with up-to-date knowledge and practical skills required for computer education. Moreover, these departments aim to prepare educators, scholars, and researchers and to advance the profession of Instructional Design (METU, 2011; HU, 2011). Most of the graduates have been appointed as computer teachers in K-12 schools while some of them have preferred to work as graduate assistants at universities, and some others have preferred to work in IT firms as instructional technologists who have different tasks such as web designing, developing of sofwares, and programming, etc. (HU, 2011).

In every profession, there are common, recognized set of duties, responsibilities and competencies (Rasmussen, 2002). The competency is defined as "a knowledge, skill, or attitude that enables one to effectively perform the activities of a given occupation or function to the standards expected in employment" (Richey et al., 2001, p. 31). Focusing on competencies, the organization will become more competent and successful (Kratvetz, 1999). So, it is meaningful to explore the professionals' competencies. In their undergraduate education CEIT students take several courses regarding the foundations of instructional technology, instructional

design, programming, developing educational materials, etc (see Appendix C). As a result of this, some of the CEIT graduates work as qualified employees in IT sector where tasks such as developing web-based environments, designing various kind of educational materials, and implementing distance learning methods are highly needed (Seferoğlu, 2007). The main focus of this study will be to identify the competencies of CEIT graduates working in IT firms, and to explore in which positions they are competent, in which they are not. Moreover, the probable reasons of their incompetencies will be discussed.

### 1.3. Purpose of the Study

The purpose of the study is to investigate the current status and competencies of CEIT graduates working in IT firms in the employers' point of view. In other words, the purpose is to explore whether the graduates have gained competencies in their undergraduate education or while working in the firms. In the end it is aimed to identify how well CEIT departments are preparing students for professional practice.

### 1.4. Research Questions

The research questions that have guided this study are:

1. In which positions are CEIT graduates employed in ICT firms?
2. In which field/s are CEIT graduates more competent according to their employers?
3. How competent are the CEIT graduates working in ICT firms,
   3.1. in pedagogical domain?
   3.2. in technical domain?
   3.3. in terms of communication skills and teamwork?
4. Which competencies are important according to employers of CEIT graduates?

## 1.5. Significance of the Study

There are several studies in the literature about identifying competencies of instructional technologists (Tennyson, 2001; Şumuer, Kurşun & Çağıltay, 2006; Dooley et al., 2007, as cited in Schwier & Wilson, 2010; Seels & Glasgow, 1991; Schwier & Wilson, 2010; Liu et al., 2002; İzmirli & Kurt, 2009). In these studies, mostly, the reserchers have determined and categorized competencies for instructional technologists. Studies conducted in Turkey about CEIT graduates include the graduates' competencies as teacher, their future concerns during their undergraduate education and after they graduate, the problems they face after graduation (Altun & Ateş, 2008; Çakır & Yıldırım, 2006; Berkant & Tuncer, 2011; Kabakçı & Odabaşı, 2007; Seferoğlu; 2007).

As a result, there are no studeies about CEIT graduates working in private sector. Therefore, there is a need for guiding research about their current status and competencies in firms. This study seeks the expectations of the employers for CEIT graduates, and provides detailed information and recommendations about the situation of the graduates working in IT firms.

## 1.6. Definition of Terms

### Competency

Competency is defined as knowledge, skill, or attitude that enables one to effectively perform the activities of a given occupation or function to the standards expected in employment (Richey et al., 2001, p. 31).

### Educational Technology

Educational technology is defined as "the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources" (AECT, 2004, p. 3).

## Instructional Technology

The term “instructional technology” has been interchangeably used with other terms such as instructional design, instructional design and technology, but mostly with “educational technology”. Although instructional technology and educational technology has been used interchangeably, educational technology was accepted as a broader term than instructional technology. Instructional technology is defined as “the theory and practice of design, development, utilization, management and evaluation of processes and resources for learning” (Seels & Richey, 1994, p. 1).

## Instructional Technologist

The term instructional technologist, like instructional technology, has been interchangeably used with educational technologist, instructional designer, etc. It refers to “a person who is employing the instructional development process to solve learning and performance problems and needs in a technology-based learning environment” (Tennyson, 2001, p. 356).

## Information Technology

Information Technology is defined as “the study, design, creation, utilization, support, and management of computer-based information systems, especially software applications and computer hardware” (Gharegozi, Faraji & Heydari, 2011, p. 51).

# CHAPTER 2

# REVIEW OF LITERATURE

This part of the study presents related literature in order to provide background information for this study.

## 2.1. Instructional Technology

The scope of the field of Instructional Technology has changed for years. In some publications the field is referred to as Educational Technology; however I will refer to it as Instructional Technology.

### 2.1.1. Confusions about Defining the Field

For years, it has been difficult to define the field of Instructional Technology. In parallel with this, graduates and students of Instructional Tehcnology programs have difficulty in explaining their profession to their parents, relatives or friends. Statement of Reiser and Dempsey (2002) is a good example to express this situation:

> Many of us who have been in this field for a while have had the experience of facing our parents and trying to explain our profession to them. Long explanations, short explanations – the result is always the same. Our parents go cross-eyed and mumble something like, 'That's nice, dear.' (p. 1).

Why Instructional Technology programs are still preserving its uncertainty in regard to its studying area is because of its dynamism. In approximately eighty years-time the definition has changed several times, therefore, it has brought about some confusion (Gentry, 1995). During this period, the changes have not only been seen in definition, but the label of the field has also varied. As Reiser and Dempsey (2002) stated, many professionals have difficulties even in what

to call it –instructional technology, educational technology, instructional design, instructional systems design, and instructional development.

### 2.1.2 Definitions of Instructional Technology

Before giving the definition of Instructional Technology, it is important to define the term technology in order to understand the former clearly. Gentry (1995) mentioned definitions of technology by different authors one of which is as follows:

> Paul Saettler, a well-known historian of instructional technology, states, "The word technology does not necessarily imply the use of machines, as many seem to think, but refers to 'any practical art using scientific knowledge.' This practical art is termed by the French sociologist JacquesEllul, as 'technique.' He believes that 'it is the machine which is now entirely dependent upon technique and the machine represent only a small part of technique. Not only the machine is the result of a certain technique, but also its instructional applications are made possible by technique. Consequently, the relation of behavioral science to instructional technology, parallels that the physical sciences to engineering technology, or the biological sciences to medical technology' " (Saettler 1968, p. 5-6, as cited in Gentry, 1995, p. 2).

Gentry (1995) both summarized and broadened this definition by proposing a new one: "The systemic and systematic application of behavior and physical sciences concepts and other knowledge to the solution of problems." (p. 7). He explained the term *systemic application* according to the notion of the system that all things have an impact upon and are affected by other things in their environment. Considering interactive issues embedded in education, we can bind this issue to education. With *systematic application* he meant that "many significant variables in a complex system can easily be passed over" (Gentry, 1995, p. 7). *Application* refers to "the translation and implementation ofscientific and other knowledge into a system of strategies and techniques designed to solve a problem" (Gentry, 1995, p. 7).

Instructional technology has lots of definitions according to the developments and changes in different areas that affect the field such as the media in education, psychology of instruction and systematic approaches to education (Seels, 1989; Seels & Richey, 1994). The early definitions were based on instructional media which meant the physical mediums used for instruction (Reiser & Dempsey, 2002). Through the 1920s, with the visual instructional movement, definitions were focused on the use of visual aids. Between the late 1920s and 1940s, after the use of sound media increased, the movement evolved from visual instruction to audiovisual instruction, and then in the 1950s, interest in media continued with the growth of television.

In the 1960s, the definition shifted from focusing on the media to being a process. In 1963, the first definition was produced by a commission established by the Department of Audiovisual Instruction which is now known as the Association for Educational Communications and Technology (AECT):

> Audiovisual communication is that branch of educational theory and practice primarily concerned with the design and use of messages which control the learning process. It undertakes: (a) the study of the unique and relative strengths and weaknesses of both pictorial and nonrepresentational messages which may be employed in the learning process for any purposes; and (b) the structuring and systematizing of messages by men and instruments in an educational environment. These undertakings include the planning, production, selection, management, and utilization of both components and entire instructional systems. Its practical goal is the efficient utilization of every method and medium of communication which can contribute to the development of a learner's full potential (Ely, 1963, p. 18-19, as cited in Seels & Richey, 1994, p. 15-16).

As seen, instead of instructional media, the definition focused on the design and the use of messages, and a series of steps that individuals should follow which included planning, production, selection, utilization, and management (Reiser & Dempsey, 2002).

In 1970, the Commission on instructional technology, which was established and funded by the U.S. government to examine the potential benefits and problems associated with increased use of instructional technology in schools, produced two definitions:

> In its more familiar sense, it [instructional technology] means the media born of the communications revolution which can be used for instructional purposes alongside the teacher, text- book, and blackboard . . . The pieces that make up instructional technology [include]: television, films, overhead projectors, computers, and other items of "hardware" and "software." (Commission on Instructional Technology, 1970, p. 21, as cited in Reiser & Dempsey, 2002, p. 8)

> It is the systematic way of designing, carrying out, and evaluating the whole process of learning and teaching in terms of specific objectives, based on research on human learning and communication, and employing a combination of human and nonhuman resources to bring about more effective instruction (Commission on Instructional Technology, 1970, p. 21, as cited in Reiser & Dempsey, 2002, p. 8).

While the former focused on the media like early definitions of the field, the latter focused on the process. According to Seels and Richey (1994), the idea that instructional technology must include specific objectives was probably influenced by the ideas of behaviorist leaders, B. F. Skinner and Robert Mager. In addition, Reiser and Dempsey (2002) emphasized that this definition includes the systematic instructional design procedures that were beginning to be discussed in the professional literature of the field (e.g., Finn, 1960; Gagne, 1965; Hoban, 1977; Lumsdaine, 1964; Scriven, 1967).

In 1977, the AECT adopted a new, lengthy definition (sixteen pages), the first sentence of which was thought as an abbreviated version, given below:

> 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 human learning. (AECT, 1977, p. 1)

This definition put more emphasis on practitioner roles (Reiser & Dempsey, 2002). Like the second 1970 definition, it includes the steps of systematic instructional design process (Seels and Richey, 1994).

From 1977 to the 1990s, the field was influenced by both technological and theoretical developments. While the field was under the effect of behavioral learning theory, the practitioners started to be influenced by the cognitive and constructivist learning theories. With technological developments such as microcomputers, interactive video and the Internet, interest in distance learning began to increase. Besides, new instructional strategies such as collaborative learning came into prominence (Reiser & Dempsey, 2002). Consequently, in 1994, a new definition was published:

> Instructional Technology is the theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning (Seels & Richey, 1994, p. 1).

According to the definition, five basic domains of instructional technology contribute to the theory and practice which is basis for the profession. The domains are independent but related (Seels & Richey, 1994).

The most recent definition put forth by AECT is as follows:

> Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources (Januszewski & Molenda, 2008, p. 1).

This definition, like the 1994 definition, focuses on theory and practice; however, whereas the term “theory” was used in the previous one, “study” was used here. It puts importance on the use of theories and models, and importance of resources as well. Besides, though it seems not to include the domains of the field (design, development, utilization, management, and evaluation), they are meant by the terms “creating, using, and managing”. Looking at these new terms, it can be said that the field was influenced by the systems approach (Richey, Silber, & Ely, 2008).

### 2.1.3. The History of Instructional Technology

Depending on developments and changes in the field of Instructional Technolog, as stated above, the definitions as well as labels varied. In early years of the field, the term instructional media which defined as the physical media via which instruction is presented to learners was used instead of instructional technology (Reiser & Gagne, 1983). According to this, every type of physical means that provides instruction such as textbook or instructor was classified as instructional media (Reiser, 2002).

At the first decade of the twentieth century, school museums which were referred to as administrative units for visual instruction by Seattler (1968) emerged. The use of the media in the school was called “visual instruction” or “visual education” movement. In that decade, between 1914 and 1923, the visual instruction expanded (Reiser, 2002). In the following decade, sound technologies such as radio broadcasting, sound recordings, and sound motion pictures came into prominence and the expanding visual instruction movement became known as the audiovisual instruction movement (Finn, 1972; McCluskey, 1981, as cited in Reiser, 2002). The Great Depression which began in 1929 did not affect the development of audiovisual instruction movement as frightened; rather, it continued to evolve (Reiser, 2002).

In the 1930s, radio gained popularity because many who advocated audiovisual instructional movement thought that this media would revolutionize education (Reiser, 2002). However, in the following twenty years it started to lose its popularity due to its ineffectiveness on instructional purposes (Cuban, 1986, as cited in Reiser, 2002).

With World War II, audiovisual instruction movement slowed in schools, instead, it emerged in the military services and industry. Training films were shown to the US military personnel. There were also training films for civilians in the US about working in industry (Reiser, 2002). This was important because it drew more attention than any traditional education and provided time and cost efficiency (Saettler, 1990, as cited in Reiser, 2002). After the war, because of their success in training, the interest in audiovisual devices increased in the schools (Finn, 1972; Olsen & Bass, 1982, as cited in Reiser, 2002).

In its early years, the leaders in audiovisual instruction movement focused on the effect of the medium, however, from the beginning of the 1950s, they were interested in communication theories or models which emphasized communication process (Reiser, 2002). In the same years, television started to be used as an instructional device. Although it drew too much attention and authorities thought that it would have great effect on learning, it did not meet the expectations especially because of the quality of the the programs that were produced (Reiser, 2002).

The next technological innovation in which the educators became interested was computers. The use of computers for educational purposes traced back to the 1950s when IBM researchers developed the first computer-assisted instruction (CAI) program to use in public schools. In the 1960s and 1970s PLATO and TICCIT also developed CAI systems. With the 1970s the field started to be called as educational technology and instructional technology. In the 1980s, microcomputers started to be used for instructional purposes. After

the use of the Internet, especially distance learning became important and widespread. The Internet also provided new job opportunities for instructional technologists (Rasmussen, 2002).

### 2.1.4. The History of Instructional Technology in Turkey

In Turkey, instructional technology studies traced back to the establishment of the Republic of Turkey. Ministry of National Education of Turkey (MoNE) established a school museum in which instructional materials were exhibited (Akkoyunlu & İmer, 1998). In the 1930s, different tools such as maps, projectors and laboratory equipment were provided in order to enhance the quality of education (Akkoyunlu & İmer, 1998; Akkoyunlu, 2002). In the 1940s, mostly printed instructional materials were used in school while between 1950 and 1970 audio and video cassettes and overhead projectors began to be used. During the 1970s, new instructional materials were provided for schools and introduced to teachers. Moreover, graduate programs aiming to train professionals in the field of Instructional Technology started to be offered by some big universities (Akkoyunlu & Orhan, 2001). Though some of these traditional technologies are still in use to prepare students, according to educational policy makers in Turkey schools must give students the knowledge and the skills they will need in the future. Consequently, computers have gained more importance than any other means of instructional technology (Akkoyunlu & Orhan, 2001).

In the 1985-86 school year, a pilot study was started including purchasing microcomputers for secondary schools for computer education, and in the following years, secondary and vocational schools were provided with more computers. As a result, it was found that computers should be used as an instructional media for more than just educating students about computers. Therefore, the Turkish Educational System soon started to make use of computers with CAI (Akkoyunlu & Orhan, 2001).

In 1989, in accordance with a project supported by World Bank, Ministry of Education invited several computer companies to work together in the educational sector in order to integrate computers into education. Varieties of courseware were developed by these companies. This project not only included integrating computers into schools, but it also included training teachers (Akkoyunlu & Orhan, 2001).

### 2.1.5. Computer Education and Instructional Technology Departments

In parallel with the common usage of information and communication technologies in all area, the need of trained manpower emerged to perform the use of information and communication technologies for education and training (Kabakçı & Odabaşı, 2007). In order to meet this need, in-service training programs called "Formator Teacher" training was begun in 1985. This new application was based on "train the trainer" approach and aimed to train in-service teachers as computer teachers. Several universities of Turkey undertook the training; however, the number of the formator teachers did not meet the need. Thus, computer-teaching departments were opened in educational faculties of several universities (Akkoyunlu & Orhan, 2001).

Within the context of reconstruction of educaitonal faculties, new departments were established by Higher Education Council (HEC) (YÖK, 1998). One of these departments was the department of Computer Education and Instructional Technology (CEIT) which enrolled its students in the 1998-1999 academic year and gave its first graduates in the 2001-2002 academic year (Akkoyunlu, 2002).

CEIT departments' primary aim is to train prospective teachers who will teach computer courses in both public and private schools and to equip them with up-to-date knowledge and practical skills required for computer education. Moreover, these departments aim to prepare educators, scholars, and researchers and to advance the profession of Instructional Design by combining the science and art of teaching and learning, the repertoire of research methods

rooted in various paradigms, the effective uses of technology and the analysis, design, development, implementation and evaluation of instructional practices (METU, 2011; HU, 2011). Most of the graduates have been appointed as computer teachers in K-12 schools while some of them have preferred to work as graduate assistants at universities, and some others preferred to work in IT firms as instructional technologists who have different tasks such as web designing, developing of sofwares, and programming, etc (HU, 2011). Nowadays, there are currently 52 CEIT departments in the education faculties of universities in Turkey (ÖSYM, 2011). The list of CEIT departments can be seen in the Appendix D.

Examining the curriculum of CEIT departments prepared by HEC, it has been concluded that it provides students adequate training sufficient for satisfying the requirements of primary education curriculum. Due to the deficiencies in it and widespread dissatisfaction, HEC modified CEIT curriculum in 2007. After the changes, some courses in the old curriculum were replaced by new ones and the number of elective courses was increased (Seferoğlu, 2007).

Currently, the curriculum of CEIT departments consists of three domains which are the subject matter domain, the pedagogical domain, and the general culture domain. The subject matter domain includes 83 credit hours, the pedagogical domain includes 35 credit hours, and the general culture domain includes 24 credit hours. The curriculum of CEIT departments can be seen in Appendix C.

### 2.2. Competencies for Instructional Technology

Professions have a common, recognized set of duties, responsibilities, and skills that make them profession (Rasmussen, 2002). There are some characteristic elements that form professions such as an intellectual technique, an application of that technique to the practical affairs, a period of long training, body of theory and research, a series of standards and enforced ethics, and association and communication among members of the profession (Finn

1953, as cited in Silber, 1984). According to these characteristics instructional technology can be thought as a profession.

One of the most important components of a profession can be considered as a common, standard set of competencies (Rasmussen, 2002). Competency has several definitions, some of which are related to work tasks, outputs of work, and the beneficial results of the outputs, while others refer to the knowledge, skills, and attitudes of people doing the work (McLagan, 1997).

According to Ewens (1977, as cited in Byun, 2000) “the term competence is used in the following ways in English and American dictionaries: adequate supply or sufficiency; a capacity to deal adequately with a subject; a quality or state of being functionally adequate or of having sufficient knowledge, judgment, skill or strength. Competency is seen as "adequacy" rather than "excellence". When we say Jack is competent in driving, it means that Jack can drive sufficiently. It does not imply that Jack is an excellent driver.” (p. 6). The International Board of Standards for Training and Performance Instruction (IBSTPI) defined competency as “a knowledge, skill, or attitude that enables one to effectively perform the activities of a given occupation or function to the standards expected in employment” (Richey et al., 2001, p. 31). In any profession, common competencies provide a common vocabulary among the individuals, a set of quality standards, and a way to measure products objectively (Silber, 1992, as cited in Rasmussen, 2002).

The process of developing educational materials and the roles of developers involved in the process have changed due to the rapid changes in the technology (Liu et al., 2002), and in the field of Instructional Technology as well. As a result of this, the definition and competencies of an instructional technologist have also changed (İzmirli & Kurt, 2009). Tennyson (2001) described the instructional technologist as “a person who is employing the instructional development process to solve learning and performance problems and needs in a technology based learning environment” (p. 356). Besides, in

another resource it is mentioned that “an instructional designer’s task is to plan the instruction so that the student can use cognitive strategies to learn the material actively” (West et al., 1991, as cited in Liu et al., 2002). As seen in definitions, as different terms have been used instead of the term ‘instructional technology’, there also have been several terms used instead of instructional technologist which are educational technologist (Alkan, 1997; Surry & Robinson, 2001, as cited in İzmirli & Kurt, 2009), instructional technologist and designer, instructional coach, technology trainer, technology consultant, technology advisor, technology learning coordinator, technology expert (Sugar, 2005; Surry and Robinson, 2001, as cited in İzmirli & Kurt, 2009), learning specialist, curriculum developer, or sometimes just project manager (Liu et al., 2002). In this study, the term ‘instructional tehcnologist’ was used in the remainder except the citations or quotations.

According to Tennyson (2001), competency of the instructional technology is an important variable in solving learning and performance problems in a technology-based environment, and in general, an instructional technologist should have knowledge and skills in three basic areas: educational foundations, instructional systems development (ISD) methodology, and the instructional development (ID) process experience. Here, the knowledge of educational foundations means core knowledge in learning philosophy, learning theory, and instructional theory. Tennyson (2001) thinks that an educational foundation is the most important variable in the development of quality learning environments, because it provides instructional technologists the ability of making valid decisions about the application of foundations to curricular and instructional design. Additionally, with the help of learning theory instructional technologists can write goals and objectives, analyze content select instructional strategies, employ the media, design the means for evaluating students, and determine costs. Tennyson’s second variable, competency in ISD methodology, refers to skill in applying principles of instructional development such as evaluation, design, production,

implementation, and maintenance methodologies. He emphasizes that although competency in ISD seems to be extensive, it is not the prior variable, rather, "it is the third competency attribute of ID process experience that moves the instructional technologist into the realm of the instructional technology expert" (Tennyson, 2001, p. 357). His third variable, ID process experience, refers to skillful and thoughtful performances and experiences in developing successful learning environments (Tennyson, 2001).

Şumuer, Kurşun and Çağıltay (2006) carried out a study analyzing the job announcements for instructional designers and technologists by using content analysis method in order to find out major competencies employers look for in instructional design and technology professionals. They analyzed the job announcements both in academic and corporate settings, then identified instructional technology competencies and grouped them under four headings: professional foundations, educational foundations, technical foundations, and instructional technology foundations. Regarding professional foundations, the researchers stated that instructional technologists should have necessary collaboration, communication and project management skills. In terms of educational foundations, they highlighted pedagogical knowledge, learning theories and principles, and online learning techniques. By technical foundations, they pointed out the experience in course management systems such as Moodle, Blackboard, the use of software (e.g. Microsoft Suite) and multimedia production tools (e.g. Adobe Flash) and knowledge about web programming, and with instructional technology foundations, the researchers emphasized that the academic and corporate settings look for individuals experienced in instructional technology and instructional design.

Dooley et al. (2007, as cited in Schwier & Wilson, 2010) identified seven categories of competencies for instructional designers: needs assessment, writing objectives, choosing content and method, choosing delivery strategies, assessment, roles of a development team, and best practices, specific to the Roadmap to Success Program.

Seels and Glasgow (1991) conducted a survey study for which they collected data via a questionnaire in order to get information about jobs and task requirements for instructional design professionals. They collected data from members of four professional associations' members whose job titles or organizations were related to ID tasks. In questionnaire they developed a list including nine competencies: establishing educational goals, doing task analysis, determining learner characteristics, writing objectives, selecting strategies for instruction, developing the media, evaluating instruction, managing ID projects, and promoting adoption of instructional programs. According to the results, the least critical task and the task done the least was developing the media. However, the most important tasks for school personnel, were evaluating, managing and diffusing, and for other settings (industry, health, etc.) the most important task was establishing goals.

Schwier and Wilson (2010) made a qualitative study to explore the unanticipated roles and skills that instructional designers identify in their practice of instructioal design (ID). In other words, the study was about the skills, competencies and roles that are not addressed in formal ID programs and discovered by instructional designers after they enter the field, and sometimes long after their formal education has been completed. The researchers emphasized that there may be neglected topics in instructional design programs that deserve attention. They categorized the roles of instructional designers under four titles: professional relationship roles, project roles, institutional roles, and teaching and learning roles. According to the responses of the participants it is stated that although professional relationships were at the heart of their work, they felt that they were not sufficiently prepared for the interpersonal aspects of the work in their graduate training. Moreover, they highlighted the importance of project management skills, and that they were not prepared enough in the way of formal training in their programs. Generally, they pointed out that "professional practitioners face a wide range of demands,

and these demands are often outside the boundaries of what we think of as 'instructional design'" (Schwier & Wilson, 2010, p. 145)

In their study Liu et al. (2005) aimed to learn the roles and responsibilities of instructional designers in developing technology-enhanced instrucitonal materials from the practitioners' point of view. One of their research questions explored which skills are important in order to be a good instructional designer. According to the results of the research, they described four competencies for instructional designers: communication, instructional design, problem-solving/ decision making, and knowledge of technology tools. In terms of communication they emphasized that a good instructional designer should have high communication skills in order to communicate with clients, subject matter experts, and other team members both verbally and in writing. Regarding instructional design, they pointed out that a good designer should know several instructional design models and strategies, and be able to choose the appropriate one. By problem-solving/decision making they meant that a good instructional designer should be able to find practical solutions when needed, and offer different alternatives. Finally, about knowledge of technology tools they stated that a good designer should basically know about necessary and important software tools used in the field and be able to easily adapt to the new tools.

İzmirli and Kurt (2009) classified the competencies of an instructional technologist under three categories: social, edicatioal and technological competencies. The first one, social competencies, includes the skills of cooperative working, communication with those both in institution and from other institutions, and planning. The second one, educational competencies includes the knowledge learning pychology for child education and adult education, instructional design, consulting skills, ability of integrating technology into where needed. The third one, technology competencies includes the basic knowledge about hardware, software and virtual environments such as blog and wiki**.**

The list of the competencies determined by the researchers is summarized in Table 2.1.

**Table 2.1.** The Summary of Competency Studies

| **Reserachers** | **Competencies** |
|---|---|
| Seels and Glasgow (1991) | - Educational goals<br>- Doing task analysis<br>- Determining determining learner characteristics<br>- Writing objectives<br>- Selecting strategies for instruction<br>- Developing media<br>- Evaluating instruction<br>- Managing ID projects<br>- Promoting adoption of instructional programs. |
| Tennyson (2001) | - Educational foundations<br>- ISD development<br>- ID process experience |
| Liu et al. (2005) | - Communication<br>- Instructional design<br>- Problem solving/ decision making<br>- Knowledge and technology tools |
| Şumuer, Kurşun and Çağıltay (2006) | - Professional foundations<br>- Educational foundations<br>- Technical foundations<br>- Instructional tehcnology foundations |
| Dooley et al.(2007) | - Needs assessment<br>- Writing objectives<br>- Choosing content and method<br>- Choosing delivery strategies<br>- Assessment<br>- Roles of a development team<br>- Best practices |

**Table 2.1. (Continued)**

| Reserachers | Competencies |
|---|---|
| İzmirli and Kurt (2009) | - Social competencies<br>- Educational competencies<br>- Technological competencies |
| Schwier and Wilson (2010) | - Professional relationships<br>- Project roles<br>- Institutional roles<br>- Teaching and learning roles |
| IBSTPI (2010) | - Professional foundations<br>- Planning and analysis<br>- Design and development<br>- Implementation and management |

## 2.3. Standards for Instructional Technology

Because the field has changeable nature, since the 1970s, various scholars, researchers, and organizations have described common competencies. In 1977, Association for Educational Communications and Technology (AECT) and National Society for Performance and Instruction (NSPI) formed descriptions of the field, and then the International Society for Perfomance Improvement (ISPI), which joined to form a Joint Certification Task Force (Seels & Richey, 1994), as well. Finally, International Board of Standards for Training, Performance, and Instruction (IBSTPI), a not-for-profit corporation that focused on improving performance via a variety of means such as research, development, and competency definition, was formed by this task force (IBSTPI, 1999, as cited in Rasmussen, 2002). These groups and task forces began to examine what kinds of knowledge, skills, and abilities individuals in the IDT field should have to provide the mission and aims of the field (Rasmussen, 2002).

### 2.3.1. AECT

In the early 1990s, AECT joined with the National Commission on Accreditation of Teacher Education (NCATE) to define a set of competencies (AECT/NCATE, 1999, as cited in Rasmussen, 2002). As Rasmussen (2002) mentioned, “NCATE accredits academic programs and includes as one of its standards a knowledge base of instructional technology. Together, the two groups worked to develop standards for two of NCATE's accreditation guidelines: Accreditation of Initial Programs in Educational Communications and Instructional Technologies and Accreditation of Advanced Programs in Educational Communications and Instructional Technologies. These competencies are organized around the areas of design, development, utilization, management, and evaluation, the five domains within the 1994 AECT instructional technology definition (AECT/NCATE, 1999). Each of the categories within the framework contain a series of performance objectives, within two levels (initial and advanced), too numerous to completely detail in this work” (Rasmussen, 2002, p. 381).

### 2.3.2. IBSTPI

IBSTPI is “a professional service organization to the instructional design, training, and performance improvement communities” (Richey, Fields & Foxon, 2001, p. 11). In 1986, IBSTPI proposed sixteen competencies which were commonly used in the profession of Instructional Technology. Then, in 1998, those sixteen competencies were increased to twenty-three, and further categorized into four general areas: professional foundations, planning and analysis, design and development, and implementation and management (Rasmussen, 2002). The list of IBSTPI instructional design competencies can be seen in Table E.1. (IBSTPI, 2010) (see Appendix E).

### 2.3.3. NETS

In 1979, International Society for Technology in Education (ISTE), a non-profit organization, was established in order to provide the improvement of

teaching and learning through the effective integration of technology in education. Though widely adopted and recognized in the USA, countries such as China, Costa Rica, Denmark, Ireland, Latin America, England and Japan also developed national and regional educational technology standards or adapted the current standards to their own situations (Kurt et al., 2008).

In 1993, ISTE developed National Educational Technology Standards (NETS), the standards for learning, teaching, and leading in the digital age. The family of NETS includes five levels which are NETS for Students (NETS-S), NETS for Teachers (NETS-T), NETS for Administrators (NETS-A), NETS for Coaches (NETS-C), and NETS for Computer Science Teachers (NETS-CSE). These components work together to transform education (ISTE, 2007).

**Table 2.2.** The NETS Family

| | |
|---|---|
| NETS-S | The standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world |
| NETS-T | The standards for evaluating the skills and knowledge educators need to teach, work, and learn in an increasingly connected global and digital society. |
| NETS-A | The standards for evaluating the skills and knowledge school administrators and leaders need to support digital age learning, implement technology, and transform the instruction landscape. |
| NETS-C | The skills and knowledge technology coaches need to support peers in becoming digital educators. |
| NETS-CSE | The skills and knowledge that computer science educators need to reach, inspire, and teach students in computing. |

(ISTE, 2007).

## 2.4. Summary

The field of Instructional Technology has been defined several times because of its dynamism throughout the years. Besides the definition, the label of the field has also varied such as audiovisual instruction, audiovisual communications, educational technology, instructional design, instructional design and technology (Reiser, 2002).

The field of Instructional Technology has gained importance over the years both in Turkey and other countries. The indispensability of instructional technology in designing, developing, implementing and evaluating instructional materials has forced educators to search for new theories and look for new ways of practices. As a result, departments of Computer Education and Instructional Technology (CEIT) were founded in Turkey in 1998 (Seferoğlu, 2007). Most of the CEIT graduates have been appointed as computer teachers in K-12 schools while some of them have preferred to work as graduate assistants at universities, and some others have preferred to work in IT firms as instructional technologists who have different tasks such as web designing, developing of sofwares, and programming, etc. (HU, 2011).

Every profession has common, recognized set of duties, responsibilities and competencies (Rasmussen, 2002). There are several studies about the competencies of instructional technologists in the literature (Tennyson, 2001; Şumuer, Kurşun & Çağıltay, 2006; Dooley et al., 2007, as cited in Schwier & Wilson, 2010; Seels & Glasgow, 1991; Schwier & Wilson, 2010; Liu et al., 2002; İzmirli & Kurt, 2009). In these studies, mostly, the reserchers have determined and categorized competencies for instructional technologists.

Studies conducted in Turkey about CEIT graduates include the graduates' competencies as teacher, their future concerns during their undergraduate education and after they graduate, the problems they face after graduation (Altun & Ateş, 2008; Çakır & Yıldırım, 2006; Berkant & Tuncer, 2011;

Kabakçı & Odabaşı, 2007; Seferoğlu; 2007). There are no studies about CEIT graduates working in private sector. Therefore, there is a need for guiding research about their current status and competencies in firms. This study seeks the expectations of the employers for CEIT graduates and provides detailed information and recommendations about the situation competencies of CEIT graduates working in IT firms.

# CHAPTER 3

# METHODOLOGY

This chapter presents detailed information about methodology of the study including the research questions, design of the study, participants of the study and sampling, data collection instruments and procedure, data analysis procedure, and limitations of the study.

## 3.1. Overall Design of the Study

This research study was designed to investigate the current status and competencies of CEIT graduates working from IT firms from the employers' point of view.

The research questions that have guided this study are:

1. In which positions are CEIT graduates employed in IT firms?
2. In which field/s are CEIT graduates more competent according to their employers?
3. How competent are the CEIT graduates working in IT firms,
   3.1. in pedagogical domain?
   3.2. in technical domain?
   3.3. in terms of communication skills and teamwork?
4. Which competencies are important according to employers of CEIT graduates?

In this study, mixed methods research approach was used in order to answer these research questions. More spesifically, mixed methods explanatory sequential design was employed in this study. Creswell and Plano Clark (2007) explain mixed methods design as follows:

> Mixed methods research is a research design with philosophical assumptions as well as methods of inquiry. As a methodology, it involves philosophical assumptions that guide the direction of the collection and analysis of data and the mixture of qualitative and quantitative approaches in many phases in the research process. As a method, it focuses on collecting, analyzing, and mixing both quantitative and qualitative data in a single study or series of studies (p. 5).

Additionally, Johnson and Onweugbuzie (2004) define it as "the class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study." (p. 17). They point out that owing to the mixed methods research, "words, pictures, and narrative can be used to add meaning to numbers, and numbers can be used to add precision to words, pictures, and narrative" (p. 21). In other words, "the qualitative data provide a deep understanding of survey responses, and statistical analysis can provide detailed assessment of patterns of responses" (Driscoll et al., 2007, p. 26). Likewise, according to Creswell and Plano Clark (2007), using quantitative and qualitative approaches in combination provides a better understanding and more comprehensive evidence than using either one alone. They also emphasize that mixed methods research encourages the use of multiple worldviews or paradigms, so the researcher is not confined to a single method or approach, and can answer a broader and more complete range of research questions.

Johnson and Onweugbuzie (2004) state that for more than a century there have been a debate between the advocates of quantitative and qualitative research paradigms about whether quantitative research is better and more useful or the other. The researchers underline that mixed research method is a bridge between quantitative and qualitative research methodologies that is complementary rather than competitive.

Creswell and Plano Clark (2007) mention several classifications of mixed methods design in the literature. They advance four types of mixed methods design one of which, the explanatory sequential design, was employed in this study (Figure 3.1). In the explanatory sequential design "qualitative data helps explain or build upon initial quantitative results" (Creswell, Plano Clark, et al., 2003, as cited in Creswell & Plano Clark, 2007, p. 71). Therefore, in the first phase of this two-phase mixed methods design, quantitative data are collected and analyzed. The second phase including subsequent collection and analysis of qualitative data follows the results of the first quantitative phase (Creswell & Plano Clark, 2007).

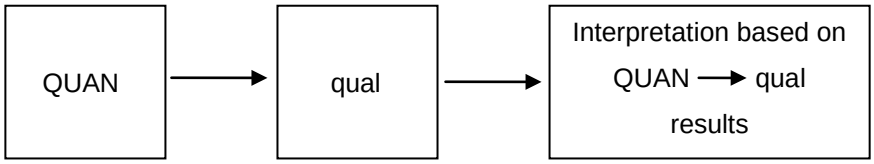



**Figure 3.1.** Explanatory Sequential Design (Creswell & Plano Clark, 2007)

In this study, initially, a quantitative method including the Competencies of CEIT Graduates Working in IT Firms Questionnaire was employed in order to examine the competencies of CEIT graduates working in IT firms. After the data of the questionnaire were collected and analyzed, follow-up semi-structured interview questions were prepared according to the findings of the questionnaire.

### 3.2. Participants and Sampling

Participants of this mixed methods research study were the employers of CEIT graduates working in IT firms in METU technopolis. In the technopolis, there are 157 firms 13 of which have CEIT graduate employees. In order to determine the number of the firms who employ CEIT graduates, the researcher contacted the firms via telephone. After the firms were determined, an e-mail

including detailed information about the study and the Competencies of CEIT Graduates Working in IT Firms Questionnaire was sent to each firm. All of these 13 firms participated in the quantitative part of the study, but seven of them accepted to participate in the qualitative part of the study. The participants of the present study have different activity of field as shown in Table 3.1.

**Table 3.1.** Field of Activity of Participants' Firms

| Field of Activity | Number of Participants |
|---|---|
| e-learning | 7 |
| ICT | 4 |
| Educational software | 2 |

In this study, since it was aimed to investigate the competencies of CEIT graduates working in IT firms from their employers' point of view, it was meaningful to search for firms which employ CEIT graduates. Therefore, purposive sampling method was used for both the quantitative and qualitative part of this study. Fraenkel and Wallen (2006) explain that "on occasion, based on previous knowledge of a population and the spesific purpose of the resarch, investigators use personal judgement to select a sample. Researchers assume they can use their knowledge of the population to judge whether or not a particular sample will be representative" (p. 100).

In the qualitative part of the study, although the researcher wanted to interview all the employers participating in the quantitative part of the study, seven of the firms accepted to be interviewed. However, the researcher could have interviewed with the pioneer firms representing IT in technopolis.

### 3.3. Instruments and Data Collection

In this mixed methods research study, both quantitative and qualitative measures were used in order to obtain comprehension results about the current status and competencies of CEIT graduates working in IT firms. Data were initially collected through a questionnaire, and then with a follow-up semi-structured interview in order to confirm and complement the quantitative findings.

#### 3.3.1 Competencies of CEIT Graduates Working in IT Firms Questionnaire

In the first part of the study, The Competencies of CEIT Graduates Working in IT Firms Questionnaire was used in order to collect data on the opinions of employers of CEIT graduates about their competencies. Though it mostly incuded the quantitative data collection sections, the questionnaire also included one open-ended question.

According to Johnson and Christensen (2004), the researchers use questionnaires "to obtain the information about the thoughts, feelings, attitudes, beliefs, values, perceptions, personality, and behavioral intentions of participants" (p. 197). They underline that by means of questionnaires many different characteristics can be measured.

The Competencies of CEIT Graduates Working in IT Firms Questionnaire was developed in light of the principles of questionnaire construction given in Table 3.2.

**Table 3.2.** Principles of Questionnaire Construction

| | |
|---|---|
| Principle 1 | Make sure the questionnaire items match your research objectives. |
| Principle 2 | Understand your research participants. |
| Principle 3 | Use natural and familiar language. |
| Principle 4 | Write items that are clear, precise, and relatively short. |
| Principle 5 | Do not use “leading” or “loaded” questions. |
| Principle 6 | Avoid double-barreled questions. |
| Principle 7 | Avoid double negatives. |
| Principle 8 | Determine wherher an open-ended or closed-ended question is needed. |
| Principle 9 | Use mutually exclusive and exhaustive response categories for closed-ended questions. |
| Principle 10 | Consider the different types of response categories available for closed-ended questionnaire items. |
| Principle 11 | Use multiple items to measure abstract contructs. |
| Principle 12 | Consider using multiple methods when measuring abstract constructs. |
| Principle 13 | Use caution if you reverse the wording in some of the items to prevent response sets in multi-item scales. |
| Principle 14 | Develop a questionnaire that is properly organised and easy for participant to use. |
| Principle 15 | Always pilot test your questionnaire. |

(Johnson & Christensen, 2004, p. 164)

The questionnaire consisted of two main sections (see Appendix A). Section 1 consisted of seven items including one dichotomous item, three multiple-choice items and three fill-in-the-blanks items. In this part, it was aimed to obtain demographic characteristics of participants’ firms such as the field of activity, the employees working in the firm, etc., information about the status of CEIT graduates working in IT firms, and about CEIT curriculum.

Section 2 consisted of three different parts including a total of 27 five-point Likert-type items about the competencies of CEIT graduates. The first part including seven five-point Likert-type items was designed to investigate the pedagogical competencies, the second part including eight five-point Likert-type items was designed to examine the technical competencies, and the third part including 12 five-point Likert-type items was designed to find out the CEIT graduates' communication and temawork skills. The items in this section were coded as Very Competent (5), Competent (4), Averagely Competent (3), Slightly Competent (2), and Not Competent (1).

The Competencies of CEIT Graduates Working in IT Firms Questionnaire was developed based on a review of related literature (İzmirli, Kurt, 2009; Liu et al., 2002), and curriculum of CEIT departments (YÖK, 2011) (Appendix D).

After the questionnaire was prepared, it was reviewed and examined by two experts in order to provide content validity. Based on the feedback and suggestions of these two experts, the explanation part of the questionnaire was shortened, and several items of the instrument were changed. Before the final version, the questionnaire was checked by a Turkish language expert for the clarity of the language. The Competencies of CEIT Graduates Working in IT Firms Questionnaire was distributed via e-mail to the participants.

In order to ensure the reliability of the questionnaire, Cronbach's alpha coefficient was calculated. Gliem and Gliem (2003) stated that "when using Likert-type scales it is imperative to calculate and report Cronbach's alpha coefficient for internal consistency reliability" (p. 88). The overall Cronbach alpha coefficient was calculated as 0.81 which is accepted as a good level of reliability (George & Mallery, 2003).

### 3.3.2. Semi-structured Interview

The development of interview questions began after the data of the Competencies of CEIT Graduates Working in IT Firms Questionnaire were

collected and analyzed. Semi-structured interview questions were prepared according to the findings of the questionnaire in order to confirm and complement its results. Berg (2004) stated that semi-structured interview "involves the implementation of a number of predetermined questions and special topics. These questions are typically asked of each interviewee in a systematic and consistent order, but the interviewers are allowed freedom to digress; that is, the interviewers are permitted to probe far beyond the answers to their prepared standardized questions" (p. 81). The researcher tried to contact all 13 firms in order to conduct qualitative part of this study, however, seven of the firms accepted to participate. Therefore, seven semi-structured interviews with seven employers were conducted in each one's firm. Due to the nature of the semi-structured interview, the researcher asked additional questions during the interview whenever needed. The interviews were recorded using an audio recorder and took about 15-20 minutes. After the interviews finished, each was transcribed.

### 3.3. Data Analysis

In this mixed methods research study, both quantitative and qualitative analysis techniques were employed in order to have a broader and deeper understanding of the issues under investigation. Initially demographic information was collected and reported in frequences and percentages. Then, mean scores and standard deviations were calculated for each item of the scale. The qualitative data gathered from the interview were first transcribed on Word Processor and then analyzed.

#### 3.3.1. Quantitative Data Analysis

The quantitative data were analyzed using descriptive methods such as percentiles, means, frequency distributions, and standard deviations. For the analysis of the data collected through questionnaire, Microsoft Excel was used.

### 3.3.2. Qualitative Data Analysis

The qualitative data of this study were collected through semi-structured interview questions using audio recorder. After each recording was transcribed, and categorized, the responses for each question were enumerated in order to find out frequencies. This was important to increase realibility and objectivity of the qualitative data (Yıldırım & Şimşek, 2000).

## 3.4. Assumptions and Limitations of the Study

### 3.4.1. Assumptions

The following assumptions are adopted:

- The participants answered all the questions in both questionnaire and interview honestly and accurately.
- The data were accurately collected, recorded and analyzed.
- Reliability and validity of all measures used in this study are accurate enough to allow accurate assumptions.

### 3.4.2. Limitations

The following limitations are relevant to the study:

- In this study, purposive sampling procedure was used; however, the purposive sampling procedure decreases the generalizability of findings. Thus, the results of this study are limited to the sample of 13 firms located in METU technopolis, therefore, it can be stated that the results of this study are limited with the participants, cannot be representative of all CEIT graduates working in IT firms, and cannot be generalized beyond this study.
- The pilot study was not conducted with participants and this may restrict the validity and the reliability of the study.

- Any positive or negative findings related to the status of CEIT graduates are in this context.
- The findings of the study are limited to the items which were included in the questionnaire and follow-up semi-structured interviews.
- Validity of this study is limited to the reliability of the instruments used to collect data and the honesty of the participants while responding the questions in these instruments as well.

# CHAPTER 4

# FINDINGS

This chapter includes the findings of the study regarding the research questions. Firstly, findings of descriptive analysis of quantitative data collected through “The Competencies of CEIT Graduates Working in IT Firms Questionnaire” are presented. Then, the qualitative data obtained through semi-structured interview questions are reported.

## 4.1. Quantitative Data Analysis

For the analysis of quantitive data, descriptive statistics such as percentiles, means, frequency distributions, and standard deviations were used. Quantitative data analysis was categorized under five headings.

### 4.1.1. Demographics of the Participants

The Competencies of CEIT Graduates Working in IT Firms Questionnaire included a short section about the demographics of the participants and participants’ firms. As mentioned before, there were 13 participants who are the employers of CEIT graduates.This means that 13 firms were investigated in order to gather data. As shown in the figure 4.1., there were totally 1330 employees in these firms, 95 of which graduated from the department of CEIT (7%) while 1235 of them graduated from other departments.

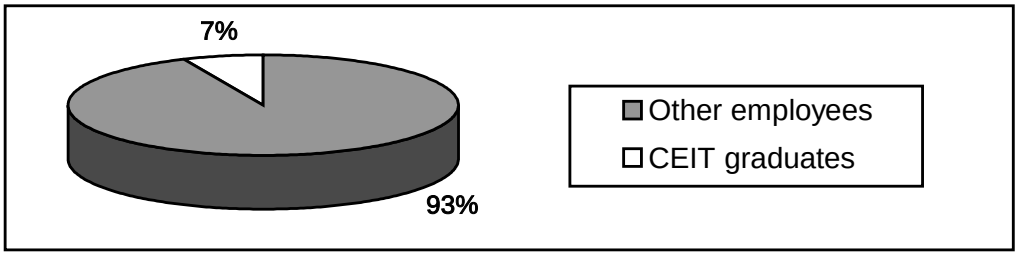



**Figure 4.1.** Demographics of the Firms

The fields of activities of these 13 firms were e-learning, Information and Communication Technologies (ICT), and educational software. As illustrated in Table 4.1., the field of activity of seven firms (43.7%) was e-learning, of five firms (31.2%) was ICT, and of four firms (25%) was developing educational softwares.

**Table 4.1.** Field of Activity of the Firms

| Field of Activity | F | % | Frequency bar graph |
|---|---|---|---|
| e-learning | 7 | 43.7 | |
| Educational software | 5 | 31.2 | |
| ICT | 4 | 25 | |

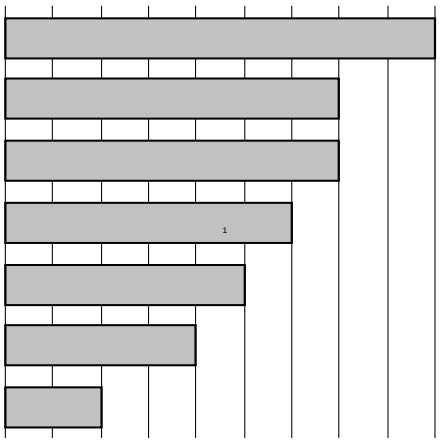
Note: Although the number of participants is 13, the sum of frequencies in the table is more than the number of participants. This is because some firms have more than one field of activity.

### 4.1.2. Demographics of CEIT Graduates Working in IT Firms

The results of the questionnaire revealed that the field in which CEIT graduates are employed most is programming (22.5%) (Table 4.2.). Almost the same number of CEIT graduates work as content designer (17.5%) and instructional designer (17.5%), 15% of CEIT graduates work as graphic

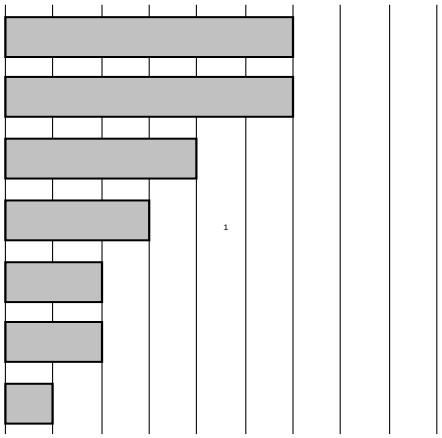
designer, 10% of them give technical support, and 5% of them work in other fields such as project management, user education and 3D modelling.

**Table 4.2.** The Fields in which CEIT Graduates Work

| Fields | F | % | Frequency bar graph |
|---|---|---|---|
| Programming | 9 | 22.5 |  |
| Content design | 7 | 17.5 | |
| Instructional design | 7 | 17.5 | |
| Graphic design | 6 | 15 | |
| Web design | 5 | 12.5 | |
| Technical support | 4 | 10 | |
| Other | 2 | 5 | |

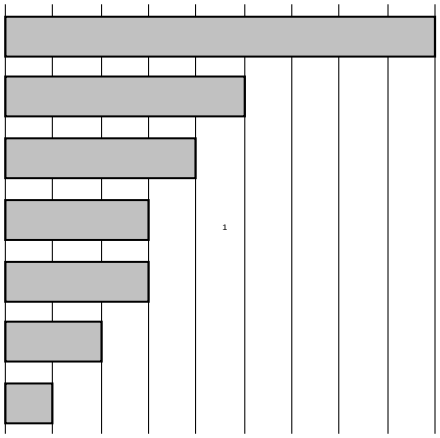
As shown in Table 4.3., according to the employers, the fields at which CEIT graduates are most efficient are content design (25%) and instructional design (25%). The other fields are relatively programming (16.6%), graphic design (12.5%), web design (8.3%) and technical support (8.3%), and other fields (4.1%) such as project management.

**Table 4.3.** The Efficiency of CEIT Graduates according to the Employers

| Fields | F | % | Frequency bar graph |
|---|---|---|---|
| Content design | 6 | 25 |  |
| Instructional design | 6 | 25 | |
| Programming | 4 | 16.6 | |
| Graphic design | 3 | 12.5 | |
| Web design | 2 | 8.3 | |
| Technical support | 2 | 8.3 | |
| Other | 1 | 4.1 | |

As indicated in Table 4.4., according to their employers, the field that CEIT graduates are least competent is programming (33.3%). The other fields are respectively content design (18.5%), graphic design (14.8%), instructional design and technical support (11.1%), web design (7.4%), and other fields (3.7%) such as project management, 3D modelling, and creating animations with softwares.

**Table 4.4.** The Fields at which CEIT Graduates are Least Competent

| Fields | F | % | Frequency bar graph |
|---|---|---|---|
| Programming | 9 | 33.3 |  |
| Content design | 5 | 18.5 | |
| Graphic design | 4 | 14.8 | |
| Instructional design | 3 | 11.1 | |
| Technical support | 3 | 11.1 | |
| Web design | 2 | 7.4 | |
| Other | 1 | 3.7 | |

It is noteworthy that although the field in which the CEIT graduates are least competent is programming, they are mostly employed as programmers. The researcher explored the reason of this in the qualitative part of the study.

There was a question about the current curriculum of department of CEIT seeking whether the employers think there are fields that should be added as lessons into the curriculum of CEIT. As seen in Figure 4.2., 69% of the employers reported that there should be lessons about the fields such as adult education and popular programming languages, while 29% stated that there is no need to add any lessons into the curriculum.

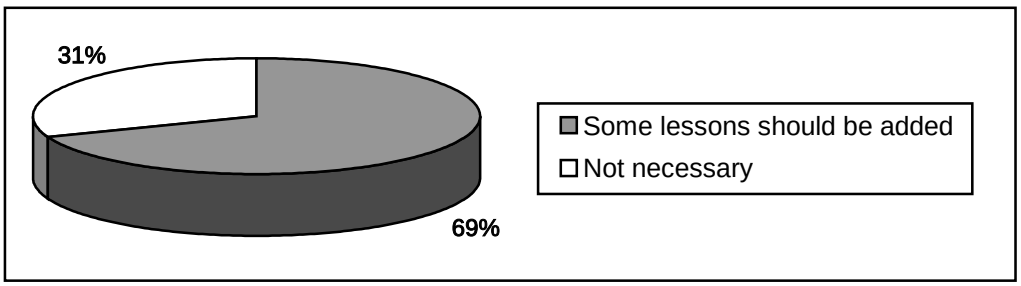



**Figure 4.2.** Requirement of Adding New Lessons to CEIT Curriculum

These findings of quantitative analysis totally represent the expectations of the employers from CEIT graduates. Generally it might be interpreted that employers want to work with CEIT graduates especially in programming, content design and instructional design, and expected them being more competent in these fields. In order to get clear results, the researcher conducted interview with the seven of the participants.

### 4.1.3. The Pedagogical Competencies of CEIT Graduates according to the Employers

There were seven five-point Likert-type items about the pedagogical competencies of CEIT graduates in the Competencies of CEIT Graduates

Working in IT Firms Questionnaire. Based on the responses to the items in this scale, the overall mean score is 3.15, and standard deviation is 0.72. This shows that according to their employers, CEIT graduates are averagely competent in pedagogical domain. Item 5 has the highest mean score (*M*= 3.46) which implies that the employers think that CEIT graduates are almost competent at preparing appropriate content for target groups. Item 6 has the lowest mean score (*M*= 2.77). The employers of CEIT graduates do not think that they are competent enough to determine appropriate assesment and evaluation methods for target group.

**Table 4.6.** Mean and Standard Deviation Scores for Pedagogical Competencies of CEIT Graduates

| **Pedagogical competencies** | **M** | **SD** |
|---|---|---|
| Item 1. In estimating the properties (cognitive, sensory, social properties) of target group | 3.08 | 0.76 |
| Item 2. In determinig the learning needs of target group | 3.15 | 0.80 |
| Item 3. In determining appropriate learning objectives | 3.38 | 0.51 |
| Item 4. In being able to choose appropriate method, strategy, etc. to be able to reach determinated goals | 3.00 | 0.71 |
| Item 5. In preparing appropriate content for target group | 3.46 | 0.78 |
| Item 6. In being able to choose appropriate assesment and evaluation methods for target group | 2.77 | 0.83 |
| Item 7. In determining appropriate immediate feedback options for target group | 3.23 | 0.60 |
| Overall | 3.15 | 0.72 |

### 4.1.4. The Technical Competencies of CEIT Graduates according to the Employers

There were eight items about the technical competencies of CEIT graduates. As illustrated in Table 4.7., the overall mean score is 3.09 which means that emloyers think that CEIT graduates are average competent at technical issues such as programming, the use of content management systems, and softwares necessary for graphical design, animation, etc. The overall standard deviation is 0.99. The highest mean scores are both for items 6 and 7 (*M*= 3.62). The lowest mean score is for the item 2 (*M*= 2.69).

**Table 4.7.** Mean and Standard Deviation Scores for Technical Competencies of CEIT Graduates

| Technical competencies | M | SD |
|---|---|---|
| Item 1. In using graphic design softwares in an effective way | 3,08 | 1.26 |
| Item 2. In using softwares needed for animation or simulation softwares in an effective way | 2,69 | 1.11 |
| Item 3. In planning and implementing the project | 3,00 | 0.82 |
| Item 4. In producing alternative solutions for technical problems | 3,23 | 0.93 |
| Item 5. In mastering stardards such as SCORM | 2,69 | 1.11 |
| Item 6. In using appropriate satndards in instructional materials | 3,62 | 0.65 |
| Item 7. In using Learning Management Systems and Content Management Systems efficiently | 3,62 | 0.77 |
| Item 8. In using programming languages efficiently | 2,85 | 0.90 |
| Overall | 3.09 | 0.99 |

### 4.1.5. The Communication and Teamwork Competencies of CEIT Graduates According to the Employers

There were 12 items about the communication and teamwork competencies of CEIT graduates. As shown in Table 4.8., the overall mean score of the scale is 3.8, and the standard deviation is 0.93. The highest mean score is for item 7 (*M*= 4.15). The lowest mean score is for the item 11 (*M*= 2.77).

**Table 4.8.** Mean and Standard Deviation Scores for Communication and Teamwork Competencies of CEIT Graduates

| Communication and teamwork competencies | M | SD |
|---|---|---|
| Item 1. In working patiently | 4.08 | 0.86 |
| Item 2. In working with discipline | 4.08 | 0.76 |
| Item 3. In taking responsibilities | 4.08 | 0.86 |
| Item 4. In working compatible with colleagues | 4.38 | 0.65 |
| Item 5. In keeping silent when communication problems occur | 3.77 | 0.60 |
| Item 6. In expressing him/herself effectively | 3.69 | 0.75 |
| Item 7. In helping colleagues when needed | 4.15 | 0.55 |
| Item 8. In being enthusiastic for research and exploration | 3.85 | 0.99 |
| Item 9. In being open to develop | 4.08 | 0.76 |
| Item 10. In using creativity and problem solving skills | 3.46 | 0.88 |
| Item 11. In project management | 2.77 | 1.30 |
| Item 12. In time management | 3.23 | 1.01 |
| Overall | 3.80 | 0.93 |

### 4.1.6. The Comparison of the Scales about Three Different Competency Areas: Pedagogical, Technical, and Communication and Teamwork

As illustrated in Table 4.9., according to employers, of three competency areas investigated in the present study, the area at which CEIT graduates are the most competent is communication and teamwork (*M*= 3.80), and they are the least competent at technical issues (*M*= 3.09).

**Table 4.9.** Mean and Standard Deviation Scores of Employers' Responses on Sub-scales of the Questionnaire

| Sub-scales | M | SD |
|---|---|---|
| Pedagogical competencies | 3.15 | 0.72 |
| Technical competencies | 3.09 | 0.99 |
| Communication skills and teamwork competencies | 3.80 | 0.93 |

## 4.2. Qualitative Data Analysis

The qualitative data of the current study were collected through interviews conducted in different times using audio recorder. The interviews were first transcribed on the Word Processor and then analyzed. In the remainder of the qualitative data analysis part, the researcher presents the participants' responses in detail using quotations from the responses. Seven participants were labelled as Firm 1, Firm 2, Firm 3, and so on.

### 4.2.1. Why do you prefer CEIT graduates while recruiting employees?

The first question was about whether the employers especially have preferred CEIT graduates by the time they recruit new employees. Firm 1 responsed this question "Ours is an e-learning firm and is a multifunctional business which is

a compound of programming, visual design and content design, and we need the contributions of all our employees in order to prepare appropriate presentation of the content. Therefore, every one should know about each compound of the business so that they can communicate easily and create more fruitful contents and products as well. CEIT graduates know these functions because of the projects they did during their undergraduate education, hovewer, we have to explain the process to the employees who did not graduate from CEIT and this usually takes long. That is why we prefer CEIT graduates." Similarly, Firm 2 said that the firm prefers CEIT graduates because firm's expectations are met with their qualifications. He added "In fact, I used to think that the firms do not plan to recruit CEIT graduates, rather, CEIT graduates apply for the job, and the firms evaluate their applications and decide to recruit them if needed. But I think, lately, this has changed gradually. The idea that 'it will be good if we also have a CEIT graduate in this project' has begun to emerge, because they know the process of developing e-learning materials through their undergraduate education. Thanks to their familiarity with the process and experiences, they can provide communication among the participants of the projects, in other words, I can say that they are good at project management." Likewise, Firms 3, 4 and 6 said that the main reason they prefer CEIT graduates is their familiarity with different aspects of the job.

Firm 7 responded that they do not seek especially for CEIT graduates, however, when they evaluate the job applications they might prefer them if they think applicants' qualifications are appropriate for them. Similarly, Firm 5 said "In fact, we did not seek especially for CEIT graduates, but when we introduced ourselves, they began to apply for jobs in our company." She added "They are, actually, familiar with our world due to the experiences in their undergraduate education, they know about the terminology of the field and we do not have to explain them the meanings of terms, for example, when we use the words like 'scenario' or 'story' they know what we are talking about, but still there is a lot they need to learn here. On the other hand, we think that they

have the potential to become project managers, and that is why we include them in our projects, yet as I said, they still need to learn a lot."

According to the results, it can be said that there is a need for CEIT graduates, and they are generally preferred by the companies especially because of their familiarity with the job processes due to the experiences in their undergraduate education. However, it is thought that they still have deficiencies as well. The responses of the employers' to the first question are summarized in Table 4.10.

**Table 4.10.** Employers' Responses to the Interview Question 1

| Question 1 | Summary of Responses |
|---|---|
| Why do you prefer CEIT graduates while recruiting employees? * | • Familiarity with the product development process<br>  · Quickly adaptation<br>  · Familiarity with the terminology of the field<br>• Having qualifications meeting with the employers' expectations |

* Of seven, four firms said that they especially prefer CEIT graduates while recruiting emloyees, the entire firms responded that they do not seek especially for CEIT graduates, but, when they evaluate the job applications they might prefer them in case they need.

### 4.2.2. When you consider about your experiences with CEIT graduates, in which fields do you think they are competent and in which fields they are weak?

With the second question, it was aimed to seek the employers' opinions about strong and weak points of CEIT graduates. Firm 1 commented that CEIT graduates can adapt easily and more quickly, additionally, they are good at programming and teamwork. Firm 2 said that they are good at content design

and project management. However, Firm 3 responded “We especially expect them to be competent at content design but I do not think they are competent enough.”

According to Firm 4, they have high business discipline and responsibility, and communication skills. She added “At times, we had to work with them over long distances but even then they handled the process pretty well. They are also good at technical issues. Throughout some projects, when we have to use new software that they have not used before, they can easily learn and use it. Because of the department they graduated from, they know, maybe little, but about everything. This is not a weakness, instead a strongness, because there are a lot of alternatives on which they can be experts if they develop themselves.” Conversely, Firm 1 said that not being an expert on a spesific field is a weakness of them; nevertheless, this can enable them to become project managers one day if they make an efort in order to develop themselves.

Firm 5 responded “Our CEIT graduate employees generally work at preparing educational scenarios, some of them are project managers, some of them are programmers but they have been working here for years, are not new graduates, I mean, I am not sure if their achievement is a contribution of CEIT or not.”

Firm 6 expressed that CEIT graduates are good at content design and visual design, they know about target groups’ needs and things that are important for increasing the motivation of the target group, and they have high communication skills. However, they need to develop themselves in technical standards such as SCORM, and Learning Management Systems (LMS). Similarly, Firm 7 said that they are good at visual and content design, and they have high communication skills, however, are not competent enough at programming.

In parallel with the results of The Competencies of CEIT Graduates Working in IT Firms Questionnaire, according to the firms, CEIT graduates are good at content design and communicating. The summary of the responses to the second question is indicated in Table 4.11.

**Table 4.11.** Employers' Responses to the Interview Question 2

| Question 2 | Summary of Responses | |
|---|---|---|
| According to your experiences with CEIT graduates, in which fields do you think they are competent and in which fields they are weak? | **the pros** | • Quick adaptation<br>• Being good at teamwork<br>• High communication skills<br>• Having potential to become project manager<br>• Organization skills |
| | **the cons** | • Weak in programming<br>• Lack of having a special expertise field<br>• Lack of visual designing (3 firms)<br>• Incompetent at content design<br>• Incompetent at standards such as SCORM, and LMSs |

### 4.2.3. When you compare CEIT graduates with employees graduated from other departments, are there any fields that you think CEIT graduates are more qualified in?

With the third question the researcher aimed to investigate the qualifications which distinguish CEIT graduate employees in IT firms from others who graduated from other departments. Firm 1 said that because CEIT graduates know about each step of the process, they are able to get better at project

management. Firms 2 and 3 expressed that they are better at content design. Firm 4 stated that their CEIT graduate employees are new graduates so it is not fair to compare them with other employees, but if they were more experienced, they would be especially better in educational fields such as instructional design and content design, because even now, they have important contributions in those domains.

Firms 6 and 7 compared CEIT graduates with computer engineers and asserted that they are better at communication and teamwork, and content design. Firm 6 explained "They can effectively express themselves even when they apply for job, for instance, computer engineers' applications are just texts while CEIT graduates prepare portfolios using different visuals, animations, so they can attract attention."

Firm 5 said "They are better in terms of orientation. As I said before, they are familiar with terminology, so have theoretical foundations, but I do not think they are competent enough to put their knowledge into practice."

The responses of the employers' to the third question are summarized in Table 4.12.

**Table 4.12.** Employers' Responses to the Interview Question 3

| **Question 3** | **Summary of Responses** |
|---|---|
| When you compare your CEIT graduates with employees graduated from other departments, are there any fields that you think CEIT graduates are more qualified? | • Better at<br>· orientation<br>· project management<br>· teamwork<br>· communication<br>· content design<br>· expressing themselves<br>• Lack of putting theoretical knowledge into practice |

### 4.2.4. According to the findings of The Competencies of CEIT Graduates Working in IT Firms Questionnaire, CEIT graduates are mostly employed in programming although they are least competent in programming according to the employers. What is your opinion about this situation, why are they employed as programmers though they are not that competent?

This question was asked in order to investigate the contradiction between results obtained from the questionnaire. When asked, Firm 2 responded “I think there might be two explanations for this situation. The first one is, maybe CEIT graduates introduce themselves as good programmers, or, the second one is about the expectations of employers. Maybe they have high expectations that are not met with CEIT graduates’ competencies”

Firm 1 said “Although there are exceptions, most of them are not successful enough in programming but some of them are overzealous in writing codes. In that case, we try to support them in educating in that field. In brief, we do not seek them as programmers; instead, it is they who have requests for working as programmers, so apply for job for that purpose.” Firms 3 and 5 had similar explanations as Firms 1 and 2.

Participants of the rest of the firms explained that this is because of the economic interests of the firms. They added that they can employ CEIT graduates for lower wages. The summary of the responses to the forth question is indicated in Table 4.13.

**Table 4.13.** Employers' Responses to the Interview Question 4

| Question 4 | Summary of Responses |
|---|---|
| According to the findings of questionnaire, CEIT graduates are mostly employed in programming although they are least competent in programming according to the employers. What is your opinion about this situation, why are they employed as programmers though they are not that competent? | • CEIT graduates' requests for being programmer and being assertive<br>• Not meeting the employers' expectations with CEIT graduates' competencies<br>• Two of the firms talked about money as soon as they hear the question |

### 4.2.5. Do your employees who are not CEIT graduates engage in instructional design or content design, or do you think these kinds of tasks should especially be the area of CEIT graduates?

According to the results of the questionnaire, the employers think that the fields at which CEIT graduates are most efficient are content design and instructional design, so this question was asked in order to learn detailed opinions of employers. The whole participants explained that they prefer to give priority to CEIT graduates; however, when they find out a competent and talented employee in those areas, they assign those tasks to him/her. They stated that there is a need for instructional and content designers in e-learning market and generally they agree with the idea that CEIT graduates should especially develop themselves in these areas. The summary of the responses to the fifth question is indicated in Table 4.14.

**Table 4.14.** Employers' Responses to the Interview Question 5

| Question 5 | Summary of Responses |
|---|---|
| Do your employees who are not CEIT graduates engage in instructional design or content design, or do you think these kinds of tasks should especially be the area of CEIT graduates? | • Giving priority to CEIT graduates<br>• Assigning these tasks to those who are competent and talented at these areas |

### 4.2.6. According to the findings of The Competencies of CEIT Graduates Working in IT Firms Questionnaire 69% of the employers think that the curriculum of CEIT is unsatisfactory. What do you think about this, and do you think that any lessons should be added to the curriculum?

Firms 2, 4 and 7 said that since CEIT graduates are not competent enough at programming, they should be given the opportunity of taking more lessons about programming from their departments and other departments as well. Firm 5 suggested lessons about visual design and stated that CEIT graduates can take design lessons from other departments such as industrial design.

Generally, the participants think there are several lessons in the curriculum, and the problem is not the number of the lessons. They suggested that the lessons should be enriched. Moreover, almost all of the participants said that it would be useful if a lesson about adult education is added to the curriculum. The responses to the sixth question are summarized in Table 4.15.

**Table 4.15.** Employers' Responses to the Interview Question 6

| Question 6 | Summary of Responses |
|---|---|
| According to the findings of The Competencies of CEIT Graduates Working in IT Firms Questionnaire 69% of the employers think that the curriculum of CEIT is unsatisfactory. What do you think about this, and do you think that any lessons should be added to the curriculum? | • Necessity of enhancing current lessons<br>• Giving opportunitiy to take lessons from other departments<br>• Adult education<br>• Popular programming languages |

**4.2.7. As you know there were three scales about pedagogical, technical, and communication and teamwork competencies of CEIT graduates in the questionnaire. Results of the analysis showed that CEIT graduates are most competent at communication and teamwork. Do you think that the group projects on which CEIT graduates were working during undergraduate lessons have any influence over this?**

Firm 1 responded as follows: "Of course I think, because the tasks they undertake here are similar with those which they undertook in their undergraduate education. Due to their experiences and familiarity with the whole process, and probable communication problems, it is inevitable that they can easily solve the communication problems and work in tune with their friends." Likewise, the other participants said that they think CEIT deparments have contributions to their students in terms of communication skills. However, one of the participants stated that this can change from one to the other, it is mostly individual. The summary of the responses to the last question is indicated in Table 4.16.

**Table 4.16.** Employers' Responses to the Interview Question 7

| Question 7 | Summary of Responses |
|---|---|
| As you know there were three scales about pedagogical, technical, and communication and teamwork competencies of CEIT graduates in the questionnaire. Results of the analysis showed that CEIT graduates are most competent at communication and teamwork. Do you think that the group projects on which CEIT graduates were working during undergraduate lessons have any influence over this? | • Positively responded due to the thought of CEIT graduates' familiarity with working in groups during the projects they participated in undergraduate education<br>• CEIT departments' contributions in terms of increasing students' communication skills<br>• It is individual |

### 4.2.8. Additional Suggestions of the Respondents

Additional suggestions independent from the interview questions are given below by using quotations from employers' responses.

Firm 1 and Firm 4 suggested "CEIT departments should be five or six years. In the following year/s the students should be educated in a specific area at which they are more competent and talented."

Firm 2 explained that since the employers think CEIT graduates are not competent enough in programming, it is important to provide more lessons for students in order to improve their programming skills. He added "I think, besides basic programming lessons, there should be popular programming of the current time." Moreover, Firms 1 and 2 recommended that one of the internships in CEIT departments may be in public schools, but another one should be optional. In other words, CEIT departments should give their undergraduate students the opportunity of doing one of the internships in a firm

in order to gain experience and in case some of the students do not want to be a teacher.

Firm 4 suggested that CEIT departments should direct their students before graduation, should follow their graduates and provide a platform on which the graduates and the departments continue to be in contact.

Generally, the participants emphasized that both IT firms and CEIT departments should get in touch with each other.

**Table 4.17.** Summary of Employers' Suggestions

| **Suggestions** |
| --- |
| • CEIT departments should<br>  · be five or six years<br>  · provide lessons for students in order to improve their programming skills<br>  · give undergraduate students the opportunity of doing one of the internships in a firm in order to gain experience and in case some of the students do not want to be a teacher<br>  · follow their graduates and provide a platform on which the graduates and the department continue to be in contact<br>• Both IT firms and CEIT departments should get in touch with each other |

### 4.2.9. The Summary of the Responses

The responses of the participants are summarized in the Table 4.18

**Table 4.18.** The Comparision of the Employers' Responses to the Interview Questions

| Interview Questions | Similarities | | Differences |
|---|---|---|---|
| Q1. Why do you prefer CEIT graduates while recruiting employees? | • Familiarity with the product development process<br>· Quickly adaptation<br>· Familiarity with the terminology<br>Having qualifications meeting with the employers' expectations | | |
| Q2. According to your experiences with CEIT graduates, in which fields do you think they are competent and in which fields they are weak? | **the pros** | • Quick adaptation<br>• Being good at teamwork<br>• High communication skills<br>• Having potential to become project manager<br>• Organization skills | • Competent at programming |
| | **the cons** | • Weak in programming<br>• Lack of having a special expertise fields<br>• Lack of visual designing | • Incompetent at content design<br>• Incompetent at standards such as SCORM, and LMSs |

* Of seven, four firms said that they especially prefer CEIT graduates while recruiting emloyees, the entire firms responded that they do not seek especially for CEIT graduates, but, when they evaluate the job applications they might prefer them in case they need

**Table 4.10. (Continued)**

| Interview Questions | Similarities | Differences |
|---|---|---|
| Q3. When you compare your CEIT graduates with employees graduated from other departments, are there any fields that you think CEIT graduates are more qualified? | • Better at<br>· orientation<br>· project management<br>· teamwork<br>· communication<br>· content design<br>expressing themselves | • Lack of putting theoretical knowledge into practice |
| Q4. According to the findings of The Competencies of CEIT Graduates Working in IT Firms Questionnaire, CEIT graduates are mostly employed in programming although they are least competent in programming according to the employers. What is your opinion about this situation, why are they employed as programmers though they are not that competent? | • CEIT graduates' requests for being programmer and being assertive<br>• Not meeting the employers' expectations with CEIT graduates' competencies<br>Maybe money | • Two of the firms talked about money as soon as they hear the question |

**Table 4.10. (Continued)**

| Interview Questions | Similarities | Differences |
|---|---|---|
| Q5. Do your employees who are not CEIT graduates engage in instructional design or content design, or do you think these kinds of tasks should especially be the area of CEIT graduates? | • Giving priority to CEIT graduates<br>• Assigning these tasks to those who are competent and talented at these areas | |
| Q6. According to the findings of The Competencies of CEIT Graduates Working in IT Firms Questionnaire 69% of the employers think that the curriculum of CEIT is unsatisfactory. What do you think about this, and do you think that any lessons should be added to the curriculum? | • Necessity of enhancing current lessons<br>• Giving opportunitiy to take lessons from other departments<br>• Adult education | • Popular programming languages |

**Table 4.10. (Continued)**

| Interview Questions | Similarities | Differences |
|---|---|---|
| Q7. As you know there were three scales about pedagogical, technical, and communication and teamwork competencies of CEIT graduates in the questionnaire. Results of the analysis showed that CEIT graduates are most competent at communication and teamwork. Do you think that the group projects on which CEIT graduates were working during undergraduate lessons have any influence over this? | • Positively responded due to the thought of CEIT graduates' familiarity with working in groups during the projects they participated in undergraduate education<br>• CEIT departments' in terms of increasing students' communication skills | It is individual |
| Suggestions | • CEIT deparments should be five or six years<br>• The department should<br>· provide lessons for students in order to improve their programming skills<br>· give undergraduate students the opportunity of doing one of the internship in a firm in case some students do not want to be a teacher<br>· follow its graduates and provide a platform on which the graduates and the department contuniue to be in contact.<br>Both IT firms and the CEIT departments should get in touch with each other | |

# CHAPTER 5

# CONCLUSION AND DISCUSSION

The purpose of this study was to investigate the current status and competencies of CEIT graduates working in IT firms from the employers' point of view. In other words, the purpose was to explore whether the graduates have gained competencies in their undergraduate education or while working in the firms, and to identify how well CEIT departments prepare students for professional practice.

In the light of the purpose stated above, this study focused on the following research problems:

1. In which positions are CEIT graduates employed in IT firms?
2. In which field/s are CEIT graduates more competent according to their employers?
3. How competent are the CEIT graduates working in IT firms,
   3.1. in pedagogical domain?
   3.2. in technical domain?
   3.3. in terms of communication skills and teamwork?
4. Which competencies are important according to employers of CEIT graduates?

In this chapter, firstly; the major findings and the discussions about the current status of CEIT graduates working in IT Firms are presented based on the related literature. Then, it continues with the implications for further research.

### 5.1. The Current Status of CEIT Graduates in IT Firms

In the first part of the study the current status of CEIT graduates working in IT firms was investigated. According to the results, CEIT graduates are mostly employed in programming field, and the fields of instructional design and content design follow it. Another result was related to the field in which CEIT graduates are less competent. It is surprising that CEIT graduates are least competent at programming field. That being mostly employed as programmers although not competent enough in programming is a contradiction. The first thing that comes to mind is that CEIT graduates might be employed with lower salaries. In order to explore the reason of this contradiction, it was asked as an interview question to the employers. There were three different responses:

- The employers have high expectations that are not met with CEIT graduates' competencies in programming
- Most of the job applications made by CEIT graduates are for programming positions and their applications appear to be too ambitious
- They are employed with lower salaries

In CEIT curriculum, there are three courses about programming, which are Programming Language I, Programming Language II, and Web Based Programming (YÖK, 2011) (see Appendix C). The employers suggested that the number of the courses about programming should be increased, or the department should give CEIT students the opportunity of taking programming lessons from other departments such as computer engineering and software engineering. Altun and Ateş (2008) conducted a study through a questionnaire regarding the problems that CEIT students encounter, their concerns about the future, and the problems they have after graduation. According to the results of their study, CEIT students also think that the courses regarding programming are not sufficient.

Another result was about the filelds in which CEIT graduates are more efficient. The results show that according to the employers the fields at which CEIT graduates are most efficient are content design and instructional design. Employers reported that there is a serious need especially in these fields, thus, undergraduate students should pay more attention to these.

### 5.2. Employers' Opinions about the CEIT Curriculum

According to both quantitative and qualititative results, most of the employers think that the curriculum of CEIT departments is not sufficient and should be enriched. They also suggested new courses such as adult education and popular programming languages.

As mentioned in previous chapters, due to the deficiencies in it and widespread dissatisfaction, High Education Council modified CEIT curriculum in 2007. Even if the changes made in the curriculum were well received, the students think that there are still deficiencies in terms of the length of some courses such as programming and databases (Altın & Ateş, 2008).

### 5.3. Employers' Opinions about the Competencies of CEIT Graduates

In this part of the study there were three scales regarding the pedagogical, technical, and communication and teamwork competencies of CEIT graduates. In general, employers think that the fields at which CEIT graduates are most competent are teamwork, and communicating with both employers and colleagues, while they are least competent at technical issues.

#### 5.3.1. Opinions about Pedagogical Competencies

This part incuded items regarding CEIT graduates' competencies about target groups' learning needs, characteristics, and determining objectives, assesment methods, etc. Considering the results, the competency level of CEIT graduates in pedagogical issues is average. In CEIT curriculum there are four courses about pedagogical domain (see Appendix C). It can be said that the number of

courses should be increased, or the content of current courses should be revised and enriched.

Employers asserted that the task at which CEIT graduates are most competent is preparing appropriate content for target groups. Other tasks ordered in decreasing level of competency are:

- determining
  - objecitves for target group
  - appropriate feedback options for target group
  - learning needs of target group
  - characteristics of target group such as cognitive, sensory, social, etc.
- appropriate methods and strategies in order to reach the determined objectives

CEIT departments' primary aim is to train prospective teachers who will teach computer courses in both public and private schools and to equip them with up-to-date knowledge and practical skills required for computer education (METU, 2011; HU, 2011). During their undergraduate education, CEIT students study for different courses regarding teacher training. It can be said that CEIT students' teacher identity has positive effect on their pedagogical competencies. The study of Çakır and Yıldırım (2006) supports this idea. In their study, they investigated general characteristics of prospective computer teachers at Middle East Technical University (METU) by examining their pedagogic and subject domain competencies through a quastionnaire. They collected data from second, third and forth year students in order to understand prospective teachers' progress about subject domain and pedagogic competencies. According to the results of their study, the pedagogic competencies of prospetive teachers are very low in the first years of their education and increased throughout the years. In another study conducted by Berkant and Tuncer (2011), views of senior students (fourth-year students) studying at CEIT department toward their profession and professional

competencies were investigated. The results of their study indicated that senior students feel themselves pedagogical competent. It could be said that CEIT department have positive effect upon students' pedagogical competencies.

The task at which CEIT graduates are the least competent is determining appropriate assesment and evaluation methods for target groups. Although some courses such as "instructional design" and "design and use of instructional material" include assesment and evaluation processes, it can be said that the content of these courses is not able to provide students sufficient competency. It can be suggested that the contents should ne enriched, or the course of Measurement and Evaluation in CEIT curriculum might be offered with any material development course. Thanks to this, CEIT students can combine their theoretical knowledge about assesment and evaluation with practical applications.

### 5.3.2. Opinions about Technical Competencies

The results of the current study indicate that CEIT graduates are average competent at technical issues such as graphic design, using animation and simulation softwares, content management systems and learning management systems, programming, etc. However, of three competency fields investigated in this study, CEIT graduates are the least competent at technical issues. This might be due to the deficiencies of courses including technical tasks. Another reason for this can be because of the group projects. During their undergraduate education, CEIT students participate in several group projects which are thought to develop their communication skills. Generally, each project group averagely consists of five students. Instructors do not follow which tasks were done by which student, so in each project the students can do the same kind of task. For example if a student is good at using animation programs, in group works s/he is the one who always creates animations, thus students who can not use animation softwares sufficiently remain the same. As a result, it can be recommended that the courses including technical tasks

should be carried out individually until the students gain the sufficient competency of the tasks, or the instructors should organize distribution of tasks between students.

Of the technical tasks, employers reported that CEIT graduates are most competent at using content management systems and learning management systems, and using appropriate standards while devepoling materials. They think that CEIT graduates are good at finding alternatives for solutions of technical problems. They are least competent at using animation and simulation softwares, programming, and standards such as SCORM.

### 5.3.3. Opinions about Communication and Teamwork Competencies

Considering both the questionnaire and interview results, CEIT graduates working in IT firms are more competent at communicaton and teamwork than pedagogical and technical domains. As mentioned before, in their undergraduate education, CEIT students have to participate in several group projects in which they have to cope with probable communication problems. Employers explained that they think the group projects on which CEIT graduates have influence over this. Thus, it can be said that these courses support their development of communication skills. According to Liu et al. (2002), “a good instructional designer should have excellent ‘people’ skills and be able to communicate effectively with clients, subject matter experts, and other team members.” (p. 8). Employers emphasized that it is an important criteria for them to work with employees who have high communication skills. In order to be competitive in today’s collaborative world of work, students must develop effective teamwork skills before entering the workforce (Snyder & McNeil, 2008).

In general, employers agreed with that CEIT graduates help their colleagues when they need, they work patiently, have self-discipline and sense of responsibility, they are willing to investigate and develop themselves.

However, according the results of the questionnaire, there are differences between employers' opinions about project management competencies of CEIT graduates. During the interview, while questioning about strongnesses and weaknesses of CEIT graduates, the researcher understood that, in fact, employers think that CEIT graduates have high potential to become a good project manager due to their familiarity with terminology and the whole process of the job. Yet, they have to develop themselves in order to be a successful project manager.

### 5.4. Interview Questions

To gather detailed information about the survey results, the qualitative part of this study was conducted through an interview including "what", "which", and "why" questions.

Based on the results, it is seen that some of the employers especially seek CEIT graduates while reqruiting employees, while others do not especially seek them, instead, they evaluate job applications of CEIT graduates and decide to recruit them if needed. Nevertheless, in general, are satisfied with employing CEIT graduates but think that they still need to learn a lot. Moreover, the results indicate that there is a need for CEIT graduates in IT firms, and it can be suggested that CEIT departments should inform their students about their importance in private world so that they can develop themselves. Employers especially emphasized that they need qualified content designers; thus, another issue they underlined was that CEIT students should be informed about this.

Another result inferred from the interview is that according to employers, CEIT graduates know about each process of the job which is thought both a strong and weak point of them. Some of the employers highlighted that this is a weakness, because although they know about everything, they are not experts in any field. However, the other employers pointed out that owing to their pedagogical and technical foundations, CEIT graduates can become experts in

whichever field they want if they develop themselves. Furthermore, due to their experiences and familiarity with terminology they can become successful project managers.

Since qualitative part of the present study conducted by means of a semi-structured interview, the conversation was flexible and the employers made additional suggestions independent from inerview questions which are as follows:

- CEIT departments should be at least four or five years. In the following year/s the students should be educated in a specific area at which they are more competent and talented.
- One of the internships in CEIT departments may be in public schools, but another one should be optional. In other words, CEIT departments should give undergraduate students the opportunity of doing one of the internships in a firm.
- CEIT departments should direct its students before graduation, they should follow their graduates and provide a platform on which the graduates and the department contuniue to be in contact.
- IT firms and CEIT departments should get in touch with each other.

### 5.5. Implications for Reseach

In the present study, the current status and competencies of CEIT graduates working in IT firms from the employers' point of view were investigated. According to both quantitative and qualitative results it can be said that in the private world there is a need for CEIT graduates, but, the employers think that they should still develop themselves in order be more successful and become employees that employers especially look for. As mentioned before, there are no other studies about CEIT graduates working in IT firms in Turkey, so, this study can be considered as a significant contribution to the field, and a guide for the students as well.

### 5.6. Further Recommendations

For further research studies, the following studies may be conducted:

- The competencies of CEIT graduates in other public corporations
- The comparision of competencies of CEIT graduates from the employers and employees' point of views
- The satisfaction of CEIT graduates working in IT firms
- The perceptions of of CEIT graduates working in IT firms about their competencies
- Defining the competencies of CEIT graduates working in IT firms by analyzing the job announcements

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# APPENDIX A

# THE COMPETENCIES OF CEIT GRADUATES WORKING IN IT FIRMS QUESTIONNAIRE

**Bilişim Teknolojileri Firmalarında Çalışan Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümü (BÖTE) Mezunlarının Yeterlikleri Anketi**

Değerli Yetkili,

Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümü'nün (BÖTE) temel amacı eğitim kurumlarında kullanılacak bilgisayar ve diğer öğretim teknolojisi ürünlerinin etkili ve verimli kullanımı için gerekli olan yöntem ve teknikleri geliştirmek, yaymak ve öğretmek, bu kurumlarda öğretmenlik yapmak isteyen bireyleri yetiştirmektir. Bu anket Bilişim Teknolojileri firmalarının çeşitli pozisyonlarında görev alan BÖTE mezunlarının ne derece yeterli olduklarını belirlemek üzere gerçekleştirilmektedir. Vereceğiniz bilgiler sadece bilimsel araştırma amaçlı kullanılacaktır. Bu nedenle vereceğiniz cevapların gerçek düşüncelerinizi yansıtıyor olması büyük bir önem taşımaktadır. **Doldurduğunuz anketleri aşağıdaki e-posta adreslerinden birine yollayabilirsiniz**. En uygun seçeneği işaretlemeniz ve gerekli yerleri doldurmanız ricasıyla, değerli görüşleriniz, harcayacağınız emek ve zaman için şimdiden teşekkür ederiz.

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## BÖLÜM 1. ŞİRKETİNİZ VE BÖTE MEZUNU ÇALIŞANLARINIZ HAKKINDAKİ BİLGİLER

Şirketinizin Adı:

İleride görüşlerine başvurabileceğimiz yetkilinin adı ve e-posta adresi:

**1.** Şirketinizin çalışma alanı:

**2.** Şirketinizde çalışan eleman sayısı:

**3.** Şirketinizde çalışan BÖTE mezunu sayısı:

**4.** BÖTE mezunlarını çalıştırdığınız alanlar nelerdir? (Birden fazla seçenek işaretleyebilirsiniz)

- ☐ Grafik tasarımı
- ☐ Web tasarımı
- ☐ Programlama
- ☐ Öğretim tasarımı
- ☐ İçerik tasarımı
- ☐ Teknik destek
- ☐ Diğer (belirtiniz) ……

**5.** BÖTE mezunu çalışanlarınızdan en çok verim aldığınız alanlar nelerdir? (Birden fazla seçenek işaretleyebilirsiniz)

- ☐ Grafik tasarımı
- ☐ Web tasarımı
- ☐ Programlama
- ☐ Öğretim tasarımı
- ☐ İçerik tasarımı
- ☐ Teknik destek
- ☐ Diğer (belirtiniz) ……

**6.** BÖTE mezunlarında yeterli görmediğiniz ya da gelişmeye açık olduğunu düşündüğünüz alanlar nelerdir? (Birden fazla seçenek işaretleyebilirsiniz)

☐ Grafik tasarımı
☐ Web tasarımı
☐ Programlama
☐ Öğretim tasarımı
☐ İçerik tasarımı
☐ Teknik destek
☐ Diğer (belirtiniz) …….……..….

**7.** Üniversitelerin BÖTE bölümünün eğitim programına eklenmesi gerektiğini düşündüğünüz alanlar var mı?

☐ Evet ☐ Hayır

Cevabınız "Evet" ise düşündüğünüz alanlar nelerdir?

……
……
……
……

## BÖLÜM 2. BÖTE MEZUNLARININ YETERLİLİKLERİNE İLİŞKİN GÖZLEMLERİNİZ

Aşağıdaki ölçekte BÖTE mezunlarında bulunması beklenen nitelikler ifade edilmiştir. Lütfen firmanızdaki BÖTE mezunlarının yeterliliklerini dikkate alarak aşağıdaki yeterlilik ifadelerini derecelendiren en uygun seçeneği seçiniz.

| No | Pedagojik özellikler | Yetersiz (1) | Az Yeterli (2) | Orta Düzeyde Yeterli (3) | Yeterli (4) | Çok Yeterli (5) |
|---|---|---|---|---|---|---|
| **1.** | Hedef kitlenin özelliklerini tahmin etme (bilişsel, duyuşsal, sosyal özellikler, v.b.) konusunda | | | | | |
| **2.** | Hedef kitlenin öğrenme ihtiyaçlarını belirleme konusunda | | | | | |
| **3.** | Hedef kitle için uygun öğrenim kazanımlarını belirleme konusunda | | | | | |
| **4.** | Hedef kitlenin belirlenen hedeflere ulaşabilmesi için uygun yöntemi, stratejiyi, v.b. seçebilme konusunda | | | | | |
| **5.** | Hedef kitleye uygun içerik hazırlama konusunda | | | | | |
| **6.** | Hedef kitlenin özelliklerine uygun ölçme ve değerlendirme yöntemlerini seçebilme konusunda | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **7.** | Hedef kitleye uygun anında dönüt/ geribildirim seçeneklerini belirleme konusunda | | | | | |

| **No** | **Teknik özellikler** | **Yetersiz (1)** | **Az Yeterli (2)** | **Orta Düzeyde Yeterli (3)** | **Yeterli (4)** | **Çok Yeterli (5)** |
|---|---|---|---|---|---|---|
| **1.** | Grafik tasarımı için gerekli yazılımları etkin bir şekilde kullanma konusunda | | | | | |
| **2.** | Animasyon ya da simülasyon için gerekli olan yazılımları etkin bir şekilde kullanma konusunda | | | | | |
| **3.** | Projeyi planlama ve uygulama konusunda | | | | | |
| **4.** | Teknik aksaklıklardan kaynaklanabile-cek problemlere alternatif çözümler üretme konusunda | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **5.** | SCORM gibi standartlara hakim olma konusunda | | | | | |
| **6.** | Öğretim materyallerinde uygun standartları kullanma konusunda | | | | | |
| **7.** | Öğretim ve İçerik Yönetim Sistemlerini etkili şekilde kullanma konusunda | | | | | |
| **8.** | Programlama dillerini etkili olarak kullanma konusunda | | | | | |

| **No** | **Takım çalışması ve iletişim becerileri** | **Yetersiz (1)** | **Az Yeterli (2)** | **Orta Düzeyde Yeterli (3)** | **Yeterli (4)** | **Çok Yeterli (5)** |
|---|---|---|---|---|---|---|
| **1.** | Sabırlı çalışma konusunda | | | | | |
| **1.** | Disiplinli çalışma konusunda | | | | | |
| **2.** | Sorumluluk alma konusunda | | | | | |
| **3.** | Takım arkadaşlarıyla uyum içinde çalışma konusunda | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **4.** | İletişim problemleri yaşandığı durumda sessiz kalabilme konusunda | | | | | |
| **5.** | Kendini iyi ifade edebilme konusunda | | | | | |
| **6.** | Gerektiği durumlarda çalışma arkadaşlarına yardım etme konusunda | | | | | |
| **7.** | Araştırma merakı ve keşfetme isteği konusunda | | | | | |
| **8.** | Gelişmeye açık olabilme konusunda | | | | | |
| **9.** | Yaratıcılık ve problem çözme becerilerini kullanma konusunda | | | | | |
| **10.** | Proje yönetimi konusunda | | | | | |
| **11.** | Zaman yönetimi konusunda | | | | | |
| **12.** | Araştırma merakı ve keşfetme isteği konusunda | | | | | |

# APPENDIX B

# INTERVIEW QUESTIONS

| | |
|---|---|
| **1.** | Firmanıza eleman alırken BÖTE mezunlarını neden tercih ediyorsunuz? |
| **2.** | BÖTE mezunları ile ilgili deneyimlerinizi göz önünde bulundurduğunuzda onları hangi alanlarda yeterli, hangi alanlarda zayıf buluyorsunuz? |
| **3.** | BÖTE mezunu çalışanlarınızı diğer bölümlerden mezun olan çalışanlarınızla kıyasladığınızda BÖTE mezunlarının üstün gördüğünüz yönleri var mı? |
| **4.** | Firmanız tarafından da doldurulan anket sonuçlarına göre programlama alanında BÖTE mezunlarından verim alınmadığı halde BÖTE mezunları en çok programlama alanında çalıştırılıyormuş. Bunun sebebi nedir? |
| **5.** | BÖTE mezunu dışındaki çalışanlarınıza içerik ya da öğretim tasarımı yaptırıyor musunuz yoksa bu işin özellikle onların uzmanlık alanı olduğunu mu düşünüyorsunuz? |
| **6.** | Firmaların %69'u BÖTE müfredatını yetersiz bulmuş. BÖTE müfredatına eklenmesini istediğiniz ders var mı? |
| **7.** | Bildiğiniz gibi ankette pedagojik, teknik ve iletişim becerileriyle ilgili 3 farklı ölçek vardı. Analiz sonuçlarına göre BÖTE mezunlarının en yeterliği olduğu alan iletişim becerileri çıktı. Bunda BÖTE'deki grup çalışmalarının etkisi olduğunu düşünüyor musunuz? |

# APPENDIX C

# UNDERGRADUATE CURRICULUM OF CEIT

**Table C.1.** Undergraduate Curriculum of CEIT Department

**Bilgisayar ve Öğretim Teknolojileri Eğitimi Lisans Programı (YÖK, 2011)**

**I. YARIYIL**

| | DERSİN ADI | T | U | K |
|---|---|---|---|---|
| A | Eğitimde Bilişim Teknolojileri I | 3 | 2 | 4 |
| A | Matematik I | 2 | 2 | 3 |
| GK | Yabancı Dil I | 3 | 0 | 3 |
| GK | Türkçe I: Yazılı Anlatım | 2 | 0 | 2 |
| GK | Atatürk İlkeleri ve İnkılap Tarihi I | 2 | 0 | 2 |
| MB | Eğitim Bilimine Giriş | 3 | 0 | 3 |
| **TOPLAM** | | **15** | **4** | **17** |

**II. YARIYIL**

| | DERSİN ADI | T | U | K |
|---|---|---|---|---|
| A | Eğitimde Bilişim Teknolojileri II | 3 | 2 | 4 |
| A | Matematik II | 2 | 2 | 3 |
| GK | Yabancı Dil II | 3 | 0 | 3 |
| GK | Türkçe II: Sözlü Anlatım | 2 | 0 | 2 |
| GK | Atatürk İlkeleri ve İnkılap Tarihi II | 2 | 0 | 2 |
| MB | Eğitim Psikolojisi | 3 | 0 | 3 |
| **TOPLAM** | | **15** | **4** | **17** |

**Table C.1. (Continued)**

**III. YARIYIL**

| | DERSİN ADI | T | U | K |
|---|---|---|---|---|
| A | Programlama Dilleri I | 3 | 2 | 4 |
| A | Eğitimde Materyal Tasarımı ve Kullanımı | 2 | 2 | 3 |
| A | Bilgisayar Donanımı | 2 | 2 | 3 |
| A | Fizik I | 3 | 0 | 3 |
| MB | Öğretim İlke ve Yöntemleri | 3 | 0 | 3 |
| MB | Seçmeli | 3 | 0 | 3 |
| **TOPLAM** | | **16** | **6** | **19** |

**IV. YARIYIL**

| | DERSİN ADI | T | U | K |
|---|---|---|---|---|
| A | Programlama Dilleri II | 3 | 2 | 4 |
| A | Öğretim Tasarımı | 2 | 2 | 3 |
| A | Eğitimde Grafik ve Canlandırma | 2 | 2 | 3 |
| A | Seçmeli I | 3 | 0 | 3 |
| A | Fizik II | 3 | 0 | 3 |
| MB | Ölçme ve Değerlendirme | 3 | 0 | 3 |
| **TOPLAM** | | **16** | **6** | **19** |

**V. YARIYIL**

| | DERSİN ADI | T | U | K |
|---|---|---|---|---|
| A | İşletim Sistemi ve Uygulamaları | 2 | 2 | 3 |
| A | İnternet Tabanlı Programlama | 3 | 2 | 4 |
| A | Uzaktan Eğitim | 2 | 2 | 3 |
| GK | Bilim Tarih | 2 | 0 | 2 |
| MB | Sınıf Yönetimi | 2 | 0 | 2 |
| MB | Özel Öğretim Yöntemleri I | 2 | 2 | 3 |
| MB | Özel Eğitim | 2 | 0 | 2 |
| **TOPLAM** | | **15** | **8** | **19** |

**VI. YARIYIL**

| | DERSİN ADI | T | U | K |
|---|---|---|---|---|
| A | Çoklu Ortam Tasarımı ve Üretimi | 2 | 2 | 3 |
| A | Bilgisayar Ağları ve İletişim | 2 | 2 | 3 |
| A | Veri Tabanı ve Yönetim Sistemleri | 2 | 2 | 3 |
| A | Özel Öğretim Yöntemleri II | 2 | 2 | 3 |
| A | Seçmeli II | 2 | 2 | 3 |
| GK | Topluma Hizmet Uygulamaları | 1 | 2 | 2 |
| MB | Türke Eğitim Sistemi ve Okul Yönetimi | 2 | 0 | 2 |
| **TOPLAM** | | **13** | **12** | **19** |

**Table C.1. (Continued)**

**VII. YARIYIL**

| | DERSİN ADI | T | U | K |
|---|---|---|---|---|
| A | Proje Geliştirme ve Yönetimi I | 2 | 2 | 3 |
| A | Web Tasarımı | 2 | 2 | 3 |
| A | Seçmeli III | 3 | 0 | 3 |
| GK | Bilimsel Araştırma Yönetmleri | 2 | 0 | 2 |
| GK | Seçmeli I | 2 | 0 | 2 |
| MB | Okul Deneyimi | 1 | 4 | 3 |
| **TOPLAM** | | **12** | **8** | **16** |

**VIII. YARIYIL**

| | DERSİN ADI | T | U | K |
|---|---|---|---|---|
| A | Proje Geliştirme ve Yönetimi II | 2 | 2 | 3 |
| A | Seçmeli VI | 2 | 2 | 3 |
| GK | Seçmeli II | 2 | 0 | 2 |
| MB | Rehberlik | 3 | 0 | 3 |
| MB | Öğretmenlik Uygulaması | 2 | 6 | 5 |
| **TOPLAM** | | **11** | **10** | **16** |

| **GENEL TOPLAM** | **Teorik** | **Uygulama** | **Kredi** | **Saat** |
|---|---|---|---|---|
| | **113** | **58** | **142** | **171** |

**A:** Alan ve alan eğitimi dersleri

**MB:** Öğretmenlik meslek bilgisi dersleri

**GK:** Genel kültür dersleri

# APPENDIX D

# LIST OF CEIT DEPARTMENTS IN TURKEY

**Table D.1**. CEIT Departments in Turkey

| No | Üniversite / Fakülte | Şehir |
|---|---|---|
| **1.** | Abant İzzet Baysal Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | BOLU |
| **2.** | Afyon Kocatepe Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | AFYONKARAHİSAR |
| **3.** | Ağrı İbrahim Çeçen Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | AĞRI |
| **4.** | Ahi Evran Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | KIRŞEHİR |
| **5.** | Akdeniz Üniversitesi | ANTALYA |
| **6.** | Amasya Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | AMASYA |
| **7.** | Anadolu Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | ESKİŞEHİR |
| **8.** | Ankara Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | ANKARA |
| **9.** | Atatürk Üniversitesi<br>Kazım Karabekir Eğitim Fakültesi – BÖTE Bölümü | ERZURUM |
| **10.** | Bahçeşehir Üniversitesi<br>Fen Edebiyat Fakültesi – BÖTE Bölümü | İSTANBUL |
| **11.** | Balıkesir Üniversitesi<br>Necatibey Eğitim Fakültesi – BÖTE Bölümü | BALIKESİR |
| **12.** | Başkent Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | ANKARA |

**Table D.1. (Continued)**

| No | Üniversite / Fakülte | Şehir |
|---|---|---|
| **13.** | Bilkent Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | ANKARA |
| **14.** | Boğaziçi Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | İSTANBUL |
| **15.** | Çanakkale Onsekiz Mart Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | ÇANAKKALE |
| **16.** | Çukurova Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | ADANA |
| **17.** | Doğu Akdeniz Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | KKTC - GAZİMAĞUSA |
| **18.** | Dokuz Eylül Üniversitesi<br>Buca Eğitim Fakültesi – BÖTE Bölümü | İZMİR |
| **19.** | Ege Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | İZMİR |
| **20.** | Erzincan Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | ERZİNCAN |
| **21.** | Eskişehir Osmangazi Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | ESKİŞEHİR |
| **22.** | Fatih Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | İSTANBUL |
| **23.** | Fırat Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | ELAZIĞ |
| **24.** | Gazi Üniversitesi<br>Gazi Eğitim Fakültesi – BÖTE Bölümü | ANKARA |
| **25.** | Gaziosmanpaşa Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | TOKAT |
| **26.** | Girne Amerikan Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | KKTC - GİRNE |
| **27.** | Hacettepe Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | ANKARA |
| **28.** | Hakkari Üniversitesi<br>Hakkari Eğitim Fakültesi – BÖTE Bölümü | HAKKARİ |
| **29.** | İnönü Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | MALATYA |
| **30.** | İstanbul Aydın Üniversitesi<br>Fen - Edebiyat Fakültesi – BÖTE Bölümü | İSTANBUL |

**Table D.1. (Continued)**

| No | Üniversite / Fakülte | Şehir |
|---|---|---|
| **31.** | İstanbul Üniversitesi<br>Hasan Ali Yücel Eğitim Fakültesi – BÖTE Bölümü | İSTANBUL |
| **32.** | Kahramanmaraş Sütçü İmam Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | KAHRAMANMARAŞ |
| **33.** | Karadeniz Teknik Üniversitesi<br>Fatih Eğitim Fakültesi – BÖTE Bölümü | TRABZON |
| **34.** | Kırıkkale Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | KIRIKKALE |
| **35.** | Lefke Avrupa Üniversitesi<br>Dr. Fazıl Küçük Eğitim Fakültesi – BÖTE Bölümü | KKTC - LEFKE |
| **36.** | Maltepe Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | İSTANBUL |
| **37.** | Marmara Üniversitesi<br>Atatürk Eğitim Fakültesi – BÖTE Bölümü | İSTANBUL |
| **38.** | Mehmet Akif Ersoy Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | BURDUR |
| **39.** | Mustafa Kemal Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | HATAY |
| **40.** | Ondokuz Mayıs Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | SAMSUN |
| **41.** | Orta Doğu Teknik Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | ANKARA |
| **42.** | Pamukkale Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | DENİZLİ |
| **43.** | Sakarya Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | ADAPAZARI |
| **44.** | Selçuk Üniversitesi<br>Ahmet Keleşoğlu Eğitim Fakültesi – BÖTE Bölümü | KONYA |
| **45.** | Siirt Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | SİİRT |
| **46.** | Trakya Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | EDİRNE |
| **47.** | Uludağ Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | BURSA |

**Table D.1. (Continued)**

| No | Üniversite / Fakülte | Şehir |
|---|---|---|
| **48.** | Uluslar arası Kıbrıs Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | KKTC - LEFKOŞA |
| **49.** | Yakındoğu Üniversitesi<br>Atatürk Eğitim Fakültesi – BÖTE Bölümü | KKTC - LEFKOŞA |
| **50.** | Yeditepe Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | İSTANBUL |
| **51.** | Yıldız Teknik Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | İSTANBUL |
| **52.** | Yüzüncü Yıl Üniversitesi<br>Eğitim Fakültesi – BÖTE Bölümü | VAN |

(ÖSYM, 2011)

# APPENDIX E

# IBSTPI INSTRUCTIONAL DESIGN COMPETENCIES

**Table E.1**. IBSTPI Instructional Design Competencies

| **Professional Foundations** |
| --- |
| • Communicate effectively in visual, oral and written form. (Essential)<br>• Apply current research and theory to the practice of instructional design. (Advanced)<br>• Update and improve one's knowledge, skills and attitudes pertaining to instructional design and related fields. (Essential)<br>• Apply fundamental research skills to instructional design projects. (Advanced)<br>• Identify and resolve ethical and legal implications of design in the work place. (Advanced) |
| **Planning and Analysis** |
| • Conduct a needs assessment. (Essential)<br>• Design a curriculum or program. (Essential)<br>• Select and use a variety of techniques for determining instructional content. (Essential) |

**Table E.1. (Continued)**

| **Planning and Analysis** |
| --- |
| • Identify and describe target population characteristics. (Essential)<br>• Analyze the characteristics of the environment. (Essential)<br>• Analyze the characteristics of existing and emerging technologies and their use in an instructional environment. (Essential)<br>• Reflect upon the elements of a situation before finalizing design solutions and strategies. (Essential) |
| **Design and Development** |
| • Select, modify, or create a design and development model appropriate for a given project. (Advanced)<br>• Select and use a variety of techniques to define and sequence the instructional content and strategies. (Essential)<br>• Select or modify existing instructional materials. (Essential)<br>• Develop instructional materials. (Essential)<br>• Design instruction that reflects an understanding of the diversity of learners and groups of learners. (Essential)<br>• Evaluate and assess instruction and its impact. (Essential) |
| **Implementation and Management** |
| • Plan and manage instructional design projects. (Advanced)<br>• Promote collaboration, partnerships and relationships among the participants in a design project. (Advanced) |

**Table E.1. (Continued)**

| **Implementation and Management** |
| --- |
| • Apply business skills to managing instructional design. (Advanced)<br>• Design instructional management systems. (Advanced)<br>• Provide for the effective implementation of instructional products and programs. (Essential) |

(IBSTPI, 2010)