CURRENT USE OF INSTRUCTIONAL TECHNOLOGY BY METU FACULTY: BARRIERS AND ENABLERS

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ABSTRACT

CURRENT USE OF INSTRUCTIONAL TECHNOLOGY BY METU FACULTY: BARRIERS AND ENABLERS

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The purpose of this study is to explore the barriers and enablers of current use of instructional technology by METU academic staff. The main focus was to find out the barriers and enablers and their components which are technology use patterns, perceived advantages of using technology, preferred methods of learning technology and receiving support, factors affecting the use of instructional technology in teaching and learning process, factors affecting the use of technology decision, obstacles in use of technology, acquiring knowledge about new technologies and receive support, and preferred methods of training for the use of instructional technology. This study was conducted with total 176 academic staff from Middle East Technical University: 160 were for quantitative phase and 16 were for qualitative phase. Mixed method design – explanatory sequential design – was used for the study. To obtain data a survey, questionnaire, and interview were used. According to findings, current state of use of instructional technology, barriers and enablers and suggestions of METU academic staff were presented and discussed. Academic staff stated different point of views of barriers and enablers. According to their suggestion and results of the study, implications were offered to METU.

Key Words: technology barriers and enablers, technology integration into higher education, technology perception

ÖZ

ODTÜ ÖĞRETİM GÖREVLİLERİNİN HÂLİHAZIRDAKİ ÖĞRETİM TEKNLOJİLERİ KULLANIM DURUMLARI: ZORLUKLAR VE ÇÖZÜMLER

ARSLAN, Okan

Yüksek Lisans, Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümü

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Bu çalışmanın amacı ODTÜ'deki öğretim görevlilerinin teknoloji kullanımındaki zorluklar ve çözümleri incelemektir. Araştırmanın odağı; zorluklar ve çözümler ile bunların bileşenleri olan teknoloji kullanımı, teknoloji kullanımının avantajları, teknolojileri öğrenme yolları ve destek, teknolojiyi eğitim ve öğretimde kullanımını etkileyen faktörler, teknoloji kullanım kararını etkileyen faktörler, teknoloji kullanımında karşılaşılan güçlükler, yeni teknolojiler hakkında bilgi edinme ve destek ve öğretim teknolojileri hakkında tercih edilen hizmet içi eğitimlerdir. Araştırma ODTÜ'de görev yapmakta olan öğretim görevlilerinden toplamda 176 katılımcı ile yapılmıştır. Bu katılımcıların 160'ı nicel, 16'sı ise nitel araştırmanın katılımcılarıdır. Çalışma için açıklayıcı ardışık karma yöntemi kullanılmıştır. Veri toplamak için anket ve görüşme yolları kullanılmıştır. Bulgulara göre ODTÜ'deki öğretim görevlilerinin hâlihazırdaki teknoloji kullanım durumları, zorlukları, çözümleri ve önerileri sunulmuş tartışılmıştır. Öğretim görevlileri zorluklar ve çözümerin farklı bakış açılarını dile getirdiler. Onların onerileri ve bu çalışmanın sonuçlarına gore de ODTÜ'ye bazı önerilerde bulunuldu.

Anahtar Kelimeler: teknoloji zorlukları ve çözümleri, teknoloji algıları, yükseköğretimde teknoloji entegrasyonu

To my family

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INTRODUCTION

1.1 Introduction

Technology is 'the application of knowledge, tools and skills to solve problems and extend human capabilities' (Smith, 1994, p. 2). Nowadays, technology takes a big place in our both academic and daily life. In today's educational life it is more important that how to use technology rather than what technology we have. In this point of view, the awareness and implementation are the basic line of the technologies used in campus – campus technology. Although technology is pervasive in education, it has not been heavily infused in the activities of teaching and learning (Grabe and Grabe 2008). In order to make the campuses more efficient for education, design, plan and integration of technologies that are going to be used in campuses are needed. The design and implementation of technology can prove a particularly daunting challenge for campus planners and project designers. (Keengwee et al. 2009). As parts of the teaching and learning in campus, curriculum and instruction are the foundation stones that need to be contributed by technology. Change plays a key role in the process of information and communication technology (ICT) adoption into curriculum and instruction (Spotss 1999; Zhao and Cziko 2001; Keengwee et al. 2009). To effectively integrate ICT tools into teaching and learning practices, faculty must not only learn how to use technology, but also fundamentally change the way they teach (Fabry and Higgs 1997; Hagenson and Castle 2003; Schrum et al. 2002; Spotts 1999; Zhao and Cziko 2001; Keengwee et al. 2009).

Regarding to statements, barriers and enablers of use of instructional technology and its parameters issues which are important for the efficiency of teaching and learning are discoursed in this research.

1.2 Background of the Problem

In higher education the introduction of technology to pedagogy is a debate question which was the main motivation of this study. To put it on a historical base, US Department of Education offers the technology literature's earliest official explanation "computer expertise and the capacity of using computers and other technology to improve performance, productivity and learning. Technology literature has transformed into a basic ability for a person to blend in the society like the other usual skills as arithmetic, writing and reading" (1996, Par.1). The Department of Education does not point out a guide to handle computer and other advancements to secure a satisfactory position for technology literature. Warner, Brawn and Shackelford (2004) stated that the meaning of technological literature is that a

person have to have enough skill to "use, improve, design, direct and evaluate the technological systems and processes" (p. 7).

Seminal research of Spotts (1999) and Novitzki (2000) are likely to be the most influential works on the subject. Despite the most of the research conducted on technology was concentrating on the student learning development. One of the first studies has been conducted by Spotts to determine and identify user levels of technology. His outputs can be classified in three main categories: high, medium and low-level users. Spotts states that the differentiation between the users is the result of the gained benefit: higher the level, users perceive greater benefits. The study concludes that if the technology is to be used by a faculty, the faculty needs to get technological back up and academic acknowledgement (promotion and occupancy circumstances). Time and training are the other two factors required for a successful implement of technology into pedagogy.

Pertaining to pedagogy with an attempt for further understand technological literacy, Novitzki's (2000) study acknowledges levels of user proficiency in asynchronous learning tools (ASL). During the 1999 academic school year (fall, spring and summer semesters) Novitzki established and recorded the low, moderate and high use levels. Those level scales introduces a set point to technology literacy proficiency (user ascribed), and assisting the Spott's (1999) study. The studies mentioned are supplying a credible tool for recognizing and categorizing user levels in technology literacy. Technology training showing the instructional technology tool guide might not be the instructor's choice but the training integrates their pedagogy, understanding the difference between these can be crucial for technological literacy (Georgina, 2007).The primary task of technology infrastructure is to support both instructional technology and student learning technology. This includes technology to enhance and support communication between student and instructors. Learning-support technology goals consist of creating communities (Olapiriyakul and Scher, 2006, p. 295).

Organizational change is not easy to accomplish, and technological changes cannot be implemented without resistance. The implementation of new technology is recognized by many as an event characterized by fear of the unknown, concern over organizational changes and their implications, and criticism from many constituents (Gibson et al. 2008). In Teaching Acceptance Model research, user acceptance is characterized as a combination of a positive attitude toward the technology, intention to use the system, and actual use of the system (Davis et al., 1989; Taylor and Todd, 1995).

Audio and visual consultants are hired to outline the technology requirements by identifying how technology functions within the organization. Once a detailed matrix of technology choices has been prepared for each space, the consultants present a document that lists each room, the equipment recommended, and their list prices. A primary goal of higher education is delivering instruction to students. Therefore, one foundational tenet for the design team should be, "How can we design systems that facilitate and enhance the core business of instruction?" (Bryan, 2009). Another key part of the design process included reaching out to peers at other institutions and traveling to see what worked at other campuses.

Universities, which are learning and teaching center of higher education, spend a lot of money and performance for a good technology implementation in order to make the learning and teaching more efficient and quality. Investment in technology systems by universities is driven by the expectation that increased use of technology will improve the quality and

flexibility of learning (Bates 2001; Bush 1945; Cuban 2001; DfES 2003; Oppenheimer 2003; Ryan et al. 2000). Management Systems and the computerization of key administrative functions (Hawkins and Rudy 2006, 52; Zemsky and Massy 2004), and the maintenance of an effective technology infrastructure remains a key strategic focus for university leaders (Allen and Seaman 2008; McCarthy and Samors 2009). Many institutions have attempted variations on early adopter innovation projects, invested in substantial infrastructures, and consequently developed an awareness of the need for formalized and systematic professional development (Marshall, 2010).

1.3 Statement of the Problem

Campus technology and its implementation are the issues that are studied in the literature commonly. However, beside the planning and implementation process, faculty members' attitudes, trends for using technology, perceptions and expectations from campus technology are the issues that need to be examined.

According to Wallin and Smith (2005), "Faculty life in community and technical colleges is remarkably similar across the country and is characterized by heavy teaching loads, close relationships with business and industry, involvement in community service, and a lack of clerical and teaching support" (p. 89).

Gilbert (1996) reported that many institutions did not provide obtainable information for "good practices" (p. 11). In addition, research, such as a study by Wolcott and Betts (1999) has identified limited institutional reward practices and incentives for faculty members who did not encourage participating in technology supported activities. Faculty members identified little or no financial support and stated a need to devote extended working hours to the use of technology.

According to Daugherty and Funke (1998), faculty members have encountered significant barriers to technology use. Such barriers have included a perceived lack of technical support, inadequate software or lack thereof, and lack of institutional policies to provide released time for creating course materials.

The most frequently identified barriers cited in the literature were lack of technical support, equipment, administrative support, time, and student acceptance (Hall & Elliot, 2003; Massey & Zembrey, 1995; Richard, 1999; Spodark, 2003; Wolcott, 2003). The literature also recognizes a relationship between gender, age, professional experience, rank, and tenured with nontenured faculty status with the perceived status of technology at higher education institutions (Peluchette & Rust, 2005; Spotts & Bowman, 1995).

Each university makes their own strategic plans for education policy and its components such as instructional technology, campus life, accommodation etc. There are different commissions about different departments. Each department has difficulties about preparing the strategic plan and its implementation in to practical life. In this point, the factors that affect these parameters should be researched and stated for an efficient campus technology planning. In the light of these information, the barriers and enablers of use of technology in teaching and learning process by academic staff need to be investigated. In this case METU set its own strategic plan in 2011. According to this plan academic staff were supposed to use and integrate instructional technologies in their teaching and learning process. Based on these plans administrative board of METU planed to build policies. To do so, a state analysis should be conducted. With this research the current state of technolohy use by METU faculty

will be depicted. This study will also be the first step of technology adoption strategies. Results of this study will provide evidences in order to build a more understandable and easy to adopt technology integration policies in METU.

1.4 Purpose of the Study

The purpose of this study is to explore the barriers and enablers of current use of instructional technology by METU academic staff. The main focus was to find out the barriers and enablers and their components which are technology use patterns, perceived advantages of using technology, preferred methods of learning technology and receiving support, factors affecting the use of instructional technology in teaching and learning process, factors affecting the use of technology decision, obstacles in use of technology, acquiring knowledge about new technologies and receive support, and preferred methods of training for the use of instructional technology.

1.5 Significance of the Study

Universities are evolving and technology plays a central role within the fundamental changes that are evident (Schneckenberg, 2009). Universities' strategy planners started to think about not only what kinds of technologies are available for campuses, but also how they can be implemented in to higher education and adopted by academic staff. Academic staff are nowadays facing new pedagogical challenges; they have to design learning environments which respond to the changing needs of technology-savvy students; and they have to integrate ICT into their courses to extend the flexibility of educational services in universities (Schneckenberg, 2009).

From this point of view, the importance of technology integration into teaching and learning process and factors that affects the integration take an important place in higher education. With this research, not only the literature, but also academic staff and universities can gain their current states. With the help of this research, while this study contributes the literature for widening the research areas, it also shows different point of view to technology studies. In addition to this, universities and colleges and their contents benefit from this research. Strategic plans of higher education which is the most important thing because of the fact that it is vital for future planning to make the universities and colleges easy to accommodate for improvements and changes. If a suitable path and process steps are clarified, technology implementation and adoption can be applied efficiently in order to increase the quality of teaching and learning.

1.6 Research Questions

1. What are the technology use patterns of METU academic staff?
2. What are the perceived advantages of using of technology by METU academic staff?
3. What are the factors affecting the use of technology decisions of METU academic staff?
4. What are the barriers that the METU academic staff confront in technology use and their suggestions to overcome those barriers?

5. How do academic staff acquire their knowledge about new technologies and receive support?
6. What are the preferred methods of training for the use of instructional technology?

1.7 Assumptions

- Participants accurately respond data collection instruments,
- The data will be accurately recorded and analyzed,
- The measures employed are reliable and valid indicators of the constructs to be studied,
- The purposes, processes, and elements of the framework studied have a degree of applicability and generalizability to Middle East Technical University.

1.8 Limitations

- Validity is limited to the honesty of the subjects' responses to the instruments used in this study.
- The sample size in this study is limited by the number of METU academic staff.
- Validity is limited to the reliability of the instruments used in this study.
- Findings of this study are limited to METU.
- Sample may not be exactly representative of the population.
- Participants' profiles, such as current technology awareness, are different from one participant to another, and that may affect the subject's responses.

1.9 Definition of Terms and Abbreviations

Academic Staff: Assistant, associate and full professors; instructors with Ph.D; instructors; experts; and research assistants

Faculty member: Assistant, associate and full professors

Instructional Technology: In this study, the term instructional technology applies to any use of multimedia, computer technology, or networked communications for improving student instruction or assessment. It can also apply to academic data management. The term applies whether an activity is perfumed in an in-person, in a face to face classroom setting, or between individuals occupying two or more remote locations. Michael Molenda (2004) explained that, "in popular usage, instructional technology refers to the use of communications media–hardware and software--to help people learn" (p. 1).

OCW: METU Open Course Ware

ITSO: Instructional Technology Support Office

TSO: Technical Support Office

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This is the chapter which the synthesis of the literature and its implication on this study are defined. The research question of this study is provided by previous studies which stated in the literature. From different studies, the related points of views are gathered in order to contribute this research.

2.2 Synthesis of the Literature

2.2.1 Technology Integration and Adoption in Higher Education

Olapiriyakul and Scher's (2006) study reiterates that the three main technological components required for a hybrid course are technology infrastructure, instruction technology, and technology in learning. The authors also suggest that developing and designing web-based learning (hybrid) courses is an iterative process, which includes five main phases: course content design, course development, course implementation, course evaluation, and course revision (pp. 297–300). Their five phases are very similar to Gustafson and Branch's (2007) model, ADDIE: analyze, design, develop, implement, and evaluate (pp.11–12).

Lewis and Strarsia (2009) stated that the design and implementation of technology can prove a particularly daunting challenge for campus planners and project designers. Specialization is required for the selection and implementation of technologies including the familiar network, telecommunications, and data-processing functions, and also the more esoteric emerging technology labs and simulation spaces, financial trading rooms, and teleconference centers.

The success or failure of technology use depends more on “human and contextual factors than on hardware or software” (Valdez, McNabb, Foertsch, Anderson, Hawkes, & Raack, 2000, p. 4.). Besides, the faculty beliefs about schooling are likely to influence their pedagogical styles as well as technology integration practices in the classroom (Sandholtz, Ringstaff, & Dwyer, 2000). In addition, it is usually the factors that are personal and deeply ingrained, such as instructors’ beliefs about the instruction process (Ertmer, 1999), and the value of computing in education (Kent & McNergney, 1999) that play a big role in the way faculty generally integrate technology tools into instruction.

In a study about the effectiveness of technology in schools, Sivin-Kachala and Bialo (2000) reported positive and consistent patterns when students were engaged in technology-rich environments. Even so, reports indicate that faculty members are not using technology in

ways that make a difference in student learning (Anderson, 2000; Cuban, 2001; McCannon & Crews, 2000). Regrettably, technology integration is lacking throughout the educational curriculum (International Society for Technology in Education, 2000).

Adoption can be seen as a process of information diffusion, culminating in a rational choice to use (or not to use) the new technology. This perspective relies principally upon a view of learning as information acquisition (Mayer, 1996). A prospective user engages in a process of inquiry concerning the technology (Hall and Hord, 1987; Rogers, 2003). After learning more about the pros and cons, the user (or group of users) commits to a testing, followed by a fullscale adoption of technology. Further, technology adoption can be seen as the assimilation of new cultural tools and practices.

2.2.2 Theories Used in Technology Adoption

A number of theories have been explored in relationship to faculty adoption of ICT in teaching and teacher education programs. The Concerns-Based Adoption Model (Hall and Hord, 1987) and Rogers' Diffusion of Innovations (Rogers, 2003) theory have commonly been used in many studies. The Concerns-Based Adoption Model is used to study the process of adopting innovations (Sherry and Gibson, 2002). In this model, Hall and Hord (1987) described eight different levels of use of an innovation: non-use, orientation, preparation, mechanical use, routine, refinement, integration, and renewal. While the Concerns- Based Adoption Model focuses more on the adoption process of an innovation, the Diffusion of Innovations Theory looks at both the adoption and the diffusion of an innovation.

Dooley et al. (1999) and Stuart (2000) defined Rogers' theory as a widely used theoretical framework in the area of technology diffusion and adoption. Other studies have suggested that Rogers' Diffusion of Innovations theory is most appropriate for investigating the adoption of technology in higher education and other educational environments (Medlin 2001; Parisot 1997). Roger's Diffusion theory provides a model for other institutions seeking a theorybased approach to study faculty adoption and diffusion of ICT that enhances technology leadership. General surveys, for instance, at the state or regional level become useful benchmarks of adoption levels over time (Becker 1994). These demographic data then become valuable information in the hands of policymakers and administrators seeking to allocate resources in fair and effective ways.

2.2.3 Instructional Technology Adoption Patterns of Faculty in Higher Education Institutions in Turkey

Odabaşı (2000) has conducted a study in a Turkish university to explore the faculty familiarity and use of technology resources, and factors affecting utilization of technology. According to the study, familiarity of faculty members to traditional resources like radio, video is high. But they are not so familiar with current technology resources. For the use of technology resources frequency the study shows that faculty never used computer conferencing to promote class discussion (81,3%), multimedia for individualized learning (76,2%), e-mail for individual contact with students (71,5%) and computer-assisted instruction (68,8%). Faculty used technology resources frequently as word processing to

prepare exams and course materials (36,8%), presentation software to prepare handouts, transparencies (26,4%) and e-mail with on and off-campus colleagues (21,5%).

Gulbahar, Zayim and Yıldırım (2002) conducted a combination of qualitative and quantitative research which found that technology resources are used by the faculty in the old fashioned sense. In order to explore discrepancy pertaining to the current and the expected technology utilization. Participants of this study were 7 administrators, 42 faculty member, 44 research assistant, 24 administrative personnel and 957 students. It is reported that computer technologies are used by faculty members mostly in course related activities rather than in classroom. According to this study faculty use computers mostly to communicate (95%), to prepare course materials and exams (92%), to search on Internet (ODTÜ Eğitim Fakültesi Öğretim Teknolojileri Planı, 2001).

2.2.4 Technology Strategies for Higher Education

Kyei-Blankson et al.(2009) examined students' technology use, skills, and expectations, as well as students' evaluation of faculty use of technology to support classroom instruction. Ideally, their study is intended to help faculty for identification of effective strategies that could improve and strengthen academic programs to meet the learning needs of all students, especially the Net Generation students. The study also provides an insight into how higher education faculty might model technology integration in their courses to enhance student learning.

To meet the technological demands of college students, many institutions of higher learning continue to invest substantially in computer technology and computer-mediated communications on their campuses (Cuban, 2001; Oppenheimer, 2003).

In a study to examine students' perceptions of technology adoption by faculty at a Midwest public university, Keengwe (2007) reported that students lacked computer skills in various computer applications that are necessary to support and enhance their learning experiences. This implies that college students do not necessarily possess the much needed skills to conform to the process of technology integration, but could benefit from direct technology-specific instruction by their faculty.

Faculty are challenged to prepare graduates to effectively use technology as a learning tool yet the faculty are new to various technology uses and have no personal experiences as students themselves learning in technology infused classrooms (Jacobsen, Clifford, & Friesen, 2002).

Although findings from research conducted in technology use in education has led to improvements in teaching and learning with technology, the information gathered has primarily been from the faculty and not the students' perspective.

According to Kyei-Blankson et al. research, regarding students' use of technology, most students (83%) indicated that in a typical week within the semester, they spent 3 hours or more using the computer for various course-related activities and assignments; 67% spent 3 hours or more communicating with their peers or instructors by email. Another finding is the common theme voiced by students not regarding the effect of technology itself but rather the effect of an instructor's lack of technology proficiency on their learning.

There is need to change the existing traditional pedagogical approaches to benefit the current learners on our campuses (Keengwe, 2007). However, making meaningful modifications,

improvements, or changes to classroom instructional approaches cannot take place without a thorough understanding of students' true technology skills.

Change in large complex organizations can be described as operating at multiple levels: process, systems, structures, organizations and institutions (Seel 2007; Waks 2007). Birnbaum (1988) suggests that change can occur more effectively if universities are managed according to the principles of cybernetics, what Stafford Beer called the science of effective organization. Structures within the organization are then organized in a loosely coupled manner (Weick 1976).

Additionally, campuses need to design and implement a strong academic vision grounded on technology integration as well as offer relevant professional development programs that support teachers experimenting with new educational technologies. Students' technology use and skill are different from those of their instructors. Additionally, faculty use technology at a lesser rate than expected by their students. Further, technology use in instruction may have either a positive or negative effect on students' learning. There is need for faculty to gain primary technology skills in their instructional practices but they will be most successful using technology as a learning tool for their students if they can model their own instructional practices to enhance student learning.

Organizational change in universities depends, to a high degree, on their capability to motivate their professorate to engage actively into institutional innovation. However, because of the specific career development mode within the academic profession, which will be outlined in the next section, universities play only a limited role in the continuous development of their academic staff. Strategic human resources development plans, although they seem indispensable for the innovation of organizations, are a new phenomenon in most universities and need to cope with these structural constraints (Schneckenberg, 2009). In addition to these points, the wider changes that emerge in the macro-level institutional environment often bear little relation to the work done within universities themselves.

Taylor (2001b) observed that the challenge facing universities trying to best use technology for education is not so much about the innovation itself. Key is the execution of the change; the need for the organization to rapidly evolve to sustain the execution of change at the same increasing pace at which new technologies are developed.

Change within an organization can be described as top-down (driven by management), bottom-up (reflecting emergent or participatory-driven change), or combinations of the two. Bottom-up initiatives are generally driven by individual 'early adopters' (Rogers 1995), and while substantial resources have been invested in such projects, wider adoption and use requires more than resources: leadership, systems and a supportive climate for change are essential (Southwell et al. 2005).

There is a danger that the adaptation of innovation strategies within universities tends to be more of a ritualistic or symbolic nature than to reflect a real willingness and commitment of their workforces to drive change forward. As consequence, the validity of organizational rationality implications, which are discussed in new public management models for corporate governance, has to be critically questioned for the higher education sector (Birnbaum 1998).

We can draw from this overview on general trends in the higher education sector and on organizational structures of universities at least two central conclusions for the subject of this study. First, the higher education sector is in a period of fundamental change. These change processes exert an increasing pressure on universities to adapt to new normative value systems and to regulation frameworks, which emphasize institutional performance

measurements on the basis of quantitative output indicators. And second, this environmental pressure is forcing universities gradually to re-structure themselves from sheltered state institutions to more entrepreneurial institutions, which need to be able to act as autonomous organizations in competitive educational markets (Schneckenberg, 2009).

2.2.5 Barriers and Enablers to Technology

A barrier is considered, "Any condition that makes it difficult to make progress or to achieve an objective" (Free Dictionary, 2008). Schoepp (2005) stated the understood and yet unspoken connotation of a barrier is that its removal acts as an aid toward the achievement of the objective. The study of barriers as they pertain to technology (integration) is essential because this knowledge could provide guidance for ways to enhance technology. (p. 2)

Roberts, Kelley, and Medlin (2007) investigated "factors influential to the instructors' decision to use technology in the learning environment: (p. 426). This study included "eighty faculty members teaching Principles of Accounting at accredited colleges of business within the State of North Carolina" (p. 426). The survey investigated various "social, organizational and personal factors influencing accounting faculties' decision to adopt electronic technologies in the delivery of instruction" (p. 426). Social factors in this study included, "peer support, peer pressure, mentors, shared values in their department, friends and students" (p. 429). Organizational factors included in this study were "mandate from the university; institutional reward system; formal recognition on a department, college, university level; and physical resources (equipment, hardware, software)" (p. 429). Personal factors included in this study were "personal interest in instructional technology; personal interest in improvement in their teaching; and personal interest in enhancing student learning" (p. 429). The results of this study identified the following "as statistically significant to the adoption of technology; those social factors statistically significant were "peer support, shared departmental values, friends, and students" (p. 428). In addition, organizational factors statistically significant were "physical resources" (p. 429) including that "technology must be available, easy to use, and reliable" (p. 429). "All three personal factors significantly influence the faculty member's decision to adopt technology" (Roberts et al., p. 429).

According to Butler and Sellbom (2002), faculty members at Ball State University identified three main barriers for the use of technology for teaching and learning. These barriers were reliability, ease or difficulty of use of technology, and institutional support. Reliability or "unreliability was the most commonly cited" (Butler & Sellbom, p. 23).

A study completed by Morse, Glover, and Travis (1997) compared use of technology among three departments: information systems, management information systems, and computer information systems. The researchers identified lack of funding, equipment, and administrative and faculty support as reasons or barriers by the identified departments for not using technology. Of the faculty members surveyed, 83.3% said lack of funding, 72.2% reported lack of equipment 55.6% said lack of administrative support, and 66.7% noted lack of faculty support. This was echoed by Daughtery and Funke (1998) in a study where faculty members mentioned the same barriers as stated by Morse et al. but also included lack of technical support and an increase in time and resistance of students' acceptance of technology.

Additional studies completed by Daugherty and Funke (1998) referred to lack of technical and administrative support as barriers to development of online course work. Schoepp (2005)

identified the common barriers to technology integration amongst faculty members at a U.A.E. University. The faculty members surveyed identified "knowledge as to how to effectively integrate technology and the shortcomings of the current reward structure" as barriers (Schoepp, p. 9).

A main barrier to technology use by faculty member has been time. According to Morales and Roig (2002), faculty members' main responsibilities of teaching and research were priorities and took up all of their time. Faculty members have "limited time to dedicate to learning new technologies" (Morales & Roig, p. 70). This issue of time was further discussed in a study by Bocchi, Eastman, and Swift (2004) in which faculty members identified that the development and management of a course by the instructor requires a significant amount of time. This course development using technology was beyond the faculty members' other duties of teaching, research, and administrative responsibilities. Along the lines of management, Gerlich and Wilson (2005) indicated full-time faculty members who used technology "held slightly more office hours per week than their peers" (p. 3).

Researchers are beginning to investigate the question of time and the relationship with technology use (Hilsop & Ellis, 2004). It appears there is evidence indicating overtime is a major downside to faculty using technology (Hulbert & McBride, 2004). According to Morales and Roig (2002), only 50% of faculty members at the University of Puerto Rico participated in technology training. This low percentage was because of time constraints. As cited by Baldwin (1998), "Many faculty do not incorporate technology into key aspects of their work because for them digital technology requires to much time and effort, supplies too many distractions, and yields too little value for the investment" (p. 47)

According to McNeil (1990), a review of faculty issues identified rewards and incentives as key issues relating to faculty participation with technology. In a study by Wolcott and Betts (1999), institutional rewards were listed among faculty members' barriers. According to Wolcott and Betts, the faculty members were not attracted to use technology on the benefit of rewards including financial gains or promotion benefits. In addition, Beggs (2000) conducted a study of faculty members' responses to three barriers: lack of interest in technology (70.4%, not important to somewhat important), lack of relevance to the discipline (65% not important to somewhat important), and surprisingly, lack of contribution to Professional development (61.4% not important to somewhat important) (p. 11). The researcher indicated that the faculty "seem to be saying that the student is the focus and not the teacher" (Beggs, p. 11). According to (Wallace, 2004), "One major factor that cannot be ignored is failure to identify and deal with social and psychological dimension" of technology (p. 45).

As cited by (Wallace, 2004), "Academic and professional goals, interests, and needs, work patterns, social networks, etc. must be taken into account when attempting to diffuse technology into the work place" (p. 46).

According to Butler and Sellbom (2002), a barrier not previously mentioned is the thought that faculty perceive technology as worthless.

> Many faculty wonder whether it is worth their effort to learn many of the available technologies, given the skepticism that those technologies facilitate learning in higher education. Faculty cannot easily find convincing data that technology matters, nor can they easily determine if this is because technology doesn't matter or because the right studies aren't widely available. (p. 26)

According to (Wallace, 2004), technology use by faculty members will occur faster if it is perceived as having:

> (a) a relative advantage over the methods it supersedes in terms of economics, convenience, social prestige, satisfaction; (b) a high degree of compatibility with existing values, past experiences, and needs of potential adopters; (c) a low degree of complexity; (d) a high degree of "trial ability" before commitment is required, and (e) a high degree of visibility to other potential adopters. (p. 29)

According to Betts, "If faculty are to integrate technology into their classes, they must feel comfortable using technology" In addition, Roberts and Ferris (1994) mentioned this comfort level takes approximately "1,000 hours of training" (p. 335). Also Roberts and Ferris explained that training, support, and time and leadership were necessary for the successful integration of technology into the classroom" (p. 335).

Bromme, Hesse, and Spada (2005) described a barrier as "it comes from psychological research on problem solving and creativity. There it refers to the gap between an initial and end state. In other words, barriers are challenges which have to be overcome in order to attain a goal" (p.1). The authors also stated it has also become apparent that the localization of difficulties always depends on theoretically based assumptions concerning the nature of barriers. Working with ICT is often difficult, simply because they are new, and because individual and social routines have to be established in using them. Additionally, the use of ICT is difficult because they are not just alternative tools for dealing with old conventional problems but they are also expected to help with meeting new challenges (Bromme, Hesse, and Spada, 2005).

In their study, Ertmer, Addison, Lane, Ross, and Woods (1999) stated about the struggle of using technology effectively, "it may be important to look at what they have (in terms of beliefs and practices) in addition to what they do not have (in terms of equipment)" (p.68). They classified these barriers into two primary categories: extrinsic (first-order) and intrinsic (second-order). While extrinsic barriers include lack of resources, adequate training, technical support, and time, intrinsic barriers include teacher beliefs, visions of technology integration, and views about teaching, learning, and knowledge.

The authors (Ertmer et al., 1999) classified enablers, like barriers, as being either intrinsic or extrinsic. For example, access to hardware, quality software, the Internet, technical support, as well as administrative and peer support might be viewed as being extrinsic whereas personal beliefs, previous success with technology, and self-efficacy might be viewed as being intrinsic enablers.

Odabasi (2000) stated the most effective factors for use of ICT were its availability, increase in student interest, and improvement on student learning. The enablers were time release, clerical assistance, and grants, whereas the most important barrier was the lack of easily accessible resources. Williams et al. (1998) explained main barriers as: (1) teachers identify a range of issues which they regard as inhibitors to effective use of ICT, (2) lack of access/availability of hardware/software, and (3) lack of familiarity, skills and knowledge.

According to Scrimshaw (2004), there were two factors, which enable ICT use in education. One of them was individual factors such as the availability of high quality resources, high level of technical support, full access to software and hardware at all times, and availability of good quality training. Second was school level enabling factors which included a staff program of ICT training, effective timetabling of rooms and equipment, access to resources, on-site technical support, and whole school policies on using ICT across the curricula.

The following items might also be enablers to overcome the significant barriers: adequate equipment and resources in the literature (Becker, 1994; Fabry & Higgs, 1997; Hadley & Sheingold, 1993; OTA, 1995; Topp, Mortensen, and Grandgenett, 1995); allocating specific units or personnel for peer support and to help reduce the teacher workload (Becker, 1994; Japonite, 2001; OTA, 1995; Pricewaterhousecoopers 2001; Ronnkvist, Dexter, & Anderson, 2000); staff development (OTA, 1995; Willis, 1993); and preparation of technology plans for implementing ICT in STE and universities (UNESCO, 2002).

2.2.6 ICT Perceptions

In the literature, perception has a number of meanings and implications. Most of them are amazingly general or specific. This lack of restrictedness is to be found even if the usages of the terms differ by those who study the field (Bartley, 1969). As Saglam (2006) stated, there are two approaches for the definition of perception: direct and indirect. The supporters of a direct approach have stated that perception is the detection of information about an environment, and this happens through the interactions between animal and environment.

Conversely, the supporters of the indirect approach stated perception is an action process of information, which involves both memory and representation. They believed that the senses do not provide complete information about an object so the gathered information must go through cognitive operations in order to become rich, elaborate, and accurate.

Ashcraft (2006) described perception as the process of interpreting and understanding information gathered by the senses. As humans adapt to their environment, they extract certain information about the environment through their senses. This information extraction process is called perception (Forgus & Melamed, 1976). Also Hentschel, Smith, and Draguns (1986) stated two important features for perception: (1) perception is not an immediate reaction to an object; rather it is a process extended in time, and (2) perception is interlinked to previous experiences and memories. In this study, perception was used based on definitions stated above and these attributes.

In the ICT integration process, positive perceptions of stake holders are crucially important for success. Ropp (1999) clarified this importance as: "If prospective or in-service teachers demonstrate proficiency integrating technology into their teaching but do not believe that technology has a use in the classroom, they will probably not teach with technology despite their proficiency" (p.403). Parallel to Ropp's ideas, Elwood-Salinas (2001) believed that by investigating the perceptions of prospective teachers, regarding ICT integration experiences, their Professional development can provide essential knowledge for pre-service teacher education curriculum designers. On the other hand, Sugar (2002) stated the idea that positive perception of teachers toward ICT integration in the classroom is the most important incentive. By changing perceptions toward the use of technology in schools, teachers could potentially remove several obstacles to effective ICT integration.

2.2.7 Faculty Knowledge of Technology

The previous sections of this document addressed the perceptions and barriers to technology use among full-time faculty members. This section will focus on faculty members' knowledge and experience with technology.

Spotts and Bowman (1995) found that faculty members generally possessed a foundational knowledge of audio, film, video, and word processing but fewer had a foundational knowledge of technologies that incorporate spreadsheets, statistics, e-mail, and course management systems for computer-assisted instruction. Furthermore, faculty members had limited knowledge of technologies that use instructional methods such as presentation software, multimedia, and distance learning.

Researchers Summers and Vlosky (2001) found that 50% of faculty members indicated word processing as the only technology they used. However, many faculty members had "high levels of proficiency with multiple technologies including word processing, e-mail, and the Internet" (Summers & Viosky, p. 84).

According to Butler and Selldom (2002):

> Faculty varied widely in technology proficiency, but most believed that they have many proficiencies with regard to technologies for teaching and learning. The majority rated themselves themselves as either proficient or very proficient in older Technologies (chalkboards, overhead projectors, and VCRs) and new technologies (whiteboards, computers, word processing, e-mail, and internet browsing). The best discriminators of those most proficient from those least proficient are the levels of proficiency with presentation software, graphic, software, Internet browsing, and spreadsheets. (p. 23)

In conclusion, according to Sahin and Thompson (2007), there are many levels of technology that could be used by faculty members. Sahin and Thompson identified "instructional courseware, online sources, up-to-date technology, nontraditional operating systems, self-directed informational sources, data analysis tools, management tools, and collegial interaction" (p. 167) as contributing to the level of technology used by faculty members.

Chizmar and Williams (2001), whose study identified six recommendations for the successful insertion of technology, listed four that were relevant:

> Instructional technology units should invest less of their efforts in solving the technical problems of individual faculty members and more in serving the faculty in general; respect the value of faculty time, campuses need to create venues for faculty to come together to share and trade experiences, development efforts, templates, products, and the like; administration need to insure technology works flawlessly, when technology administrators decide to adopt a new technology they should over – not under-, estimate its capacity; more than ever, faculty need rewards for their instructional development efforts through the release time, monetary awards, software and hardware support, and credit in the salary, promotion, and tenure process. (p. 24)

Along with Chizmar and Williams' (2001) recommendations, Brzycki and Dudt (2005) recommended the following for overcoming barriers, "There must be flexibility among technology administrators to be more able to adapt to faculty needs and barriers, faculty need support that address diverse barriers, needs, concerns, schedules, skill levels and learning styles" (p. 18). Also, Brzycki and Dudt recommended that administrators must provide reward and incentive for the "desired outcomes and products" (p. 19). The rewards and incentives need to be well publicized or well documented, including "support staff that can both use and teach technology and technology needs to be incorporated into faculty evaluation" (Brzycki & Dudt, p. 19).

Sahin and Thompson (2007) questioned the relationship among faculty characteristics, technology experience, instructional technology used in teaching, and technology training. They determined that when these factors were analyzed, then and only then could leaders of higher education institution have a full understanding of the hesitation of faculty members in using technology.

2.2.8 Technology Training

The how, why, and what of implementing faculty training programs are being examined across higher education curricula. Garrison and Kanuka (2004) claim, "Given the increasing evidence that Internet information and communication technologies are transforming much of society, there is little reason to believe that it will not be the defining transformative innovation for higher education in the 21st century" (p. 96).

However, the manner in which training is proffered may be the determining factor for the level of technology literacy (low, moderate, high). Brown (2003) suggests that "wheneve possible introduce faculty to technology through agencies that they know and trust" (p. 12). Learning to integrate technology into pedagogy usually begins as a personal trialand- error approach into simple daily use, and then expands into more collaborative exploration as the tools and practices become more familiar (Garrison & Kanuka, 2004).

Faculty technology literacy training should begin with low level personal use and slowly increase toward higher level pedagogical use. Low level technology use may serve as a way for faculty to introduce technology slowly into their pedagogy and it may assist faculty learning by supporting their immediate pedagogical needs (Ertmer, 2005).

The following four categories represent the most common forms of technology training:

- Self training—personal readings/research, work with colleagues, individual participation in conferences and consortia, and trial and error.
- Departmental peer group training—faculty-led initiatives, workshops/forums or conferences presented by colleagues within the same department, college or university.
- College or university initiated training—faculty development centers/departments for instructional development, university/college technology staff, distance education departments, subject specific training programs, regional and national conferences.
- Outside agency training—instructional designers (content expert prepares materials that a facilitator delivers). (Curan, 2004; Ertmer, 2005; Spotts, 1999)

Huba and Freed (2001) state," those of us who shift our paradigm regarding teaching and learning have new rules, new boundaries, and new ways of behaving" (pp. 3-4). Indeed, new ways of practicing pedagogy are occurring throughout higher education.

The assumption seems to be that faculty will learn to use the system(s) to accommodate their instructional needs. It is as though faith in faculty's ability outweigh the reality of learning a new paradigm. However, technology alone may do nothing to enable the integration of technology-based pedagogies.

The primary task of technology infrastructure is to support both instructional technology and student learning technology. This includes technology to enhance and support communication between student and instructors. Since most universities have technological infrastructures that support internet and database technologies (online registrations, student financial aid, online directories...), the crucial issues needed to be considered are accessibility (capacity and speed of network) and security networks. The technology needed to support pedagogy focuses upon web-based instructional platforms (Blackboard, Desire2Leam, WebCT...) and incorporates digital learning objects. Leaming-support technology goals consist of creating communities (Olapiriyakul & Scher, 2006, p. 295). An example of this technology might be creating an online community that assists the self-acquisition of knowledge and enables students to share common values, expertise, and understanding (multi-user software, online student help, and course tutorials).

Schrum (1999) offers four useful points relating to teacher technology training: one, it takes considerably longer to learn about technology for personal or pedagogical use than learning a new teaching model; two, access to the new technology at school and at home is essential; three, fear of the unknown must be addressed; four, the use of new technology may require teachers to reconceptualize the ways in which they teach. Perhaps Schrum's most important perception that forced or mandated change from the administration may result in "tenuous acceptance, without real change" (p.85). Herein lies the dilemma of faculty user technology literacy growth.

There are many approaches and strategies for faculty training. The ones offered by Brown, Benson, and Uhde (2004) are designed to improve technology literacy and provide a systematic support framework for professional development. The authors offer three fictional case studies which address one of the key missing components in faculty development opportunities—technology training. Each case study reviews the professors' (Dr. Sage, Dr. Wise, and Dr. Sm art) technology literacy and identifies areas of technological weakness. Brown, Benson, and Uhde then offer possible training solutions that can be modeled to assist learning and practice. Some of their advice regarding workshops or training forums includes:

- Limiting the number of participants per workshop to allow for more individualized instruction.
- Encouraging participants to leave the workshop with an immediate goal to implement the new skill in practice
- Providing the opportunity for follow-up workshops in which participants share their successes, failures, learning processes.
- Providing technical support to individual faculty members, [technology infrastructure]
- Reducing advising loads or committee assignments (release time) for trainees.

In order to more effectively enable learning, Brown, Benson, and Uhde (2004) also suggest that university sponsored workshops provide technical experts who are sensitive to the technologically challenged, facilitate communication, sharing, coaching between colleagues [mentors], create avenues of communication for technical needs, develop individualized action plans, and provide opportunities to access the necessary resources from the institution (p. 104). Recent studies have found that technology literacy training should be as uniquely individual as is the constituent faculty—simply put, the individual departmental cultures should be considered before training begins (Brown, 2003: Ertmer, 2005; Mayo, Kajs, & Tanguma, 2005).

2.3 Literature Overview

Table - 2.1 Literature Overview Table

Research Area	Topic	Authors
Technology Integration and Adoption in Higher Education	Technological components	Olapiriyakul and Scher's (2006)
Technology Integration and Adoption in Higher Education	Design and implementation of technology	Lewis and Strarsia (2009); Gustafson and Branch's (2007); Valdez, McNabb, Foertsch, Anderson, Hawkes, & Raack, (2000); Sandholtz, Ringstaff, & Dwyer (2000); Ertmer, (1999); Kent & McNergney, (1999).
Technology Integration and Adoption in Higher Education	Effectiveness of Technology in Schools	Sivin-Kachala and Bialo (2000); Anderson, (2000); Cuban, (2001); McCannon & Crews, (2000); International Society for Technology in Education, (2000); Mayer, (1996).
Theories Used in Technology Adoption	Adoption Models	Hall and Hord, (1987); Rogers, (2003); Sherry and Gibson, (2002); Dooley et al. (1999); Stuart (2000); Medlin (2001); Parisot (1997); Becker (1994).
Instructional Technology Adoption Patterns of Faculty in Higher Education Institutions in Turkey	Faculty Famililarity, Usage and Perception	Odabaşı (2000); Gulbahar, Zayim and Yıldırım (2002); Göktaş (2006); (ODTÜ Eğitim Fakültesi Öğretim Teknolojileri Planı, (2001).
Technology Strategies for Higher Education	Faculty Cases and Solution Suggestions	Kyei-Blankson et al.(2009); Cuban, (2001); Oppenheimer, (2003); Keengwe (2007); Jacobsen, Clifford, & Friesen, (2002); Seel (2007); Waks, (2007); Birnbaum (1988); Schneckenberg, (2009); Taylor (2001b).
Barriers	Barrier Identification and Influences	Free Dictionary, (2008); Schoepp (2005); Roberts, Kelley, and Medlin, (2007); Butler and Sellbom, (2002).
Barriers	Social and Organizational Effects	Roberts, Kelley, and Medlin, (2007); Wallace, (2004).

Table - 2.2 Literature Overview Table

Research Area	Topic	Authors
Barriers	Administrative, Institute Support	Roberts, Kelley, and Medlin (2007); Butler and Sellbom (2002); Daugherty and Funke (1998); Wolcott and Betts (1999).
Barriers	Technical Support, Equipment and Funding	Daugherty and Funke (1998); Morse, Glover, and Travis (1997); Roberts, Kelley, and Medlin (2007); Bromme, Hesse, and Spada (2005).
Barriers	Time	Morales and Roig (2002); Bocchi, Eastman, and Swift (2004); Gerlich and Wilson (2005).
Barriers	Technology Integration, Ease and Difficulty of Use of Technology	Daugherty and Funke (1998); Roberts, Kelley, and Medlin (2007); Butler and Sellbom (2002); Hulbert & McBride, (2004).
Barriers	Trainings and Efficiency	Morales and Roig (2002); Hilsop & Ellis, (2004); Hulbert & McBride, (2004); (Wallace, 2004), Butler and Sellbom (2002); Roberts and Ferris (1994); Bromme, Hesse, and Spada (2005).
Barriers	Personal and Social Interest	Wallace, (2004); Beggs (2000); Butler and Sellbom (2002); Roberts, Kelley, and Medlin (2007).
Barriers	Faculty Cases	Morse, Glover, and Travis (1997); Daughtery and Funke (1998); Schoepp (2005).
Enablers	Intrinsic or Extrinsic Factors	Ertmer et al., (1999); Odabasi (2000); Göktaş (2006); Scrimshaw (2004); Becker, (1994); Japonite, (2001); OTA, (1995).
Enablers	School / Faculty Level and Support	Becker, (1994); Fabry & Higgs, (1997); Hadley & Sheingold, (1993); OTA, (1995); Topp, Mortensen, and Grandgenett, (1995).

Table - 2.3 Literature Overview Table

Research Area	Topic	Authors
ICT Perception	Direct and Indirect	Bartley, (1969); Saglam (2006); Forgus & Melamed, (1976); Ashcraft, (2006).
ICT Perception	Relationship between Perception and Professional Development	Ropp (1999); Elwood-Salinas (2001); Sugar (2002).
Technology Trainig	Training Methods	Garrison and Kanuka (2004); Brown (2003); (Ertmer, 2005).
Technology Trainig	Self Training	Curan, (2004); Ertmer, (2005); Spotts, (1999); Huba and Freed (2001).
Technology Trainig	Departmental Peer Group Training	Curan, (2004); Ertmer, (2005); Spotts, (1999); Olapiriyakul & Scher, (2006).
Technology Trainig	College or University Initiated Training	Curan, (2004); Ertmer, (2005); Spotts, (1999); Olapiriyakul & Scher, (2006).
Technology Trainig	Outside Agency Training	Curan, (2004); Ertmer, (2005); Spotts, (1999).
Technology Trainig	Sponsored Workshops and Practice Sharing	Brown, (2003); Ertmer, (2005); Mayo, Kajs, & Tanguma, (2005); Brown, Benson, and Uhde (2004).

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

In this chapter, the research methodology is presented in the following sections:

- Research questions
- Design of the study
- Population and sampling
- Data collection procedures and instruments
- Data analyses
- Limitations of the study

3.2 Research Questions

The aim of this study is to explore the barriers and enablers of current use of instructional technology by METU academic staff. The main focus was to find out the barriers and enablers and their components which are; technology use patterns, perceived advantages of using technology, preferred methods of learning technology and receiving support, factors affecting the use of instructional technology in teaching and learning process, factors affecting the use of technology decision, obstacles in use of technology, acquiring knowledge about new technologies and receiving support, and preferred methods of training for the use of instructional technology. This study was led by the following research questions:

1. What are the technology use patterns of METU academic staff?
2. What are the perceived advantages of using of technology by METU academic staff?
3. What are the factors affecting the use of technology decisions of METU academic staff?
4. What are the barriers that the METU academic staff confront in technology use and their suggestions to overcome those barriers?
5. How do academic staff acquire their knowledge about new technologies and receive support?
6. What are the preferred methods of training for the use of instructional technology?

3.3 Design of the Study

This study was designed as a mixed method. Creswell (2009) indicated that research method proposals that are used for studies contain three main phases; which are data collection, analysis, and interpretation. For this reason, a researcher should select an appropriate design methodology, which are either quantitative, qualitative or mixed methods, based on the research questions of the study.

When either qualitative or quantitative researches are not enough to describe the research problem, or answer the research questions, or when more data is required to extend, elaborate further, or explain the first database, mixed method studies can be conducted (Creswell, 2012). In other words, mixed methods are used when it is preferable to provide an alternative perspective within a study (Greene, Caracelli, & Graham, 1989). The main aim of this study was to discover the technology perception and current state of technology usage of faculty members. Thus, a mixed method research design was used in order to address the research questions for a more comprehensive understanding.

According to Fraenkel, Wallen, & Hyun (2012) there are three major mixed-methods design types that each contain a combination of qualitative and quantitative data: (1) the explanatory design, (2) the exploratory design, and (3) the triangulation design. On the other hand, Creswell & Plano Clark (2011) divided mixed method designs into six categories, the first four are the basic designs in use nowadays and the last two are complex designs which are becoming increasingly popular. These designs are: (1) the convergent parallel design, (2) the explanatory sequential design, (3) the exploratory sequential design, (4) the embedded design, (5) the transformative design, and (6) the multiphase design. For this study, as a procedure of the mixed method, explanatory sequential design (Figure – 3.1) was used to extend, explain and clarify quantitative results, which was conducted as a first phase and by collecting and analysing follow-up of qualitative data as the second phase (Creswell, 2009).

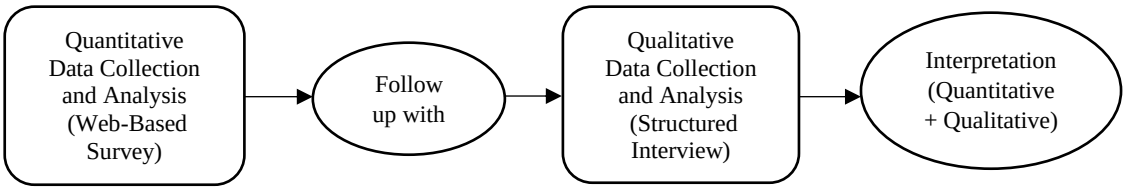

Figure - 3.1 Design of the Study

Creswell & Plano Clark defined the explanatory sequential design as:

> The explanatory design (also known as explanatory sequential design) is a two-phase mixed methods design. This design starts with the collection and analysis of quantitative data. This first phase is followed by the subsequent collection and analysis of qualitative data. The second, qualitative phase of the study is designed so that it follows from (or connects to) the results of the first quantitative phase (p.72).

Moreover, while the explanatory sequential design, the most straightforward of the mixed method designs, consists of collecting and analysing quantitative data followed by the collection and analysis of qualitative data, the priority is basically focused on the quantitative data, and the two methods are combined during the interpretation phase of the study (Tashakkori, & Teddlie, 2003).

This study was carried out in two phases as a mixed method design. In mixed method studies, quantitative and qualitative data could be collected separately in two phases so that the data collected from one source could enhance, elaborate, or complement data from the other source (Greene, Caracelli, & Graham, 1989). As the model of the study is explanatory sequential mixed method; in the first phase, which has the priority, quantitative data was gathered and analysed and followed up with phase II as a qualitative data collection and analysis. After these two phases, the data gathered from both quantitative and qualitative methods were integrated and interpreted in order to present the results. The following flowchart (Figure – 3.2) depicts the procedure of this study.

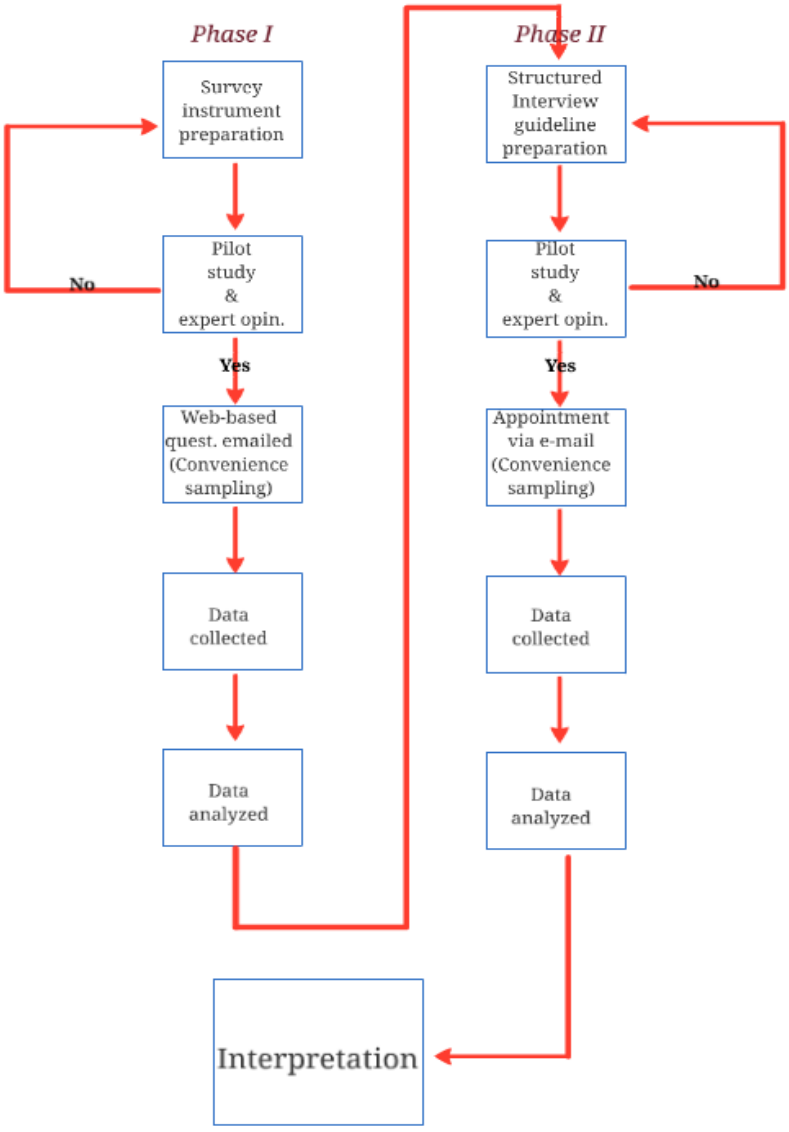

Figure - 3.2 Flowchart of the Study

3.4 Participants of the Study

Sample is a subset of the population: Fraenkel, Wallen, & Hyun (2012) defined the sample as a group in a research study where information is gathered from, where as they are called the population as the larger group to which a researcher hopes to apply the results.

The population of this study was faculty members with different titles who work in METU Ankara campus. There are a total of 2,557 academic staff, of which, 410 of them are faculty members, working in all departments at METU's Ankara Campus. Fraenkel, Wallen, & Hyun (2012) claimed that a researcher might use convenience sampling and they define it as a convenient group of individuals that are available for study. Under these definitions and conditions of the study, representative convenience sampling was used for both phase I and phase II in order to determine the participants of the study. To do so, first, official approval from the ethics committee of METU was sought and received (Appendix A).

This paragraph presents the overall sample of the study. After that, details for both phase I and phase II sampling will be given sequentially in other paragraphs. Overall, the study had 176 participants. These participants had different academic titles and were from different faculties, departments or institutes.

3.4.1 Participant Selection for the Quantitative Phase of the Study

A survey was conducted for phase I of the study. Since the sample should exhibit similar characteristics to the target population, selecting as large a sample as possible is important (Creswell, 2012). To conduct the survey, after the approval was granted, the questionnaire was converted to a web-based questionnaire in order to make it easier to reach as many potential participants as possible. Creswell (2012) also stated that sometimes, obtaining a good list of the target population is difficult. To cope with these possible problems, the general mailing list of METU was used in order to send a web-based questionnaire to possible participants via e-mail. The general mailing list of METU is a database that includes each academic staff's email address. The web-based questionnaire was sent to each individual of the population. As a convenience sampling, responders were taken as the sample. There were 160 respondents from the population. Academic title, gender (Table – 3.1), and faculty (Table – 3.2) of the academic staff who participated to the study are presented below.

Table - 3.4 Proportions of Quantitative Phase Participants by Academic Title and Gender

	Academic Title						Gender	
	Prof. (%)	Assoc. Prof. (%)	Assist. Prof (%)	Instr. With Ph.D. (%)	Instr. (%)	Res. Asst. (%)	Female (%)	Male (%)
Sample (n=160)	18.8	8.8	18.8	22.3	10.0	21.3	51.2	48.8

Table - 3.2 Proportions of Quantitative Phase Participants by Faculty

Faculties, Institutes or Schools	**Frequency (n=160)**
Faculty of Architecture	8
Faculty of Arts and Sciences	22
Faculty of Economic and Administrative Sciences	16
Faculty of Education	22
Faculty of Engineering	44
School of Foreign Languages	35
Others	13
Total	160

3.4.2 Participant Selection for the Qualitative Phase of the Study

In phase II, in-depth interviews were used in order to collect qualitative data. Similar to phase I, convenience sampling was used in phase II. To determine the interviewee candidates, first of all quantitative data were used. According to the questionnaires, the most, the least and the average users were determined. Then, the researcher tried to put together a mailing list from all five faculties and the school of foreign languages. Within the list, there were 120 interviewee candidates with at least 20 academic staff from each faculty and the school of foreign languages. In order to reach the faculty members, e-mails were sent out. Since it was convenience sampling, responders were assumed as participants. There were three groups of interviewees: those who replied to the e-mail positively, those who replied negatively, and those who did not reply at all. Participant candidates who replied to the e-mail stated their opinion about being a participant of the study, and some preferred not to contribute to the study. After these steps were taken, sixteen academic staff from different faculties, departments or institutes at METU's Ankara campus agreed to participate in phase II. Eleven of the participants were female and five of them were male. Two of the participants were professors, four of them were associate professors, two of them were assistant professors, three of them were instructors with Ph.D., and the rest (five participants) were instructors (Table – 3.3). Distribution of interviewees' faculty is presented in Table – 3.4.

Table - 3.3 Proportions of Qualitative Phase Participants by Academic Title and Gender

	Academic Title					Gender	
	Prof. (%)	Assoc. Prof. (%)	Assist. Prof (%)	Instr. With Ph.D. (%)	Instr. (%)	Female (%)	Male (%)
Sample (n=16)	12.5	25.0	12.5	18.8	31.2	68.7	31.3

Table - 3.4 Proportions of Qualitative Phase Participants by Faculties and Schools

Faculties, Institutes or Schools	**Frequency (n=16)**
Faculty of Architecture	1
Faculty of Arts and Sciences	1
Faculty of Economic and Administrative Sciences	1
Faculty of Education	2
Faculty of Engineering	3
School of Foreign Languages	8
Total	16

3.5 Data Collection Procedures and Instruments

As a mixed method research, this study consists of both quantitative and qualitative data collection procedures that allowed the researcher to obtain rich, detailed and understandable data. As mentioned above, for each phase of the study, different types of data collection procedures and instruments were applied. For phase I, as it is a quantitative study, a survey by questionnaire was conducted. On the other hand, in phase II, structured interviews were used in order to gather data for the qualitative phase of the explanatory sequential mixed method design.

3.5.1 Survey

The basic goal of surveys is to explain the characteristics of a population and by using this instrument, researchers try to find out how the sample, a subset of the population, distribute themselves on one or more variables within a population (Fraenkel, Wallen, & Hyun, 2012). Although, in the literature, there are lots of applications about survey, there are two fundamental types of research surveys: cross sectional and longitudinal (Creswell, 2012).

Creswell (2012) also argued that cross sectional design surveys are used in order to obtain data about current attitudes, opinions, or beliefs. Since the purpose of the study is to explore the barriers and enablers of current use of instructional technology by METU academic staff, the cross sectional survey design was selected.

To collect data, a web-based questionnaire was selected. A web-based questionnaire is an instrument that enables the collection of data via computers using the internet. An advantage is that web-based surveys can obtain extensive data quickly, helping the researcher to reach out to as many participants as possible (Creswell, 2012).

The questionnaire consisted of the following subtitles: (1) participant demographics, (2) use of instructional technology, (3) acquiring technology knowledge and preferred receiving support methods, (4) factors that affect use of technology, and (5) preferred instructional technology training.

Participant Demographics: This part consisted of seven items in order to gather nominal and interval data. Departments, age, gender, academic title, years of being academic staff, years of teaching experience, and e-mail address of responders were asked.

Use of Instructional Technology: For this part, there were six questions; having a computer and internet in the home and office, kind of instructional technology that academic staff have used recently, technology usage and awareness, and how they learned using such technologies.

Acquiring Technology Knowledge and Preferred Receiving Support Methods: In the third part of the instrument, a five point scale (1 = strongly do not prefer, 2 = do not prefer, 3 = neutral, 4 = prefer, 5 = strongly prefer) was used for both subcomponents. The first component had 7 items, and there were 11 items in the second.

Factors That Affect Use of Technology: This part contained 12 items. Responders used a three point scale (1 = does not block, 2 = partly blocks, 3 = mostly blocks) to answer this part.

Preferred Instructional Technology Training: Ten "Yes/No" questions were prepared for this part. Faculty members were asked what kind of training they would like to undertake in terms of instructional technology that they are using or would like to use.

Once the web based questionnaire was ready, an e-mail, which explained the study and also contained a link to the questionnaire, was sent out to the target population.

3.5.2 Interviews

As a second phase, after collection of the quantitative data, interviews were conducted with academic staff from different faculties, who had different academic titles. According to Fraenkel, Wallen, & Hyun (2012) there are four kinds of interviews (structured, semi-structured, informal, and retrospective) and structured and semi-structured interviews that consist of a series of questions to identify specific answers from participants. Based on this, a structured interview guideline was prepared in order to obtain in-depth information about technology usage and perceptions of the academic staff.

3.6 Data Analyses

In the study, both quantitative and qualitative data were obtained in order to answer the research questions.

3.6.1 Quantitative Analysis

Data obtained from the survey was analysed with the means of statistical methods. Descriptives and frequencies were analysed in order to explore, define and interpret the results obtained from the participants. The data was organised and prepared for analysis using SPSS 20.0, which is statistical analysis software. In the organisation and preparation process, data sets that had unfinished or missing data were excluded. After this step, the descriptive data was analysed and the results interpreted.

3.6.2 Qualitative Analysis

There are several types of qualitative data analysis: ethnographic analysis; narrative analysis; phenomenological analysis; the constant and comparative method; content analysis and analytic induction (Merriam, 1998). In this study, content analysis method was used in order to analyse the qualitative data obtained from the interviews. According to Fraenkel and Wallen (2009), content analysis allows the researcher to study human behaviour through analysis of their communication in an indirect way (p. 472).

As a first step, the researcher listened to the recordings several times in order to get used to the data. After listening, the recordings were transcribed in to written form. As a third step, the transcriptions were put into a table and categorised according to the research questions. Next, the researcher read the text and determined the themes and sub themes. Since the aim of the research was about state analysis, instead of defined in the literature themes, the developed themes method was used. The data was then coded according to developed themes. Finally, the coded data and themes were put into a table and this table was analysed by the researcher in order to figure out the in depth explanations of the research questions.

3.7 Validity and Reliability

3.7.1 The Questionnaire

Creswell suggested that a researcher should review the literature to see if there is a survey instrument already available to measure the researcher's variables. (Creswell, 2012, p. 385) They may also consider modifying an existing instrument. Based on these arguments, literature was reviewed in order to find out whether there was an existing survey instrument. After searching, some questionnaires were found (Zayim, Yıldırım & Saka, 2006; Cardwell-Hampton, 2008; Markova, 2011; Göktaş, 2006). Since the topic was more relevant than some of the others –technology diffusion of faculty members from Akdeniz University in

Turkey – and the fact that the instrument was already developed in the Turkish language, Zayim, Yıldırım and Saka (2006)'s questionnaire was chosen. By choosing this instrument, translation and possible content validity problems were avoided. Since the topic of the study did not address all the research questions of this study, the instrument was then modified in order to make the instrument more comprehensive for this study. As this research is a descriptive study and does not examine any constructs or attitudes, just three sections of the instrument (participant demographics, use of instructional technology and acquiring technology knowledge, and preferred receiving support methods), were applied. The remaining sections, which were used to identify adopter groups and to examine faculty members' attitudes, were omitted. In addition to these three sections, factors that affect the use of technology, and preferred instructional technology training sections were included in the instrument.

Once the survey instrument was examined, a pilot study was conducted to ensure content validity of the instrument. First of all, the researcher's colleagues were asked to comment. As a second step, an expert opinion was sought while shaping the draft version of the revised instrument. A pilot study, with four responders, was conducted and the responders were requested to comment and make their suggestions on the proposed instrument. After these steps, in order to finalise the instrument in terms of validation and grammar, a final version of the survey form was prepared (Appendix B). Since the first two sections of the instrument obtain nominal data, only the last three sections of the instrument were examined in terms of reliability issues. The Cronbach alpha coefficient was calculated as $\alpha = .81$ denoting a satisfactory level of reliability. The adopted and developed sections of the instrument are presented in Table – 3.5.

Table - 3.5 Cronbach Alpha Distribution of Instrument Sections

Instrument Section	**Adopted From**	**∑ Item No**	**Cronbach Alpha**
Acquiring Technology Knowledge and Preferred Receiving Support Methods	Zayim, Yıldırım and Saka (2006)	18	.816
Factors That Affect Use of Technology	Developed	12	.759
Preferred Instructional Technology Training	Developed	10	.797

3.7.1 The Interview

In order to obtain in-depth information about technology usage and perceptions of the academic staff an interview guideline was prepared. A survey questionnaire and research questions were taken as a guideline while preparing the instrument. As a product of these preparations, a draft version of the interview guideline was designed. After this step, two expert opinions were sought in order to review the instrument. See Appendix C for the draft interview guide. Then, as the 3rd step, a pilot study was conducted with two participants who are teaching assistants in CEIT department. According to the participants' responses and suggestions, the interview guideline was revised and finalised (Appendix D).

The interview guideline consisted of 11 main structured questions, with 13sub questions. The interview was applied to sixteen participants (n=16), with at least one participant from each faculty at METU. The interviews lasted approximately 25 to 35 minutes.

The Instrument type and addressed research questions are presented in Table – 3.6.

Table - 3.6 Research Question vs. Instruments Relation

Research Questions	**Quantitative**	**Qualitative**
What are the technology use patterns of METU academic staff?	X	X
What are the perceived advantages of using of technology by METU academic staff?	O	X
What are the factors affecting the use of technology decisions of METU academic staff?	O	X
What are the barriers that the METU academic staff confront in technology use and their suggestions to overcome those barriers?	X	X
How do academic staff acquire their knowledge about new technologies and receive support?	X	X
What are the preferred methods of training for the use of instructional technology?	X	X

3.8 Limitations of the Study

- Validity is limited to the honesty of the subjects' responses to the instruments used in this study.
- The sample size in this study is limited by the number of METU academic staff.
- Validity is limited to the reliability of the instruments used in this study.
- Findings of this study are limited to METU.
- Sample may not be exactly representative of the population.
- Participants' profiles, such as current technology awareness, are different from one participant to another, and that may affect the subject's responses.

Table - 3.7 Summary Table of Methodology

Research questions	Data Source	Instrument	Data Analysis
What are the technology use patterns of METU academic staff?	METU Academic staff	Questionnaire and Interview	Descriptive and Content Analysis
What are the perceived advantages of using of technology by METU academic staff?	METU Academic staff	Interview	Content Analysis
What are the factors affecting the use of technology decisions of METU academic staff?	METU Academic staff	Interview	Content Analysis
What are the barriers that the METU academic staff confront in technology use and their suggestions to overcome those barriers?	METU Academic staff	Questionnaire and Interview	Descriptive and Content Analysis
How do academic staff acquire their knowledge about new technologies and receive support?	METU Academic staff	Questionnaire and Interview	Descriptive and Content Analysis
What are the preferred methods of training for the use of instructional technology?	METU Academic staff	Questionnaire and Interview	Descriptive and Content Analysis

CHAPTER 4

FINDINGS

4.1 Introduction

This chapter represents the findings that were obtained from the survey and from the interviews. In each subtitle, findings that aimed to answer the research questions are summarised in detail.

For the study quantitative and qualitative results are analysed separately and merged. The quantitative data obtained from the survey has been exposed to statistical analysis in order to explore, describe and interpret the findings. The structured interviews were conducted in order to obtain in-depth information about academic staff's perception and the use of technology in the teaching and learning process.

In this part of the chapter, the following headings are presented:

- Faculty demographics
- Use of instructional technology
- Perceived Advantages in Use of Technology
- Influences on Use of Technology Decision
- Barriers in Use of Technology, Preferred Sources and Solutions
- Acquiring Knowledge about New Technologies and Support
- Preferred Technology Training and Support

The targeted population of the study are 2,557 academic staff at METU's Ankara campus, of which, 410 are faculty members (assistant, associate and full professors), and the others are faculty members, instructors with a Ph.D., non-Ph.D. instructors, experts, and research assistants. A web-based questionnaire was sent to all academic staff and 160 (6.3%) of the academic staff responded. For the interviews, e-mails were sent to 120 academic staff, with at least 20 from each faculty and school, and 16 of them responded positively and participated in the study.

4.2 Demographics

4.2.1 Faculty Demographics (Phase I)

In this section, gender, academic title, age, department, and academic background of the participants are presented (Table – 4.1).

Table - 4.1 Academic Staff Demographics.

		n	%
Gender	Female	82	51.2
	Male	78	48.8
Academic Title	Prof.	30	18.8
	Assoc. Prof.	14	8.8
	Assist. Prof.	30	18.8
	Academic staff	36	22.5
	Instructor	16	10.0
	Research Assist.	34	21.3
Age Groups	21 – 30	38	23.8
	31 – 40	66	41.2
	41 – 50	28	17.5
	51 – 60	17	10.6
	60+	11	6.9

Of the 160 respondents, 82 (51.2%) are female and 78 (48.8%) are male, and hold different academic titles.

From 160 respondents, 30 (18.8%) were professors, 14 (8.8%) were associate professors, 30 (18.8%) were assistant professors, 36 (22.5%) were academic staff, 16 (10.0%) were instructors, and 34 (21.3%) were research assistants.

The average age of the sample was 39.1 years. While this is the average, in terms of age groups, the largest group was in between 31 – 40 (41.2%).

Although convenience sampling was chosen as a strategy, the respondents were from various departments from all faculties, institutions and schools of METU's Ankara campus. METU has five faculties: (1) architecture, (2) art and sciences, (3) economic and administrative sciences, (4) education, and (5) engineering; it also has five graduate schools: (1) applied mathematics, (2) informatics, (3) marine sciences, (4) natural and applied sciences, and (5) social sciences; and one technical and vocational school, three schools of foreign languages: (1) department of basic languages, (2) department of modern languages, and (3) academic writing centre; and two departments reporting to the rectorate: (1) department of Turkish language, and (2) Department of music and fine arts.

Regarding the abovementioned figures, the respondents' distribution by departments is shown below (Table – 4.2). The definition of the department abbreviations are given in Appendix – E.

Table - 4.2 Respondents' Distribution by Departments.

Department	Frequency (n=160)	Percent	Cumulative Percent
ADM	3	1.9	1.9
AE	2	1.3	3.1
ARCH	3	1.9	5.0
BA	3	1.9	6.9
BIO	5	3.1	10.0
CE	8	5.0	15.0
CEIT	2	1.3	16.3
CENG	2	1.3	17.5
CHE	1	0.6	18.1
CHEM	2	1.3	19.4
CRP	3	1.9	21.3
DBE	22	13.8	35.0
DML	13	8.1	43.1
ECON	8	5.0	48.1
EDS	5	3.1	51.2
EE	6	3.8	55.0
ELE	4	2.5	57.5
ENVE	1	0.6	58.1
ES	2	1.3	59.4
ESE	1	0.6	60.0
FDE	5	3.1	63.1
FLE	5	3.1	66.3
GEOE	5	3.1	69.4
GGIT	1	0.6	70.0
ID	2	1.3	71.3
IR	2	1.3	72.5
IS	3	1.9	74.4
MARIN	2	1.3	75.6
MATH	1	0.6	76.3

Table - 4.2 Respondents' Distribution by Departments.

Department	Frequency (n=160)	Percent	Cumulative Percent
ME	7	4.4	80.6
METE	4	2.5	83.1
MINE	1	0.6	83.8
PHIL	1	0.6	84.4
PHYS	4	2.5	86.9
PSY	4	2.5	89.4
SSI	1	0.6	90.0
SOC	4	2.5	92.5
SSME	5	3.1	95.6
STAT	1	0.6	96.3
TEKPOL	2	1.3	97.5
TURK	2	1.3	98.8
TVS	2	1.3	100.0
Total	**160**	**100**	

The respondents' average years of being in the position is approximately 12 years. After dividing the respondents into age groups, the largest group is the 1-5 years group with 58 (36.3%) respondents (Table – 4.5). In addition to this, the majority of respondents (81.9%) has been working as an academician for 1-20 years (131 respondents).

Table - 4.3 Being Academician Distribution by Years.

Years in the Position	Frequency (n=160)	Percent
1 – 5	58	36.3
6 – 10	33	20.6
11 – 15	19	11.9
16 – 20	21	13.1
21 – 25	9	5.6
26 – 30	7	4.4
31 – 35	7	4.4
36+	6	3.7

For teaching, the average teaching experience is approximately twelve years. As the years are grouped, this is similar to the average of being in the position; the largest group was 1-5 years group with 50 (31.2%) participants (Table – 4.4). Likewise, the majority group, 133 (83.1%) respondents, were in the 1-20 years range.

Table - 4.4 Teaching Experience Distribution by Years.

Years of Teaching Experience	Frequency (n=160)	Percent
1 – 5	50	31.2
6 – 10	38	23.8
11 – 15	22	13.8
16 – 20	23	14.4
21 – 25	10	6.3
26 – 30	6	3.8
31 – 35	5	3.1
36 – +	5	3.1

4.2.2 Faculty Demographics (Phase II)

For the second phase of the study the researcher interviewed 16 academic staff from different faculties and with academic titles. The distribution of interviewees is shown in Table – 4.12. The average duration of the interviews was approximately 23 minutes, with participants from different academic ranks. Two of the interviewees were professors, four were associate professors, two were assistant professors, three were academic staff, and five were instructors. While the average age of the participants was 40.6, the average years of being academician was 11.9 years.

Table - 4.5 Distribution of Interviewees

Department	Frequency (n=16)
ARCH	1
CE	2
DBE	4
DML	4
ECON	1
EDS	2
ME	1
SOC	1
Total	16

4.3 Use of Instructional Technology

The following titles are presented in this section:

- Computer ownership and Internet access;
- Recently used technologies;
- Awareness and use of technology;
- Purpose of technology use.

4.3.1 Computer Ownership and Internet Access

Academic staff were asked whether they have a personal computer and internet access. While 158 (98.8%) participants have computer at home, in their office it was 150 (93.8%) (Figure – 4.1). It is notable that research assistants mostly complained about not being given a computer by their departments.

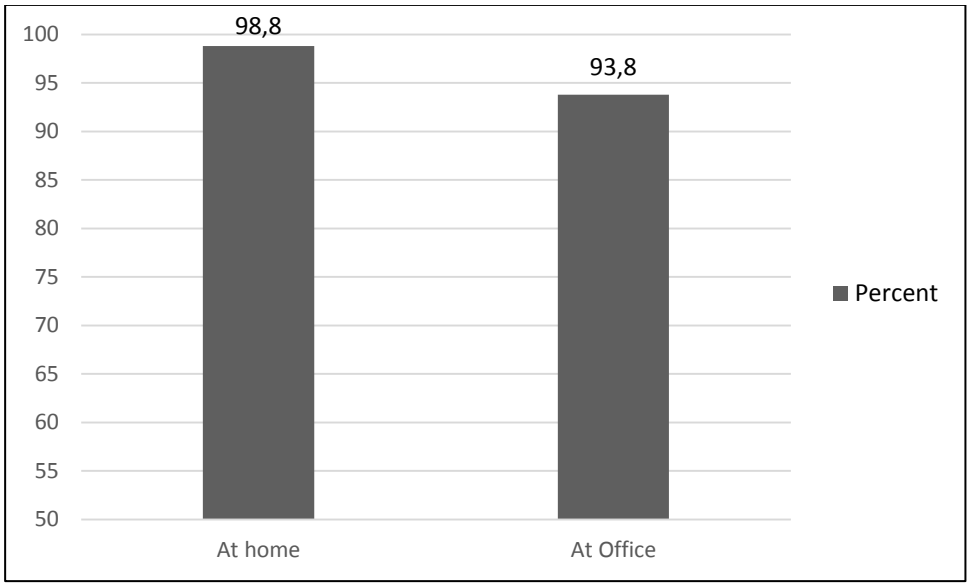

Figure - 4.1 Computer Ownership.

In terms of internet access, participants indicated that they had internet access at home (n=156, 97.5%), for internet access at the office, the number was 152 (95.0%) (Figure – 4.2).

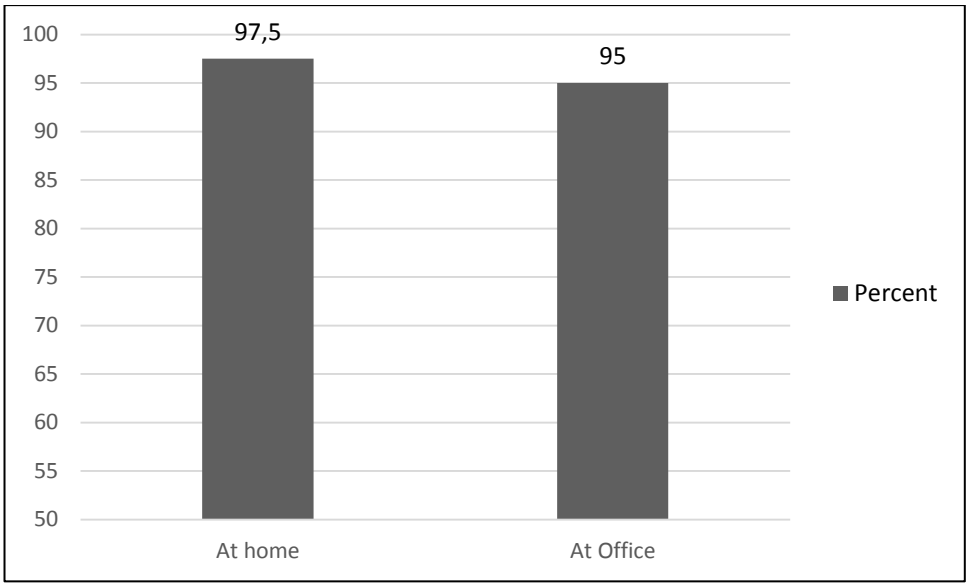

Figure - 4.2 Internet Access.

4.3.2 Currently Used Technologies

In this part both quantitative and qualitative data were obtained. In the survey questionnaire, academic staff were asked to select technologies used recently in teaching and learning from 12 instructional technologies stated in the survey. As can be seen from Figure – 4.3, the most used instructional technologies that have been recently used by academic staff were a computer and projector, 148 (92.5%); board, 128 (80.0%); and course web sites, 85 (53.1%). These results may be due to the systems infrastructure provided by METU. Classroom with ready to use computer and projector and board, and centred course website systems may make the instructional technology preferable to use. Other preferences were ranked as: educational videos, 68 (42.5%); video/TV (wide screen projection), 55 (34.4%); personal web sites, 51 (31.9%); course material preparation software, 47 (29.4%); overhead projector, 45 (28.1%); audio records, 43 (26.9%); LMS-CMS (Moodle, Sakai etc.), 16 (10.0%); smart board, 14 (8.8%); smart classrooms, 14 (8.8%); and others like e-groups, cloud tools, mock-up's and models, articles, and wiki's, 12 (7.5%).

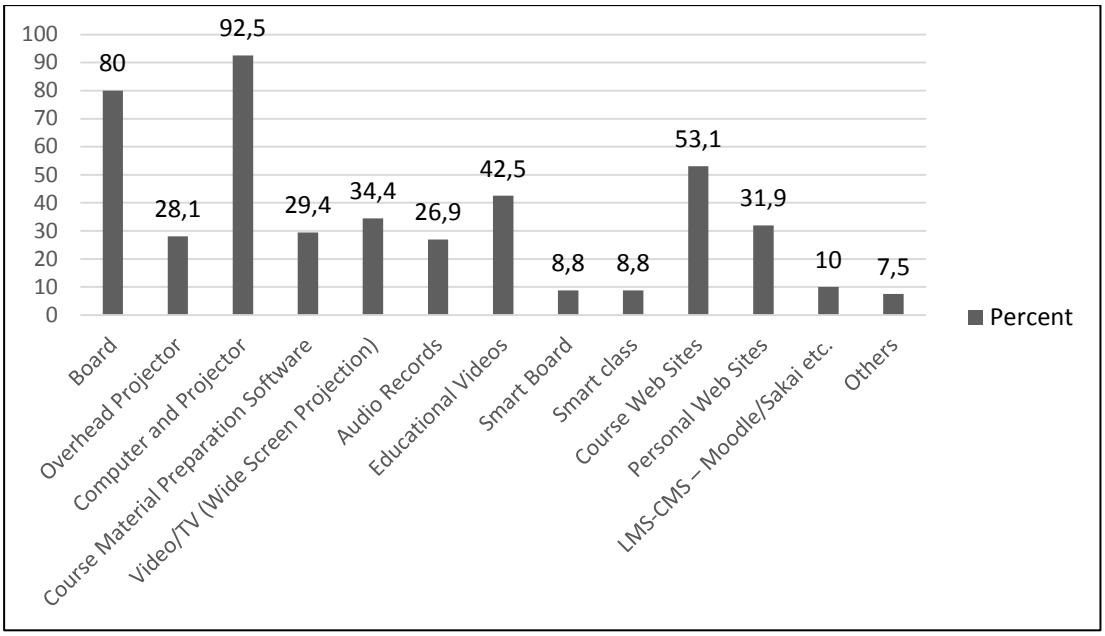

Figure - 4.3 Recently Used Instructional Technologies.

Looking at the results, computer and projector, board and course web sites are the most preferred instructional technologies used in education and learning by academic staff. Each of those technologies were used by more than 50% of the participants. Other technologies such as educational videos, personal web sites, video/TV etc. are the minor technologies that have been used recently. These findings indicate that academic staff prefer to use a computer and projector, board, and course web sites in their teaching process.

On the other hand in the second phase of the study, interviewees were asked what technologies or applications they use in teaching and activities that related to teaching. Respondents used both web based and computer based software or tools beside the hardware itself that was used as a medium or tool. Interviewees mentioned web based software and tools such as LMS like METU Online, OCW, Gradebook, and social media such as Facebook, blogs, forums, search engines, YouTube, and other Web 2.0 applications. For computer based software and tools, they meant simulations, presentations, multimedia such as video, audio etc., and packed programs like SPSS, NVivo, and Microsoft Office. For hardware, academic staff used computers, projectors, overhead projectors, DVD/CD/Audio players, and cell phones as clickers.

Half of the participants used LMS. The ones who did not use LMS were from DBE (four interviewees), DML (two interviewees), EDS (one interviewee), and ME (one interviewee). As can be seen from the results, most of the academic staff that did not use LMS were from Language teaching departments. The same cannot be said for the faculty departments, since all faculty departments used LMS except for EDS and ME used LMS. Another point is that, although some instructors from DML stated that they use Gradebook in their department as LMS and declared all grades and announcement via this system, some of the DML instructors did not mention the use of LMS.

Interviewee opinion about using OCW:

> *"İstatistikleri takip etmek güzel. Ve teşekkür mesajı geliyor, o çok motive eden bir şey. Gururlandıran bir şey. İnsanlar ne şekilde aktif olarak ne için kullanıyorlar diye istatistikten öğrenmek zor ama mesaj gelince mutlu oluyorum." (Interviewee 8).*
>
> "Following the statistics is nice. In addition, receiving thank-you messages makes one feel motivated and proud. It is difficult to understand for what and in which way they use OCW by just looking at the statistics, but receiving messages makes me happy." (Interviewee 8).

Only three academic staff record their course videos and share them via different mediums such as OCW, YouTube and a departmental LMS system. One of the interviewees stated that:

> *"Ders videolarını, hem kendimi görmek için hem de öğrenci yardımcı materyal olarak dersi kaçırdığında bakabilsin diye çekiyorum." (Interviewee 14).*
>
> "I record the course videos for both watching myself and to get feedback from the video for giving better lectures and to use the video as a support material if they could not come to the course…" (Interviewee 14).

4.3.3 Awareness and use of technology

Participants were asked whether they were aware of several technologies or not, and if they use those technologies in their teaching. The findings are presented in Table – 4.5.

Table - 4.6 Awareness and Use of Technology.

Awareness and use of technology	**Frequency (n=160)**	**Percent**
Have a personal web page	75	46.9
Sharing course documents on web	111	69.4
Department based web page for sharing course documents	78	48.8
Using smart classroom environments in METU	21	13.1
There is a department for Instructional Technology Support	55	34.4
Recording videos relevant to course content	25	15.6
Course videos are shared on web	12	7.5
Aware of ITSO	87	54.4
Using online.metu.edu.tr	117	73.1
Aware of OCW	117	73.1
Using OCW	22	13.8
Want IT Support Office	144	90.0

As Table – 4.5 shows, 144 (90.0%) of participants requested to have an ITSO in their department. On the other hand, the amount of academic staff that was aware of ITSO was 87 (54.4%). It seems that academic staff were not that aware of ITSO, as the consensus of academic staff was that they wanted an ITSO in their department. In addition to this need, 55 (34.4%) of respondents indicated that most departments do not have ITSO, but they have technology support offices. Thus, most technology support offices serve as an ITSO as well. Therefore, most academic staff admit that they don't have a clear distinction between ITSO and TSO in their minds.

METU provides a campus-wide LMS with a systematic features and templates called METU Online, and 117 (73.1%) of participants used this LMS in order enhance their teaching and learning process. The sample were also asked whether they shared their course documents online or not. Although, 111 (69.4%) of participants shared their course documents on the web, 78 (48.8%) of academic staff stated that they had a department based web page for sharing course document. Besides the web based document sharing, 75 (46.9%) of respondents have a personal web page. These pages may be used for both professional needs and teaching and learning purposes.

Another question posed to academic staff was about the use of smart classroom environments. Only 21 (13.1%) of academic staff indicated that they used such an environment. This may be a result of several reasons, including an insufficient number of smart classrooms, a lack of awareness about smart classrooms and no real need for using smart classrooms. Another noticeable remark was that, even though 117 (73.1%) of academic staff are aware of OCW, only 22 (13.8%) participants used it.

Table – 4.5 indicates that just a few academic staff (n=25, 15.6%) recorded videos relevant to course content. Correspondingly, only 12 (7.5%) respondents shared their course videos on the web. Relevant to this question, participants were asked what kind of medium they preferred in order to share those videos (Figure – 4.4). METU Online was the most preferred medium (n=18, 11.3%). While 8 (5.0%) of participants shared course videos on their department web site, the number of academic staff who used OCW was 5 (3.1%) and just 2 (1.3%) of participants used METU TV as a medium. Six (3.7%) of participants mentioned blogs (n=1, 0.6%); class sessions (n=1, 0.6%); mail groups (n=1, 0.6%); YouTube (n=1, 0.6%); peer sharing (n=1, 0.6%); and standardisation sessions (n=1, 0.6%) as mediums.

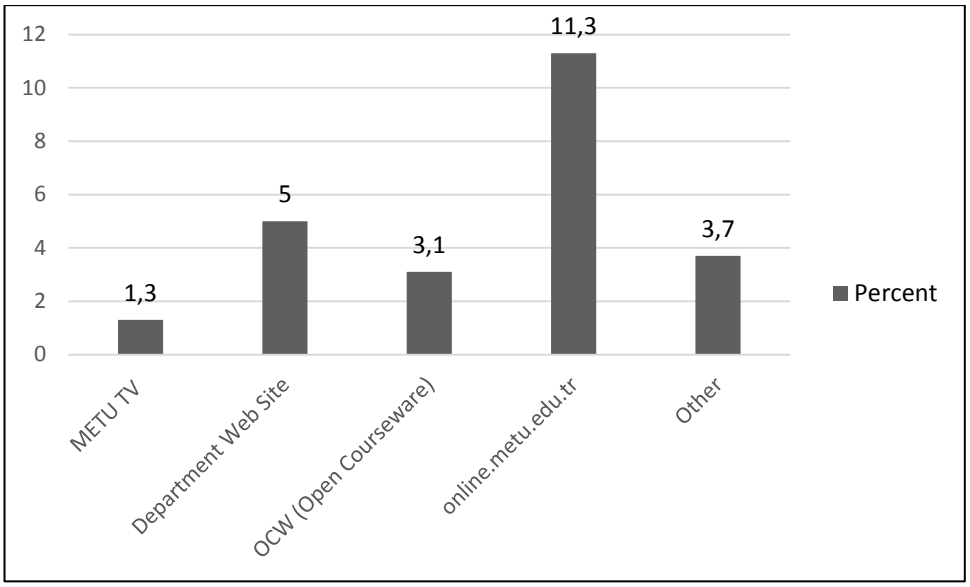

Figure - 4.4 Video Sharing Mediums.

4.3.4 The Purpose of Technology Use

Interviewees were asked about the purpose of their technology use. Although participants indicated different special or minor purposes, there was one common answer as the major purpose: to enhance teaching and learning. Prominent technologies and their purpose of use were examined from the participants' answers. Most of the interviewees used presentations for lecturing and to introduce course material. Interviewee 10 stated that, as departmental academic staff, they used presentations because students remembered them easier and most of them were visual learners. In addition to this, one academic staff member used presentations for activities and for evaluation and stated that:

> *"...Bir önceki dersi tekrar etmek için 10 ya da 5 true false sorularım oluyor. Onları yansıtıp her öğrenci cevaplandırıyor. Dersin hem işlenişi hem de ders başı ve sonundaki ufak değerlendirmelerde kullanıyorum." (Interviewee 13).*
>
> "…To revise a previous lecture, I ask 5 or 10 true-false questions to the students using the projector. I use presentations for both evaluations at the beginning of a lesson and at the end." (Interviewee 13).

Presentations were divided in to two: (1) projector, (2) overhead projector. The aforementioned usage frequencies were about using projector. Academic staff, generally instructors from DBE, used overhead projectors in lecturing. Since all classes do not have projectors, they prefer to use overhead projectors. This technology is used for whole class activities like paragraph reviewing or writing.

Academic staff used LMS, such as METU Online, Gradebook etc., for documents and course contents, for announcements, for making access to course contents easier and more flexible, and for evaluation and feedback. Some interviewees emphasised that:

> *"Ders okumalarını yükleme, öğrencilerin ulaşımı daha rahat kolay olsun diye. Gruba mail atmak için kullanıyorum. Metu online biraz karmaşık açıkçası. Ama temelde ders okumaları. O da eskiden fotokopiciye veriyordum ama bu daha rahat oluyor. Topyekûn basma zorunluluğu ortadan kalkıyor. Ve öğrencilerin ulaşabileceği yerde olduğundan emin oluyorum." (Interviewee 16).*

> "METU Online is a little bit confusing for emailing to the group and to make it easy to access course and reading materials. I use it mainly for course reading materials, whereas I used to provide photocopy reading material - however, this way is easier. There is no longer a requirement to print off whole documents and I'm confident that the students can access the course reading materials." (Interviewee 16).

Some technologies like DVD/CD/Audio players and TVs were used in courses, lectures in DBE and DML, for reading, listening, verbal, and written activities.

Social media was one medium used in the teaching and learning process. Academic staff mostly used social media for communication. Such environments were either integrated into the course and/or, were used without integration, i.e. just for the purposes of communication.

Three academic staff used video oriented lectures, recording course videos or videos as a complementary tool. One of them recorded courses and puts them into OCW in order for easy access and free usage by students. Other interviewee recorded the course and embedded it in a department LMS for both the lecturer and the students. As a lecturer, academic staff then get the chance of watching the lecture, and using it as a feedback tool. In addition to this, students who could not come to the course could watch the video whereever and whenever they want. The last participant, who was using video, used the video for crowded classes in order to address the course requirements such as field visits, rare applications indoors, unique experience etc. which was not available for all students taking the course. The lecturer stated that:

> *"Fiziksel olarak kalabalık sınıfları araziye götürmek zor olduğundan, arazi gezisini, teknik geziyi video haline getirerek öğrencilere sunuyoruz." (Interviewee 2).*

> "We film field trips and technical trips and present them back to the students as videos as taking crowded classes out into the field is difficult." (Interviewee 2).

Beside these purposes, there were marginal answers as well. These answers stated as:

> *"Öğrencilerin teknofobisini kırmak... bencil bir neden de var. Ne kadar kullanırsam o kadar iyi hissediyorum. Kopmamak için, çünkü insan çok fazla işin içine girdiğinde teknolojiden kopmaya başlıyor ve alt kuşak teknoloji ile geliyor ve iyi bir hoca olabilmek için teknolojiyi kullanmak ve kullandırmak gerekiyor. Kendi korkularımı da yeniyorum." (Interviewee 1).*

> "To break students' technophobia, plus there is a selfish reason too; the more I use technology, the better I feel. Another reason is to keep up with current technologies, because when one becomes too concentrated on the educational process, one can get disconnected from technology. I believe that to be a good instructor, one should both use the technology as well as make the students do so." (Interviewee 1).

> *"Ciddiye almadığım derslerde rahat etmek için. Bir de çizimler ve grafiklerin daha güzel katkısı var." (Interviewee 12).*

> "To be comfortable in the lectures which I don't take as seriously. In addition, graphics and drawings contribute to a better lecture." (Interviewee 12).

4.4 Perceived Advantages in Use of Technology

Academic staff were asked about their perception about the advantages of the use of technology in teaching and learning. Interviewees indicated plenty of benefits for themselves as academic staff, the lectures and for the students. There was more than one common thought about the benefits of technology. The first common perceived advantage was time efficiency. Academic staff stated that, using these technologies saved their time in terms of classroom lecturing and course related activities. Two of the interviewees indicated that:

> *"Avantajlar her şeyden önce zaman kazandırıyor. İşi bir yere kadar kolaylaştırıyor…" (Interviewee 4).*

> "Advantages - above anything else, it saves time. They make teaching and course related activities much easier." (Interviewee 4).

> *"Avantaj olarak ciddi anlamda sürenin değerlendirmesi adına direk tahtayı kullanmaktansa iyi oluyor…" (Interviewee 4).*

> "As an advantage, it is better than using a blackboard in terms of time saving…" (Interviewee 4).

> *"Tabiki materyal alanını zenginleştiriyor. Bu çok hoşuma gidiyor. Dersleri daha interaktif hale getiriyor ki bu dil öğretiminde çok önemli. Sınıf içerisindeki zamanı daha etkili kullanmayı sağlıyor. İnput vermem yerine öğrencinin kendi zamanında bunu bulmasını sağlıyor bu konuda beğeniyorum." (Interviewee 10).*

> "For sure, it enhances course materials and I like this. They make lectures more interactive which is crucial to language learning and lecture time can be used in a more effective way. Instead of providing input, it help students to discover it [topic] in their self study time; and I like it." (Interviewee 10).

The other common perception was that technology increased the quality of lectures in the view of the lecturer, student and the teaching and learning process. Nine participants stated that technology increased the efficiency of lectures. Most of the academic staff expressed that technology makes the lecture more visual, and thanks to this, easier to follow. It also makes the information more tangible and motivates students. Some of interviewees stated that since the new generation of students were visual learners, these opportunities had the effect of information being remembered for longer. Another benefit of using technology in the teaching and learning process was that it better meets the students' learning styles. Some comments about these opinions are shown below:

> *"Öğrenciler zaten inanılmaz görsel şu anda. Önlerinde yazılı sürekli bir şeyler yapıldığı zaman ilgilileri çok çabuk dağılıyor. Görsel şeyler, youtube, facebook gibi şeyler onlarında günlük yaşantısının bir parçası olduğu için onlar açısından ilgi çekici ve güzel oluyor…" (Interviewee 17).*
>
> "Students are more likely to learn visually. When they are confronted by just written documents, or the activities are visually poor, they get easily distracted. Because visually rich platforms like Facebook and YouTube are part and parcel of their lives, these environments are more attractive and useful for them…" (Interviewee 17).
>
> *"Daha kısa sürede daha çok input veriyoruz. Long lasting impacti var. Öğrenciler daha çok akıllarında uzun süre tutabiliyorlar…" (Interviewee 9).*
>
> "We can give more input in a shorter time and it has a longer lasting impact. Students can remember what they learned much longer …" (Interviewee 9).
>
> *"Öğrenciye en büyük faydası gereksiz zaman kaybını önlemesi artı elle kağıt kalemle çözülemeyecek türden problemleri de çözebiliyor hale gelmeleri. Ayrıca tabi yeni profesyonel hayatta kullanacakları yazılımalarla tanışıklık kurmaları da önemli…" (Interviewee 15).*
>
> "The most important benefit of using technology in lectures is to prevent time loss. In addition, it enables students to solve problems which can't be solved manually by pencil and paper. It is also important that they become acquainted with the software which they will use in their careers…" (Interviewee 15).
>
> *"Eğitim öğretim için çok fahydalı. Özellikle görsellller mesela bir beton santralinin nasıl çalıştığını görsel veya video ile gösterdiğiniz zaman öğrencilerin anlaması daha kolay oluyor." (Interviewee 3).*
>
> It is beneficial for learning and teaching activities, especially for visual materials. For example, pictures or videos that show how a

> batch plant works, help students to learn much easier. (Interviewee 3).

Participants also stated that another advantage of using technology was the flexibility and ease of access. According to some interviewees, sustainable access is important for a course. This also helps makes academic staff feel an increased confidence in themselves and more motivated. Three interviewees indicated that:

> *"Pratiklik, zaman kazandırıyor. Herkese ulaşmayı sağlıyor, yani devamsızlıktan kaynaklanan bilgi eksikliğini çeşitli kaynaklardan yararlanarak herkesin duymasını sağlıyorsunuz." (Interviewee 8).*
>
> "Ease of access saves time and enables us to access all of the students. In other words, a deficiency of information which results from absenteeism can be compensated by using various resources." (Interviewee 8).
>
> *"Sürekli erişilebilir kılmak açısından pozitif bir durum. İkincisi tabiki çok net çünkü siz eğer böyle bir teknoloji kullanıyorsanız çok konsantre kullanıyorsunuz. Lecture için bu öyle…" (Interviewee 1).*
>
> "First, technology use has positive impact on lectures in terms of access related issues. Second, it makes me concentrate more on the lecture …" (Interviewee 1).
>
> *"…Ne olursa internet, laptop ile bütün her şey elinizin altında. Öğrencilerin daha kaliteli veriler sunması. Daha ucuz olduğunu düşünüyorum açıkçası. Bilgi değişimi paylaşımını sağlıyor. Her şey elinizin altında." (Interviewee 5).*
>
> "…It is especially important for accessing course related resources and activities as it is so easy using computers and the internet. This way is also cheaper and helps with the exchange of information. In addition, students can access and produce data of a higher quality." (Interviewee 5).

Communication and immediate feedback were the other common responses of the academic staff. They believed that interactive and effective communication not only increases the efficiency of a lecture and students' motivation, but also reduces the time being wasted on a giant campus such as at METU. In the same manner, participants indicated that technology had the ability to provide immediate and electronic based feedback which reduces the volume of hardcopies, and saves paper.

> *"Öğrenme açısından ise öğrenciyle birlikte yapıyoruz. Öğrenciyle birebirde iletişimde olmanız onlar için iyi bir şey…" (Interviewee 1).*
>
> "We do learning activities with students. It's especially useful for keeping in touch with students …" (Interviewee 1).

> *"Artı öğrencilerin hoca ile haberleşmesini daha hızlı ve etkin kullanmasını sağlıyor. Büyük kampüste yüz yüze iletmesi zaman alabiliyor. Bunun daha etkin olduğunu düşünüyorum…" (Interviewee 10).*
>
> "It makes communication between students and instructors more effective and faster. Face-to-face communication can take a long time on a large campus …" (Interviewee 10).
>
> *"Mesela ödevlerin kontrolleri feedbacklari kolaylaştı. Ödevlerde kâğıt bastırmıyoruz artık. Öğrenci web üzerinden istediği zaman girip öğrenebiliyor." (Interviewee 4).*
>
> "Checking homework and giving feedback is easier than it used to be. We don't use hardcopies of the homework any longer. Students can get feedback whenever they want it via the internet." (Interviewee 4).

The last advantage mentioned for using technology was that it makes the course and the content easier to be updated. They thought that this motivates the academic staff.

> *"Belki eğitime ya da herkese yardımcı olan bir boyut, çok kolay güncellenebilir olmaları (yazılı kalıcı malzemeye göre elektronik ortamdaki teknolojilinin kolay güncellenebilir olması)." (Interviewee 15).*
>
> "In comparison with enduring printed materials, one of the useful dimensions of using technology in education is that it is easily updated, which helps educators and others." (Interviewee 15).
>
> *"Güncel kalmasını sağlıyor derslerin bence. Sürekli yenilikleri takip ediyor olmak kendinizi geliştirmek için önemli…" (Interviewee 8).*
>
> "It helps to keep lectures updated. Following the latest developments is important to improve oneself …" (Interviewee 8).

Although lots of participants talked about the benefits of technology, there were, however, some disadvantages of using technology. Spending time in course preparation, technical problems, uncontrolled sharing and copyright issues were the most common of the comments. They also stated that students do not criticise the information or misuse the technology, sometimes it tends to makes students lazy.

> *"Kötü tarafı bir süre sonra sizin bilgilerin nasıl paylaşıldığı, sizin hiç düşünmediğiniz bir yerde bilgilerin paylaşıldığını görmek beni üzüyor. Bu da bizlerin entelektüel haklarını başka bir contextte de kullanıldığını görmek hoş değil. Entelektüel hakların elinizden alınması başka bir bilgiye dönüşmesi bu ortamın en sıkıntılı tarafı." (Interviewee 1).*
>
> "I see that my course resources are shared without my permission in the virtual environment, which is not something I had

considered. This is not a desirable situation and this upsets me. It is not pleasant to see that our intellectual rights are violated without our permission." (Interviewee 1).

"Öğrencileri tembellik değil de çalışmak için soğuttuğunu düşünüyorum. Mesela öğrenci bir sınavda soru gördüğünde bu ppt de yoktu diyor. Bunu gözlemledikten sonra buna karar verdim." (Interviewee 3).

"I think that it decreases motivation of the students to study. For example, when a student sees a question in an exam, he/she says that the question wasn't in the presentation. After looking at such claims, I had to agree." (Interviewee 3).

"Dezavantaj için ise kullanım sıklığı olabilir. Amacını aştığı zaman problem. Sürekli her gün ve her derste teknolojiyi kullanımını doğru bulmuyorum. Gerçekten bir fayda sağlayacaksa kullanılmalı sadece kullanmak için değil. Onun dışında teknolojiye hakim değil ve yönetemiyorsanız oradan doğan teknik problemler de zaman kaybına neden olabilir." (Interviewee 7).

"Frequent use of technology may be a disadvantage. When the technology in use goes beyond its purpose, it becomes a problem. I disagree with the idea of using it in every lecture, every day. It should only be used if it offers a benefit. In addition, if one doesn't have enough competence to handle these technological tools, technical problems may lead to a waste of time." (Interviewee 7).

"Öğrenciler açısından bazen eleştirel düşünmedikleri için onları tembelleştiriyor ve yanlış bilgileri kullanmaya yönelebiliyorlar. İnsanlar teknolojiyi üniversite düzeyinde bu şekilde kullanmamalı." (Interviewee 14).

"It makes students lazy because they sometimes don't think critically and it may lead students to use the wrong information. People, especially university students, shouldn't use technology in such a way." (Interviewee 14).

4.5 Influences on Use of Technology Decision

4.5.1 Incident / People Effect

In order to investigate the factors that affect academic staff decisions on technology use, they were asked if there were any factors, incidents or person/people affecting their decision on technology use. Looking at what the interviewees said, two main viewpoints emerged. These were personal interest and self-motivation, and target group characteristics. One of the

participants stated that "When I see a piece of technology that I would like to use, I just think about how to use it." Some thoughts about these major answers were:

> *"Bir kere herkesten öte öğrencinin teknoloji ile içli dışlı olmasından kaynaklı, ister istemez geri kalmak istemiyorsunuz…" (Interviewee 4).*
>
> "It is inevitable that you do not want to fall behind since your students are familiar with the technology …" (Interviewee 4).
>
> *"Herhangi bir dış etki yok, kendim istediğim için bunları kullandım. Bu da dünyanın gidişatından dolayı aslında. Ama kişisel olarak daima teknolojiye yakın bir insanım. Yakın kullanıyorum bu kadar gelişmemiş olduğu zamanlarda da. Herhangi bir dış etkenden söz edemem." (Interviewee 10).*
>
> "There are no external influences. I have used them for my own purpose as the world progresses - as a person, I am always close to technology. I also use when it is new, so I wouldn't say there is an external influence." (Interviewee 10).

In line with these major comments, there were other factors that affect academic staff:

- Infrastructure;
- Colleagues;
- Good practices and ease of use.

> *"…İmkânlar benim karar verme sürecimi etkileyen en önemli faktörler. Gerek sınıf içi gerek sınıf dışı imkânlar." (Interviewee 15).*
>
> "…In my opinion, the most important factors that affect my decision-making time are the opportunities, both inside and outside the classroom." (Interviewee 15).
>
> *"…Aslında öyle bir altyapı varsa, o alt yapıyı kullanma yönünde artıyor. Şu an standart olan projeksiyon ve bilgisayar var onu kullanıyorum. Ama daha farklı ekipman olduğunda isteğim de o yönde gelişecektir sanıyorum…" (Interviewee 13).*
>
> "…In fact, if there is a new infrastructure, the desire is increasingly there to use it. Now, I am using projector and computer as standard, but when we have different equipment, I suppose I will want to use them as well…" (Interviewee 13).
>
> *"Meslektaşlarımdan duyduğum şeyler olabiliyor. Pratik olduğunu söylediği zaman ben de bir deneyeyim diyebiliyorum. Seminerler ve konferanslarda duyduğumuz şeyler olabiliyor. Ama çoğu zaman birinci elden tecrübe ve yardım alabileceğiniz biri varsa o teknolojiyi kullanma daha kolay oluyor." (Interviewee 8).*
>
> "There are things that I hear from my colleagues. When one of them says "it is easy to use", I say to myself to give it a try. There are also things that we learn from seminars and conferences, but most of the time, if there is someone with first-hand experience,

their help can make the use of technology much easier." (Interviewee 8).

Unlike the more common answers, one of the interviewees indicated that "If I have to, I use it." On the other hand, another participant stated that there are some problems with university policies. According to interviewee 2, since METU usually required academic staff to publish papers and studies, sometimes they faced the question of "Shall I spend my time for using technology instead of publishing?" Comments of the interviewees included:

> *"Çok gruplu derslerde böyle bir şey yapalım dediklerinde hadi yap deniyor. Kimse taşın eline altını koymuyor. Kendime kalıyor işler. Hafta sonları pptleri güzelleştirmek için bazı şeyler yapıyorum. Sanırım zaman faktörü etkiliyor. Bir de üniversitede çok iyi eğitim vermenin size bir artısı yok. Yayın için var ama kimse derste video kullandınız mı, metu.online yaptınız mı diye sormuyor. O zaman genelde bunun yerine ona ayıracağım vakti makale yazmaya ayırmak daha mantıklı geliyor. Çünkü orada bunun ödülü var. Ben etrafımda biliyorum hocalar bunu waste of time olarak görüyor. Neden video ile uğraşayım daha önemli işlerimiz var diyorlar. Belki teşvik edici üniversite çapında kurumsal bir şey yapılabilir bu konuda." (Interviewee 2).*

> "When someone in multi-group classes says "Come on let's do such a thing", everybody says: "ok, then you do it!" No one wants the responsibility. I work on my own. I'm working on creating PPT presentations at the weekends, and I think, the time factor is affected as to give quality education in a university does not provide advantages to the lecturer. It is important to publish articles, but, nobody asks you whether you used a broadcast video and METU Online or not. Logically, instead of using technology, I prefer to spend my time writing, as writing an article has rewards for me. I know other instructors around me that think that preparing for using technology is a waste of time. They say: "Why do I have to cope with videos, I have more important things to do". Maybe something can be done to encourage educators university-wide." (Interviewee 2).

4.5.2 Department / Unit Effect

Additionally, academic staff were asked whether department or unit had an effect on their use of technology. Almost all of the participants answered this question as "Yes." As to "Why?" there were different responses to that question. Infrastructural/equipment readiness, departmental or administrative incentives and colleagues were the main opinions. Some of the participants stated that since there was equipment like computers and projectors, specific software, web-based technologies etc. I use it; but if there weren't, I wouldn't use them. A group of academic staff indicated that departments or administrative units were part of the incentive. They said that there were opportunities that incentivise academic staff to use, or at least to try, such technologies. Also, sometimes administrative units declared some obligations about using technology. On the other side, there was the colleague effect. One interviewee stated that:

> *"Teknoloji kullanıp kullanmama öğretim üyesinin tamamı ile kendi kararı. Bence öğretim Üyelerinin kendi aralarında ki öğrenmeleri bu süreci hızlandırıyor. Mesela ben facebook kullanmıyorum ama etkili kullanan arkadaşım var. Ama ben buna ikna olursam onu kullanabiliyorum." (Interviewee 13).*
>
> "To use or not to use the technology is completely of the faculty members' decision. I think that learning from each other (faculty members) is accelerating this process. For example, I do not use Facebook but I have a friend that uses it effectively. But I could use it, if I was convinced." (Interviewee 13).

In addition to this opinion, one participant stated that there was also an effect of the demands from other colleagues and students.

> *"Herkes yapınca siz de yapmak zorunda kalıyorsunuz. Zaten öğrenci de aslında bunu demand ediyor. Şimdi öğrenciler acayip çünkü." (Interviewee 9).*
>
> "When everybody does something, you need to do it too. In fact, students are already demand it, because students are naturally curious." (Interviewee 9).

Apart from these, some academic staff stated that there were neither incentives nor obstacles from departments or administrative units.

4.6 Barriers in Use of Technology, Preferred Sources and Solutions

4.6.1 Barriers

In this part, factors that are barriers to the use of instructional technology in teaching and learning processes are explored. In the quantitative phase of the study, academic staff were asked to express their opinions as to what are the barriers to the use of instructional technology in the teaching and learning process. In the survey there were twelve items with a three point scale (i.e., 1 = not a barrier, 2 = partial barrier, and 3 = barrier) (Table – 4.10).

According to responses, "lack of self-confidence" (n=124, 77.5%); "lack of number of computers in campus" (n=114, 71.3%); and "lack of experience about using computers" (n=96, 60.0%) are not perceived as barriers by participants. Similarly "lack of interest in technology" (n=82, 51.3%); "lack of role models about how to use computers in education" (n=72, 45.0%); and "lack of administrative support" (n=66, 41.3%) are not considered as barriers to the use of instructional technology in the teaching and learning process.

On the other hand, for the six remaining items, academic staff indicated that lack of training (n=88, 55.0%), lack of time for learning how to use new software (n= 84, 52.5%); lack of received help about alternative instructional methods (n=83, 51.9%) were the items considered as partial barriers to the use of technology in teaching and learning processes. In addition to this, a lack of information about software that fits their discipline (n=78, 48.8%); lack of a campus-wide technology coordinator (technical support) (n=70, 43.8%); and lack of financial budget and sources (n=60, 37.5%) were also perceived as partial barriers.

Table - 4.7 Factors Affect Use of Instructional Technology.

Factors Affect Use of Instructional Technology	n	Not Barriers (%)	Partial Barriers (%)	Barriers (%)
Not enough time for learning software programs	160	20.0	52.5	27.5
Lack of training	160	30.0	55.0	15.0
Lack of help about alternative instructional methods	160	27.5	51.9	20.6
Not enough computers on campus	160	71.3	10.0	18.7
Lack of self-confidence about technology	160	77.5	18.7	3.8
Lack of experience about using computer in education	160	60.0	30.0	10.0
Lack of models about how to use computer in education	160	45.0	42.5	17.5
Lack of information about software that fits my discipline	160	33.7	48.8	17.5
Lack of budget and financial sources	160	30.0	37.5	32.5
Lack of interest about technology	160	53.8	38.8	7.4
Lack of administrative support	160	41.3	39.4	19.3
No campus-wide technology coordinator (lack of technical support)	160	34.3	43.8	21.9

In addition to quantitative findings, barriers were also examined in the qualitative part of the study. Academic staff were asked what kind of obstacles they were faced with while using technology in teaching and learning process. There were a variety of answers for this question. The most popular response was technical problems. One of the participants stated that sometimes, although they plugged the projector into the computer, the computer might not recognise the device. These problems may not be vital, but according to them, it can affect their decision about using the technology.

The second major opinion about obstacles was time. Faculty members indicated that they did not have enough time for both the preparation process and the learning process of using technology. Two interviewees' thoughts about this matter were:

> *"Zaman. Öğrenme için zaman çok kısıtlı. Bence hocaların da sistematik olarak bu teknoloji eğitimlerini almaları gerekiyor. Bu teknolojilerin raf ömrü çok kısa dolayısıyla sizin bu işi yönlendirmeniz için birebir kullanmasa da yaşam boyu öğrenme olarak öğrenmeleri gerekiyor. Nasıl doktorlar ki iç yılda bir seminerlere katılıyorlarsa aynısı olabilir…" (Interviewee 1).*
>
> "The time is too limited for learning. I think, the instructors need to take training in these technology courses systematically. These technologies have a very short shelf life, so these should be learned not only for using directly, but also as part of life-long learning. It's like doctors that attend seminars over three years, when they could do them in a year…" (Interviewee 1).
>
> *"…Öğrenme için zaman biraz kısıtlı. Onu öğrenmek için biraz zaman harcamak gerekiyor ama öğrenme için bir sıkıntı yaşamıyoruz diyebilirim…" (Interviewee 2).*

> "…The time is too limited for learning .We need to spend more time learning, but I can say we don't have a problem about learning itself …" (Interviewee 2).

Another common expression was about METU Online, which is a central LMS in METU. Almost all of the academic staff either complained about the system or did not use it at all. One academic staff member said that although the system and the unit in charge were helpful, METU online had imperfections. Beside this opinion, thoughts for this subject stated were:

> *"Metu.online dan çok memnun değiliz. Çok daha user friendly olsa diye eleştirilerimiz oluyor. Öğrencilerden de bu tür şikâyetler geliyor…" (Interviewee 2).*

> "We are not that happy about METU Online. We have criticisms about it that it could be more user friendly. Students also complain about the same thing …" (Interviewee 2).

> *"METU online için hala yapısı kurgusu biraz karmaşık. Bir şekilde uğraşınca çözüyorsun ama her dönem başında kurgu ile tekrara tanışman gerekiyor. İşte yüklemeler, sınavları nereye yükleyeceğim gibi şeyler…" (Interviewee 16).*

> "METU Online is still a complicated structure. When you spend time to deal with it, you can solve the issues, but you need to understand the new structure at the beginning of each semester. There are issues with uploading exams, etc…" (Interviewee 16).

Participants also mentioned financial/equipment problems. Academic staff had some problems with not enough equipment or devices. In addition to this, while some interviewees declared that they were financing their technological needs themselves, such as purchasing their own devices or services, there were obstacles in departments due to uncoordinated finance and bureaucracy. Some groups indicated that problems resulted from disorganised learning environments, and some classrooms are simply not compatible with the intended technology.

> *"…Yapmak istediğim her şeyi ekonomik açıdan bölümde yapamıyorum. Bürokratik olarak problem oluyor ama bunları projelerle aşmaya çalışıyorum…" (Interviewee 1).*

> "…I cannot do everything that I want in my department because of economic issues, but I'm trying to overcome the bureaucratic problems by doing projects …" (Interviewee 1).

> *"Teknik olarak sayı yetersizliği vardı ekipman olarak. O bir sıkıntı doğurdu. Ben dersimi ona göre hazırlıyorum ama internet yavaş oluyor çalışmıyor. Ya da o gün ben kullanmak istiyorum projektörü ama başka bir arkadaşım da kullanmak istiyor…" (Interviewee 7).*

> "There was a lack of technical equipment, I mean such as the actual numbers of equipment. This puts us at an inconvenience as

> I prepare my lessons, but the internet works slowly, or, that day I would like to use the projector and at the same time my colleagues also need it too...” (Interviewee 7).

Last, but not least, one obstacle mentioned by the interviewees, was sustainability. When they learned or tried to use such technologies, it was hard to gain and find new perspectives for using the technology due to limited time or a lack of training, and continue to the system even with technical coordinator problems.

> *“Orda mesela yeni bir şeyi öğrenmek istediğinizde temelini alıyorsunuz üzerine uğraşmalısınız biraz. Ama bunu için zaman ayarlamak sıkıntı olabiliyor. Mesela prezi ile ilgili öğrencileri motive etmek için çalıştım. Sonrasında içine girip onu zenginleştirmek başka bir basamak ama orada takılıyoruz gibi. Basic var ama sonrası için ona ayıracak zaman ve bunun desteksiz olması, birinin elinizin altında olması ve size yardımcı olması lazım. Ama zaman zaman o caydırıyor beni.” (Interviewee 13).*
>
> “When you learn something new in there, you can take the basics and you should study. But it can be difficult to set aside the time. For example, in order to motivate the students, I worked on Prezi. Then, to go back into it and to change it requires different steps. There is the basic work, but extra time is needed during unsupported hours. Also, I need someone to help who can be accessible at all hours - sometimes this deters me…” (Interviewee 13).
>
> *“…Ayakta tutulması ve teknik destek. Sürdürülebilir olması önemli. Teknik kadro üniversitede en sıkıntılı kadro. Her yerde olduğu gibi araştırma görevlisi desteği ile bunlara özgü iler götürülüyor açıkçası…” (Interviewee 15).*
>
> “…For technical support it is important to be sustainable. The biggest problem we have is with technical staff at the university. To be honest, it’s with the support of research assistants that our work can be done…” (Interviewee 13).

4.6.2 Preferred Sources in Technology Use Obstacles

In order to explore the sources that academic staff used for solving their use of technology problems, a question was included in the interview. Participants gave two main answers: they solve such problems on their own or prefer external sources (outsources). For personal sources, the most used strategy was an internet search. This answer was followed by YouTube and discovery (trial and error). On the other hand, outsources consisted of more alternatives. Academic staff mostly preferred (eight interviewees) department technical coordinator or technical assistants as a source to solve their obstacles. Other sources that

were preferred by academic staff, not the most, but by a large number of interviewees, were colleagues, research assistants or students.

Additionally, they were asked whether or not these sources met their expectations. Although almost all of the interviewees stated that these sources met their expectations, there were a few answers to the contrary:

> *"Hayır. Fifty fifty. Olmaz çünkü kimse teknisyen değil. Kimse fulltime için kadro verilmiyor. Master yapan gençleri kullanıyoruz. Onlar da tezini yazınca gidiyor. Ama üniversitenin kuralı da bu." (Interviewee 12).*

> "No. Fifty fifty, because nobody is a technician. No one is a fulltime member of staff. We offer the work to students who are in a Master programme, but they leave after finishing to write their thesis. But this is the way of life at university." (Interviewee 12).

4.6.3 Solution Suggestions about Technology Use Obstacles

When problems arise, academic staff try to find sources to fix these problems. They were also asked what the solutions should be in order to decrease or prevent such problems in the future from reoccurring in the institutions. After analysing the responses, besides their individual responses, there were four themes in common: (1) training, (2) infrastructure and equipment, (3) technical support systems, and (4) a better LMS.

Participants who mentioned training had two opinions. While one of them was that the university should continue regular volunteer training with more announcements and better time scheduling, the other group thought that training should be obligatory for all academic staff.

> *"…Galiba mantalitenin değişmesi ve hocalara eğitim verilmesi zorunlu olmalı. Zaten teknoloji kolaylaştı…" (Interviewee 1).*

> "…Probably the mentality should be changed and compulsory training a requisite for all instructors. Already the technology has become easier..." (Interviewee 1).

> *"…Gerçi istekli hocalar yine gidiyor ama teknoloji kullanmayana geneldeki yaşlı hocalar için de bazı eğitimler zorunlu olsa onlar da gitse teknolojinin önemini anlasa vs…" (Interviewee 2).*

> "…In fact, interested instructors do go. But if some training becomes mandatory, even the older instructors would realise the importance of technology, etc..." (Interviewee 2).

> *"Yani bence düzenli olarak konu ile ilgili workshoplar olabilir. Hocaların temel ihtiyaçlarını, günlük basit kullanabilecekleri basit uygulanabilir şeylerin öğretilmesi iyi olabilir. Bu süreç kolaylaştırılsa bence iyi olur. İdare olarak da sistem yöneticileri*

bölümdeki, onlar da gelişmeleri takip edip, yani bizim hakim olmadığımız ama bölümde bunlar kullanılırsa iyi olabilir dedikleri şeyleri bize aktarırlarsa iyi bir geçiş olabilir." (Interviewee 8).

"So I think there should be a regular workshop on the subject for the basic needs of the instructors, and for simple daily use. I think if this process is made easier, it will be better overall. It is also good to be in a period of transition, as if people in the administration section (the system administrators) follow on as well and use the systems, and then they say something to us." (Interviewee 8).

With regard to infrastructure, academic staff indicated that there was not enough equipment in terms of devices and that the infrastructure should be revised and improved. To do so, the university should invest a large amount of money for this.

"Teknoloji alt yapısının daha iyileştirilmesi lazım. Daha iyi nasıl olabilir. Up to date olsa teçhizatlar daha iyi olur…" (Interviewee 4).

"We need to improve the technology infrastructure. How can it be better? It will be better if the equipment is up to date…" (Interviewee 4).

"…Öğretim teknolojileri Destek ofisinin seminerlerin yeterince duyurulmuyor ya da zaman yetersiz insanlar gidemiyor. Ama bu materyaller her sınıfta olmalı ki insanlar gördüğünde kullanmaya başlayabilsin. İlgisi az olanlar kullanmamayı tercih ediyor çünkü." (Interviewee 10).

"…Instructional Technologies Support office' announcements are not notified to us, or to people who have not enough time and cannot go to seminars. But these materials should be in each class and so as people see them, they start to use them, because disinterested people will choose not to use them." (Interviewee 10).

In terms of technical system support, there were several opinions. Whereas some participants stated that technical support should be accessible, other interviewees indicated that more frequent seminars should be provided in departments. As a supportive idea, one participant expressed that providing troubleshooting step-by-step guides in all classrooms might be a good solution for such minor technical problems. Another solution was that of having permanent technical coordinator staff.

"…Bu tür kaynakların kullanıcıya yakın tutulması ve kullanıcının bu tür problemleri öğrenerek çözmeye çalışması gerekir…" (Interviewee 14).

"…A user should keep such resources close to them, and so the user can work to solve problems through learning…" (Interviewee 14).

"Önce kişinin kendisi çözmeli. Biz kendimiz teknoloji ile ilgili bilgili olmalıyız. Bunun yolunu bulmalıyız. Sorumlu birimlerin daha sık seminerleri olursa onlara katılmalıyız. Ne bileyim odtü çapında her yerde trouble shuting ile ilgili stepler olsa iyi olur. Her sınıfta olsa kendimiz problemi çözebilir yoksa başı kesik tavuk gibi oraya buraya gidiyoruz." (Interviewee 11).

"Firstly, one must solve our own problems. We ourselves have to be knowledgeable about the technology. We must find the way. If the responsible units prepare for seminars, we should join them more often. If common troubleshooting steps were made available everywhere on campus that would be good. If we cannot solve the problems ourselves in each class, we may end up doing nothing." (Interviewee 11).

"Kalıcı çözüm bence bir defa teknik kadro tahsisi. En ciddi olarak karşılaştığımız sıkıntılardan bir tanesi o. Ar gör olunca ders oluyor, tez oluyor bir kişi için birincil işi o olmayabiliyor…" (Interviewee 15).

"I think an on-going issue is to the allocation of technical staff's time. That's one of the most serious troubles we encounter. The research assistants have their courses or a thesis to write, and so it may not be the primary job for them..." (Interviewee 15).

Almost all academic staff who use METU Online as a LMS, complained about it. They thought that METU online is complex and not as user friendly as it was supposed to be. They demanded a better LMS which is more user-friendly.

Beside these common answers, there were different points of view. According to these individuals, instead of organising training for technology, due to academic staff's lack of available time, ITSO should arrange webinars or record training videos.

"…Teknoloji destek ofisi bazen broşür yolluyor. Ama oraya gitmeye en zamanım var ne de bir öğrenci gibi 45 dk 1 saat onları dinlemek için vaktim var. Çoğu zamanım ders ve derse hazırlık için geçiyor. Broşür hazırlayıp yolluyorlar. Bu etkili değil bence. Bunu yerine videoya çekip koysalar daha etkili olur. O bile faydalı olur. Bu seminerlere kim giriyor nasıl etkili oluyor ama bu kaynak benim teknoloji öğrenme kaynağım değil. [ÖTDO Broşürleri]." (Interviewee 13).

"…Technology support office sometimes send brochures. But I do not have time to go there or time to listen to them for at least 45 minutes - 1 hour as a student. Most of my time is spent on the courses and preparing for class. Preparing and sending out brochures is not effective I think. Instead, if they made a video available, it would likely be more effective and useful. Who goes to these seminars and how effective a source it is, I don't know… but this is not my source of learning technology. [ITSO Brochures]." (Interviewee 13).

On the other hand, one interviewee stated that sustainability should be provided. According to this participant, statistical records about problems that they are faced with might be of use as a preventive tool.

> *"Desteğin sürekliliğinin sağlanması. Bir de bu çıkan sıkıntıların sıklığı biliniyor diye varsayıyorum. Yoksa bile böyle bir istatistik kaydedilebilir. Bunun dökümü yapılıp sorunların en çok karşılaşılanlar bulunup ona yönelik çözüm bulunabilir… … Sınıf ortamında bulunan teknolojiler sürdürülebilir olmadığı zaman sıkıntı oluyor. Bir de herkes aynı titizlikte kullanmıyor. Sınıflar teknolojik hale getirildiğinde malzemelerin kullanımının öğretilmesi gerekiyor. Bir de bu malzemelerin arada her gün bitiminde sayıp kontrol etmesi belki faydalı olabilir…" (Interviewee 12).*

> "To ensure continuity of support. I assume that it is known about the incidence of problems. If they don't know, the statistics can be skewed. If they are known about, the most common encountered problems can be identified and solved… When the technologies are not sustainable in the classroom environment, problems occur as everyone does not use them correctly. When the classes have a new technological environment, technological materials need to be taught..." (Interviewee 12).

4.7 Acquiring Knowledge about New Technologies and Support

4.7.1 Acquiring Knowledge

To acquire knowledge about technology, in phase I, almost all of the participants (n=157, 98.1%), preferred online materials (Table – 4.8). This high rate of response may be as a result of the time-flexible nature of work by academic, giving them the opportunity to engage in mobile access. Alongside this, the choices; "training about their discipline"; "experimenting by themselves"; and "workshops and presentations" have the same high response rate (n=131, 81.9%). While 115 (71.9%) of participants preferred general training about technology, the rate of regular seminars in METU was 114 (71.3%). The least preferred method, but still with more than 50% of participants, was printed materials with 111 (69.4%) of responses.

Table - 4.8 Preferences about Acquiring Technology Knowledge.

Acquiring Technology Knowledge	n	Don't Prefer at All + Don't Prefer (%)	Neutral (%)	Strongly Prefer + Prefer (%)
General training about technology	160	15.0	13.1	71.9
Training about my discipline	160	6.2	11.9	81.9
Online materials	160	0.6	1.3	98.1
Printed materials	160	16.3	14.3	69.4
Experimenting by myself	160	6.3	12.5	81.2
Workshops and presentations	160	8.1	10.0	81.9
Regular seminars in METU	160	8.7	20.0	71.3

When academic staff were asked in the interviews how they acquired new knowledge about technology, the answers were grouped within five categories. The first, and the most stated one, was via the Internet. Within the internet option there were search engines, social media, following websites and groups, blogs and RSS. The next category, with nine participants, was acquiring information from colleagues, friends and relatives.

> *"Bir de akran şeyleri, yanındaki komşu sizden iyi bilmeyebiliyor ama bilgi seti olarak ikinizin bildiği daha büyük bir set. Birinin bilmediğini diğeri biliyor. Bu şekilde akran danışmanlığı çok iyi olabiliyor." (Interviewee 15).*

> "Also, peer [support]. Your peer might not know better than you, but the total amount of information that you and your peer can obtain is much more [than one person's knowledge] when combined. One person might know something which another person may not. In this way, peer support can be very beneficial." (Interviewee 15).

The other answer was published documents. Participants acquired their knowledge about new technologies from articles, ITSO booklets, books, magazines, and newspapers.

> *"BIDB nin şeyleri tabi okulda lisanslı olarak kullanabileceğimiz yazılımlar açısından bakıldığında, BIDB' nin aylık bültenleri var. Bence onlar çok yararlı. En azından son gelişmeleri imkânları takip edebiliyorsunuz." (Interviewee 15).*

> "When we consider in terms of licensed software which we can use at college, BIDB provides [informational] newsletters each month. I think they are very beneficial. At least that way, we can follow the latest developments and opportunities." (Interviewee 15).

While two interviewees stated that they were kept informed by seminars and conferences, some of the academic staff indicated that they acquired their knowledge by themselves and through observation.

> *"Kimse bana aa bak METU Online'ı kullanabilirsin diye bir duyuru yapmadı. Kendi aramızda konuşurken duyuyorum.*

Mesela metu.onlının bazı özelliklerini yeni keşfediyorum. Lazım oldukça farkına varıyorum." (Interviewee 14).

"Nobody has told me to use METU online. I found out while we were talking [in general]. For example, I have just discovered some of the features of METU Online. I have noticed them [some of the features] as and when I need them." (Interviewee 14).

4.7.2 Methods Used in Learning How to Use New Technologies

This section questioned how academic staff learn using technology. As presented in Table – 4.6, the most preferred method to learn about the new technologies was the assistance they get from their colleagues (n=77, 48.1%). The second highest response was the courses that they took in their undergraduate education (n=60, 37.5%). In third place, there was "self-exploration (discovery – observation)", which was a common preference in the "other" field (n=42, 26.3%) (Table – 4.7). After these three main preferences, responses were ordered as: general technology training (n= 38, 23.8%); and consultation of department technical coordinator (n=18, 11.3%).

Table - 4.9 Method Used in Learning How to Use Technology.

How Learned Using Technology	**Frequency (n=160)**	**Percent**
General technology training	38	23.8
Higher education courses	60	37.5
Help from colleagues	77	48.1
Consultation of Department Technical Coordinator	18	11.3
Other	64	40.0

Although 64 (40.0%) of participants selected the "other" option, the most mentioned preference was "self-exploration (discovery – observation)". Respondents' other preferences were internet-web search (n=6, 3.8%); special interest (n=5, 3.1%); seminars (n=4, 2.5%); consultation of department research assistants (n=2, 1.3%) and previous job (n=1, 0.6%) (Table – 4.7).

Table - 4.10 "Other" Option of Method Used in Learning How to Use Technology.

Other	**Frequency (n=160)**	**Percent**
Self-exploration (discovery-observation)	42	26.3
Internet-web search	6	3.8
Special interest	5	3.1
Seminars	4	2.5
Consultation of Department Research Assistant	2	1.3
Previous job or assignment	1	0.6

It may be interpreted from the data that academic staff mostly learned how to use technology from their colleagues, courses that they took in their undergraduate education, and learning by themselves. As shown in Table – 4.6, the least preferred option is consultation of a department technical coordinator.

In line with acquiring knowledge about new technologies, the interviewees were asked about how they learned to use such new technologies. In this question, unlike the previous one, the most stated learning method was discovery learning. Participants indicated that they learned using new technologies by trial and error, and experimenting with it. The second most expressed answer for this question was learning from colleagues, students and relatives. Academic staff said that they preferred to ask people that were nearby to them. Some of the interviewees used the internet in order to learn about new technologies. Tutorials, YouTube, and forums were the examples given for this learning medium. However although less than the above, some participants learned about new technologies by reading books, from manuals, or from seminars and training.

4.7.3 Obstacles in Learning and Using New Technologies and Preferred Methods about Help and Support

Academic staff were also asked whether or not they had obstacles in learning how to use new technologies; and if there were, how they had coped with these problems. Most of the participants did not have any obstacles. However, those who had such problems stated the problems as: technical problems; time concerns; usage problems; equipment problems; and sustainability. To overcome the technical problems, interviewees preferred asking around, from workshop trainers or technical coordinators or services. For time concerns, academic staff tried getting less sleep in order to gain more time, or they just kept on spending more time working. While academic staff used the trial and error method or searching on the internet, in terms of usage problems, participants who had equipment problems, mostly in DBE and DML, arranged their equipment, such as projector, computer or smart classes, much earlier. As for sustainability, one of the interviewee stated that, they learned the basics of new technologies. In the case of advance use of technologies, student assistants or experienced PhD students helped them.

For technical help and support, 144 (90.0%) of participants preferred experienced research assistants, while 140 (87.5%) of academic staff chose one-to-one help (Table – 4.9). Additionally, 139 (86.9%) of participants preferred colleagues' support, whereas 137 (85.6%) of academic staff stated that they preferred the support of the technical coordinator of the department. On the other hand, a considerable number of participants (n=130, 81.3%) underlined ITSO as their preference for technical support. Other preferred methods are as follows: academic improvement programme (AGEP) (n=97, 60.6%); hotline or telephone assistance (n=96, 60.0%); outside professionals (n=81, 50.6%); colleagues at other universities (n=70, 43.8%), and METU TV (n=45, 28.1%).

Table - 4.11 Preferred Help and Support Methods.

Preferred Help and Support Methods	n	Don't Prefer at All + Don't Prefer (%)	Neutral (%)	Strongly Prefer + Prefer (%)
Experienced Research Assistants	160	3.2	6.8	90.0
Colleagues' support	160	5.7	7.5	86.8
Colleagues at other universities	160	25.6	30.6	43.8
Outside professionals	160	23.8	25.6	50.6
Technical Coordinator	160	2.5	11.9	85.6
Instructional Technology Support Office (ITSO)	160	3.7	15.0	81.3
Academic Improvement Programme (AGEB)	160	8.7	30.6	60.7
METU TV	160	21.3	50.6	28.1
Hotline, or telephone assistance	160	23.1	16.9	60.0
One to one help	160	5.7	6.8	87.5
Other	160	4.4	8.8	0.6

4.8 Preferred Instructional Technology Training and Support

4.8.1 Preferred Training Methods

Within this section the preferred training methods of the academic staff were enquired about. There were plenty of answers from different participants - although in general, the ideas expressed differed from each other, there were some answers in common. Most of the participants preferred hands-on practical training. Training by demonstration was not enough they said. Some thoughts about this opinion are expressed below:

> *"Uygulamalı bir şey olsa daha iyi olur. Mesela sonrasında derslerimizde onu kullansak, eğitimi veren biri derslerimize girse bunu daha interaktif daha nasıl yapabiliriz diye çalışsak." (Interviewee 2).*
>
> "It is better if applications are integrated into the training. For example, we can use the products which we create in practicals in our classes in the future." (Interviewee 2).
>
> *"Uygulamalı olması gerektiğini düşünüyorum. Seminer değil de uygulama ile teknik bilgi, neyi nasıl yapılacağı. Çok fazla yormadan haftada bir iki saat gibi." (Interviewee 15).*
>
> "It should be [provided] with hands-on practice. Applications in which an explanation of how something is performed through technical knowledge should be provided rather than only from seminars. About two hours per week [are enough]. No need to make [learners] tired [with extra trainings]." (Interviewee 15).

Some of the interviewees preferred that there should be a practice experience sharing system, like a forum, in order to increase awareness.

> *"Arada bir böyle bilgilendirici platformlar, bilgi paylaşımı sağlayan bir şey olabilir belki. Hocaların teknoloji ile ilgili tecrübelerini paylaştığı bir ortam, forum ya da blog olabilir. Yani başım sıkışınca elimin altında olabilecek bir kaynak." (Interviewee 8).*
>
> "It is good to have such informational platforms or anything that provides for the sharing of information It might be a setting, a forum, or a blog in which the instructors share their experiences related to technology. That is, a resource which I can reach whenever I need it…" (Interviewee 8).

Another opinion that was stated in the interview was that there should be routine one or two day long workshops as in-depth training or two phase awareness training with small groups. The first phase about acquiring information about an application, and the second phase about hands-on practical training.

> *"Ne tür kullanım alanlarının olduğu, wprkshoplar özellikle, iki aşamalı mesela önce aplication tanıtımı sonra onu nasıl kullanacağımıza dair bir program güzel olurdu." (Interviewee 10).*
>
> "What kinds of usage area… Especially workshops should include a two-stage-programme in which an application is first introduced, and then shown how to use the application [is given]." (Interviewee 10).

One of the interviewees had more than one thought about this question: that training should be arranged for similar groups; sessions should not be overcrowded, but boutique/small scale training. Another issue that was mentioned was about sustainability. The trainer should be permanent and accessible at all times. In addition to these thoughts, the participant indicated that an administrative policy should be implemented in order to encourage academic staff to use technologies in their teaching and learning processes.

> *"Okul çapında eğitimin ihtiyaçlara yönelik küçük grup benzer alan gibi farklı değişkenleri göze alarak verilmesi gerektiğini düşünüyorum. Bunu kalabalık gruplarla almayı tercih etmem…" (Interviewee 13).*
>
> "I think school-wide training should be provided for the needs of small groups which should be assembled in accordance with [certain] variables like the similarity of their profession. I do not prefer training in crowded sessions…" (Interviewee 13).
>
> *"…Eğitimi veren kişilerin o alana aşina olması gerektiğini düşünüyorum. ya da önden öğrenmesi gerekiyor bence. Çünkü aynı eğitimleri farklı disiplinlere aynı verirseniz sıkıntı olabiliyor…" (Interviewee 13).*
>
> "…I think an instructor who gives training should be familiar with the profession [of the group]. Or they should study [to have a pre-knowledge] the profession before the training…" (Interviewee 13).

"...Bir de eğtimi veren kişilerin çok genç olması sıkıntı yaşatabiliyor. Öğretim üyelerine eğitim veren kişilerin yetişmiş bilgili ve biraz deneyimli olması gerekiyor…" (Interviewee 13).

"…Moreover, it might create problems when a very young person provides the training. The person who gives the training for instructors should be qualified, knowledgeable, and experienced [enough]…" (Interviewee 13).

"...Bir de bunun için aynı şekilde sürdürülebilir olması gerekiyor. Mesela Ahmet ile iletişime geçiyorum. Sonrasından Ahmet masterını bitirip gidiyor. Bu sefer sürdürülebilir olmuyor. Belki bu kadrolar daimi olmalı. Kadronun geçiciliği sıkıntı. Çünkü bilgi birikiminin olması lazım…" (Interviewee 13).

"…For this, it should be sustainable at the same time. For example, I am talking to Ahmet; then, Ahmet leaves after completing his master's degree - this is not sustainable. Maybe, these positions should be permanent. The transiency of the position is problematic because people [in the positions] should be knowledgeable…" (Interviewee 13).

"...Sadece bir ofisin çabası değil de kurumsal olarak biz bunu önemsiyoruz, bunu destekliyoruz ve bu uygulamaları destekliyoruz derse ODTÜ bence daha iyi yol katabileceğiz diye düşünüyorum…" (Interviewee 13).

"…I think if METU cares about and supports these applications as a whole institution rather than just one unit, we can progress better …" (Interviewee 13).

An interviewee from the EDS department expressed that instead of campus-wide, face-to-face training, webinars or training videos would be a better option for academic staff. Likewise, in such training, easy to use technologies could be introduced. More complex technologies could be introduced to those fewer academic staff who wanted to use it. Easy and flexible access to the webinars and videos and easy to use technologies might increase the number of academic staff learning such technologies.

"Okul çapında eğitim programına ihtiyaç olduğunu düşünmüyorum. Onun yerine video yapıp koysunlar. Video da aa bak bu varmış diye videoya bakıyorsun. Etkili yöntem o dur. Onun dışındakiler bence etkili değil. Dönem içinde dünya kadar iş var. Gün içinde yapılacak çok şey varken bunlar bana çok gerçekçi gelmiyor. Video gibi her zaman elimin altında video olmalı bence. ODTÜ bunu yapmalı…" (Interviewee 14).

"I think there is no need for campus-wide training. Instead, they can provide video tutorials. You watch the videos and notice different things.]. That is an effective way of training. I think the others are not so effective. There is a lot of work during the semester and I don't think that this type of training is very realistic while you have to do many other things during the day. You should have video tutorials or training videos that you can

reach anytime. METU should apply [videos]…" (Interviewee 14).

"…Kolay öğrenilen bir teknoloji olmayınca can sıkıyor. Kolay olmalı. Öğrenmek için zamanınızın %30 unu harcıyorsanız sıkıntı var demektir…" (Interviewee 14).

"…It is very annoying when the technology is not easy to learn. It should be easy. If you spend 30% of your time to learn it [the technology], it is troublesome …" (Interviewee 14).

"…Teknolojileri mümkün olduğunca basit, kullanılabilir, anlaşılabilir bir şekilde tasarlamamız lazım…" (Interviewee 14).

"…We should design technologies in the way that can be easy, usable, and comprehensible…" (Interviewee 14).

From the other participants, one of them mentioned that a serious amount of training for administrative staff (secretaries and departmental purchase specialists) should be provided in order to overcome procedural problems that occur due to them not using technology. Beside this, one interviewee believed that explaining the benefits of collaboration of technology is very important in order to convince academic staff to use technology. The last opinion about this question was about the paradigm of academic staff changing, not the students.

"…Bunun için öğrencinin değil öğretenin değişmesi gerekiyor. Değişmeyen biziz aslında. Çünkü bu eğitimi almayan tek grup hocalardır…" (Interviewee 1).

"…For this, instructors should be the ones to change, rather than the learners. In fact, we are the ones that do not change because the only group of people who do not take this training are the instructors…" (Interviewee 1).

"…Hocaların gerçekten eğitilmesi gerekiyor. Pedagojik, teknolojik, vücut dili, vs. bilmek gerekiyor…" (Interviewee 1).

"…Instructors really need to be trained. They need to have knowledge of pedagogy, technology, body language, etc…" (Interviewee 1).

4.8.2 Preferred Training

In phase I, to examine the participants' preferred instructional technology training, a ten item "yes/no" question subscale was prepared. It seems obvious from Table – 4.11 that almost all of the respondents saw themselves as proficient in using e-mail (composing and sending mail, attaching files etc.) (n=155, 96.9%); using internet (searching, downloading files etc.) (n=152, 95.0%); basic computer skills (93.1%) and therefore did not need such training. In the same manner, participants also did not prefer training such as using specific software programs (PowerPoint etc.) (83.7%); and using e-mail management programs like Outlook, Thunderbird etc. (81.2%).

On the flip side of the coin, the most popular answer was using technology for students who have different learning styles with 73.1% of responses. While using technology to evaluate

students' works and products was in second place with a 68.1% response rate, it was followed by using technology for classroom management with 67.5% of participants. Furthermore, the amount of respondents that preferred training about integrating technology into curriculum was 65.6%, whereas 61.9% of academic staff demanded training that gave the chance of using technology as a production tool.

Once one looks at the big picture for these answers, academic staff seem to demand instructional technology training for the integration of technology into the teaching and learning process as a tool, rather than just using it.

Table - 4.12 Preferred Instructional Technology Training.

Preferred Instructional Technology Training	**n**	**Yes (%)**	**No (%)**
Basic computer skills (reaching programs, print out etc.)	160	6.9	93.1
Using e-mail (composing and sending email, attaching files etc.)	160	3.1	96.9
Using e-mail management programs (Outlook, Thunderbird etc.)	160	18.8	81.2
Using Internet (searching, downloading files etc.)	160	5.0	95.0
Using specific software programs (PowerPoint etc.)	160	16.3	83.7
Integrating technology into curriculum	160	65.6	34.4
Using technology for students who have different learning styles	160	73.1	26.9
Using technology as a production tool	160	61.9	38.1
Using technology for classroom management	160	67.5	32.5
Using technology to evaluate students' work and products	160	68.1	31.9

In phase II, academic staff were asked about their training needs. Several answers were specified by the participants. One participant indicated that training such as curriculum setting, andragogy approaches, and instructional methods might be helpful for them to deliver better and more exciting lectures.

> *"Nasıl daha iyi ders anlatırım. Nasıl sınıfı daha heyecanlandırırımı iyi anlamak açısından eğitimler. Curriculum set etmek, ilişkileri daha doğru kurmak, öğrencilerin 20 dk klasik attention oldukları, iyi bir anlatım için renk seçimi ve font seçimleri vs. androgojik yaklaşımlar. Belki de dersler uzun olmamalı. Öğretim yöntemleri üzerine. Videoda da sınıftaki gibi kuru kuru duruyorsam anlamı yok. El yordamı ile öğreniyoruz." (Interviewee 1).*

> "Training about how I can teach better, [or] how I motivate the class more. Determining the curriculum, contacting better, the fact that learners classically attend for just twenty minutes, selection of colours for better teaching, selection of font, and andragogical approaches, etc. Maybe, training classes should be longer. More about teaching methods. It is meaningless if I am a passive learner while learning through video in the class. We are learning in the dark." (Interviewee 1).

If there is a new LMS, the training preferences of the participants were that it should include Photoshop, video editing, how to create animation, how to create an effective web site, introductive seminars about new technologies, course material production, discipline-

specific (specialist) software, and how to use technology in the teaching and learning process. In addition to these, technology training about examination and distance education were also expressed by some interviewees.

> *"Mesela şu an biz speaking sınavımızı internet üzerinden yapmak istiyoruz. Yani sınava yönelik bir eğitim almak güzel olur." (Interviewee 4).*
>
> "For example, we would like to conduct our verbal exams through the Internet now. That is, to take training about examinations would be nice." (Interviewee 4).
>
> *"Belki uzaktan eğitim ile ilgili olabilir. Yani ders dışında 3 saatlik derse sığdıramadım şeyleri uzaktan nasıl halledebilirim onları öğrenmek isterdim." (Interviewee 8).*
>
> "It might be related to distance education. That is, I would like to learn about how I can distantly manage the things that I do and have time to teach in a three-hour-class." (Interviewee 8).

4.8.3 ITSO Awareness and Support

For support systems, academic staff were asked if they were aware of ITSO or not. As expressed during the interviews, five of the sixteen participants (from DBE and SOC) were not aware of ITSO. From the eleven participants who indicated that they were aware of ITSO, while one of them expressed they were in need of ITSO, three of them stated that they were not in need of it or did not know what ITSO did.

When the academic staff were asked whether or not they had an ITSO in their department, almost all said no, they did not. Just two of them, from the faculty of education, stated that they have such an office. When those who indicated that they do not have ITSO in their departments were asked, "Would you like to have such an office in your department?" twelve answered yes, and only two of them answered this question as no.

> *"İyi olur. İsterdim tabi. Bu tür uzman birini desteğini almayı isterim." (Interviewee 1).*
>
> "It would be nice. I would like to receive support from such an expert." (Interviewee 1).
>
> *"…Bütün haftanın 5 günü burada olmayabilir ama haftada iki gün böyle bir birim oluşturulursa en azından ihtiyaçlara yönelik training verse süper olur. Çok isteriz." (Interviewee 9).*
>
> "It would be great if a unit was assigned, at least to provide training for our needs for two days a week. It does not have to be five days in a week. We would love that." (Interviewee 9).
>
> *"Bölümde bize teknik destek bilen kişinin bu ofis tarafından eğitilmesini isterdim…" (Interviewee 13).*
>
> "I would like our technical coordinators to be trained by this [ITSO] office…" (Interviewee 13).

> *"Hayır. İnsanların bilgisayar bağlantı Word sorunları ile uğraşmaktan çocuklar iş yapmaz." (Interviewee 12).*
>
> "No, they could not just work as as/when needed due to instructors' technical problems or MS Word related questions." (Interviewee 12).
>
> *"Çok gerek yok gibi geliyor bana. Teknik süreçler ve biraz fonksiyonel bakıyor hocalar benim gibi. Asistan bir şekilde çözüyor zaten. Bölümden ziyade fakülte babında olabilir. İlla bölüme gerek yok bence." (Interviewee 16).*
>
> "It sounds as if there is no need. Technical processes… And instructors look [at the processes] from the functional aspect, like me. Assistants already solve somehow. It might be on the basis of a faculty rather than a department. I do not necessarily need [on the basis of] a department." (Interviewee 16).

A large number of interviewees (twelve academic staff) did not receive any help from ITSO, on the other hand, four of them had. From these four, while the number of interviewees stated that the help met their expectations, one of them indicated that it did not.

4.9 Overview of both Quantitative and Qualitative Findings

Since both quantitative and qualitative data were obtained and mixed method was used in this study, it was important to merge the data in a proper way so that findings would provide better evidence to answer the research questions. Thus, in the following descriptive tables, data type, related findings and complementary data are presented. Complementary data are highlighted with the same colour in order to better illustrate the data merging in this study.

Table - 4.13 Use of Instructional Technology

Quantitative Findings	Qualitative Findings
Computer and projector, (92.5%) Board, (80.0%) Course web sites, (53.1%) Educational videos, (42.5%) Video/TV (wide screen projection), (34.4%) Personal web sites, (31.9%) Course material preparation software, (29.4%) Overhead projector, (28.1%) Audio records, (26.9%) LMS - CMS (Moodle, Sakai etc.), (10.0%) Smart board, (8.8%) Smart classrooms, (8.8%) Others like e-groups, cloud tools, mock-up's and models, articles, and wiki's, (7.5%)	Web based software→ LMS (METU Online, OCW), social media, YouTube, Forums, blogs, Web 2.0 Computer based software→ Simulations, presentations, multimedia, packed programs Hardware → Computer, projector, overhead projector, DVD/CD/Audio player

Table - 4.14 Barriers in Use of Technology, Preferred Sources and Solutions

Quantitative Findings				Qualitative Findings
Factors Affect Use of Instructional Technology	**Not Barriers (%)**	**Partial Barriers (%)**	**Barriers (%)**	
Not enough time for learning software programs	20.0	52.5	27.5	Technical Problems
Lack of training	30.0	55.0	15.0	Time → not enough time for preparation and learning
Lack of help about alternative instructional methods	27.5	51.9	20.6	
Not enough computers on campus	71.3	10.0	18.7	METU Online
Lack of self-confidence about technology	77.5	18.7	3.8	
Lack of experience about using computers in education	60.0	30.0	10.0	Financial equipment problems → not enough equipment, uncoordinated finance and bureaucracy, Disorganised learning environment, no compatible classrooms with intended tech.
Lack of models about how to use computers in education	45.0	42.5	17.5	
Lack of information about software that fits my discipline	33.7	48.8	17.5	Sustainability → it is hard to gain and find new perspectives for using tech. due to limited time or lack of training
Lack of budget and financial resources	30.0	37.5	32.5	
Lack of interest about technology	53.8	38.8	7.4	
Lack of administrative support	41.3	39.4	19.3	
No campus-wide technology coordinator (lack of technical support)	34.3	43.8	21.9	

Table - 4.15 Acquiring Knowledge about New Technologies and Support

Quantitative Findings				Qualitative Findings
Acquiring Technology Knowledge	**Don't Prefer at All + Don't Prefer (%)**	**Neutral (%)**	**Strongly Prefer + Prefer (%)**	By themselves
General training about technology	15.0	13.1	71.9	Internet (social media, web sites, groups, blogs)
Training about my discipline	6.2	11.9	81.9	
Online materials	0.6	1.3	98.1	Colleagues friends and relatives
Printed materials	16.3	14.3	69.4	
Experimenting by myself	6.3	12.5	81.2	Published documents (ITSO booklets, books, magazines)
Workshops and presentations	8.1	10.0	81.9	
Regular seminars in METU	8.7	20.0	71.3	Seminars and conferences

Table - 4.16 Acquiring Knowledge about New Technologies and Support

Quantitative Findings			Qualitative Findings
How Learned Using Technology	**Frequency (n=160)**	**Percent**	Discovery (trial & error, experimenting)
General technology training	38	23.8	
Higher education courses	60	37.5	Colleagues friends and relatives
Help from colleagues	77	48.1	
Consultation of Department Technical Coordinator	18	11.3	Internet (tutorials, forums, YouTube)
Other	64	40.0	
Other	**Frequency (n=160)**	**Percent**	Books, magazines, seminars, training
Self-exploration (discovery-observation)	42	26.3	
Internet-web search	6	3.8	
Special interest	5	3.1	
Seminars	4	2.5	
Consultation of Department Research Assistant	2	1.3	
Previous job or assignment	1	0.6	

Table - 4.17 Acquiring Knowledge about New Technologies and Support

Quantitative Findings				Qualitative Findings
Preferred Help and Support Methods	**Don't Prefer at All + Don't Prefer (%)**	**Neutral (%)**	**Strongly Prefer + Prefer (%)**	
Experienced research assistants	3.2	6.8	90.0	Majority did not have any…
Colleagues' support	5.7	7.5	86.8	Technical problem → asking around
Colleagues at other universities	25.6	30.6	43.8	
Outside professionals	23.8	25.6	50.6	Time → sleep less, keep on spending time
Technical coordinator	2.5	11.9	85.6	
Instructional Technology Support Office (ITSO)	3.7	15.0	81.3	Usage problems → internet, trial and error method
Academic Improvement Programme (AGEB)	8.7	30.6	60.7	
METU TV	21.3	50.6	28.1	Equipment → arrange earlier
Hotline, or telephone assistance	23.1	16.9	60.0	
One to one help	5.7	6.8	87.5	
Other	4.4	8.8	0.6	

Table - 4.18 Preferred Technology Trainings and Support

Quantitative Findings

Preferred Instructional Technology Training	Yes (%)	No (%)
Basic computer skills (reaching programs, print out etc.)	6.9	93.1
Using e-mail (composing and sending email, attaching files etc.)	3.1	96.9
Using e-mail management programs (Outlook, Thunderbird etc.)	18.8	81.2
Using Internet (searching, downloading files etc.)	5.0	95.0
Using specific software programs (PowerPoint etc.)	16.3	83.7
Integrating technology into curriculum	65.6	34.4
Using technology for students who have different learning styles	73.1	26.9
Using technology as a production tool	61.9	38.1
Using technology for classroom management	67.5	32.5
Using technology to evaluate students' work and products	68.1	31.9

Qualitative Findings

Instructional methods Andragogy approaches

Setting curriculum

New LMS

Photoshop, video editing, animation

Effective web sites

Introductive seminars about new technologies

Course material production

Disciplinary specific software

How to use tech in teaching and learning

Examination and distance learning

CHAPTER 5

DISCUSSION AND CONCLUSION

5.1 Introduction

The aim of this study is to explore the barriers and enablers of the current use of instructional technology by METU academic staff. The main focus was to identify barriers and enablers and their components. In order to provide a detailed description of the situation, a mixed-method research design was conducted. Data from a survey and interviews were obtained separately. Since they are complementary, the interpretation consisted of combined data. In this chapter, first there is a discussion of the results, then, it continues with suggestions for future studies and lastly, the conclusion.

5.2 Discussion

5.2.1 Use of Instructional Technology

Results of the qualitative data showed that more than 90% of the participants own a computer for home use and for professional use. Similarly, over 95% of the respondents have internet access both in their home and at their office. The reason for the higher percentage of internet access over computer ownership may be that some academic staff, mostly research assistants, are provided with computers for their office. However they connect to the internet via personal computers or other devices. In a study which was conducted at the Akdeniz University School of Medicine, most of the participants indicated that they had a computer at home and at the office (92.5%) and for Internet access it showed 47% at home, and 82.9% for the office (Zayim, Yıldırım & Saka, 2006). In another study by Turan & Çolakoğlu (2008), they expressed that at Adnan Menderes University, 93% of the participants have computer and internet access both at the office and at home. These two studies showed that at Akdeniz University and Adnan Menderes University, the diffusion of computer and internet use is high. Zayim (2004) stated that decreases in prices within the computer market and the relative economic status of faculties in Turkey may explain the high rate (p. 94). Compared to these two universities, METU's status for computer ownership and internet access is higher. However, it should be noted that rates in METU are still lower than for an ideal higher education institution; the aim should be to increase the rate up to 100%.

Findings provide that academic staff mostly use computer and projector, board, and course web sites as instructional technology. In addition to these, LMS, educational videos, personal

web sites and multimedia are used in teaching and learning. Relevant studies also investigated technologies that are used by academic staff. While Zayim, Yıldırım & Saka (2006) stated that academic staff at the Akdeniz University School of Medicine mostly use computer technologies such as presentation software, multimedia applications and the World Wide Web for instructional purposes and software for preparing presentations and hand-out's. According to Göktaş (2006)'s study, the most frequently used hardware by the faculty members of both courses were the computer and second, the LCD projector. More than 50% of respondents used LMS for their courses. Academic staff that don't use LMS in their courses are mostly from DBE. It was seen that LMS, like METU Online, is used by the majority academic staff rather than DBE staff. Academic staff of DBE differ from other staff in terms of their technology usage. The reason may be the learning environment, or the curriculum. Since projectors and computers are not in all DBE classes, academic staff of this department tend to use overhead projectors in their courses, which are a more outdated technology than projectors. Likewise, they don't use LMS in the English preparation classes. METU provide systematic technologies like projector and computer, METU Online, OCW etc. to almost all of the departments. As a general opinion, academic staff tend to use ready to use technologies more. If the technology is available, then the faculty use it. This argument is acceptable for basic and easy to use technologies.

Course videos are recorded by academic staff who are trying to use different instructional methods. It depends on the academic staff's willingness to use technology. There are different purposes of using videos in teaching and learning. Multimedia, especially videos, are generally used as a complementary tool in courses. On the other hand, some faculty members record their course videos and share it with students or use videos as field visit courses.

Academic staff use technology to enhance teaching and learning in the first place. Visualisation, easy and flexible access, evaluation and immediate feedback are the main reasons for using technology for lecturing and introducing course materials. On the other side, social media is more likely to be used for communication, than it is to be integrated into a course. Over 65% of the academic staff use course web sites. These web sites may be METU Online, departmental LMS or personal web sites. For all of these options, faculty use such web sites for sharing course documents, announcements or evaluation. It was stated in the literature that by using a variety of materials, methods and equipment in courses, teachers can enhance their performance in their instruction, and they could also benefit from ICT to more efficiently increase the quality of their instruction. (Göktaş, 2006)

Awareness is the one of the criteria about technology use patterns. Opportunities like OCW, smart classrooms, and ITSO are the major components that academic staff mentioned about their awareness. According to the results, although the percentage of academic staff that was aware of OCW and smart classrooms was more than 70%, the amount of faculty who use them is really much lower. For OCW, it can be said that although they are ready to use technologies like OCW, which is known to need more content management and/or time to coordinate, the faculty really do not prefer it. The low usage of smart classrooms may be as a result of reasons including an insufficient number of smart classrooms or just no real need for using them. On the other hand, even academic staff were not all that aware of ITSO; the consensus of opinion of academic staff was that they wanted an ITSO in their department. In addition to this, most departments do not have ITSO but they have technology support offices. Thus, most technology support offices serve as ITSO as well. Therefore, most

academic staff admit they don't see a clear distinction between ITSO and TSO in their minds.

The findings show that if academic staff are aware of technologies, and these technologies are available and easy to use, with no need for complex comprehension, they use these technologies just as a tool, or integrate them into teaching and learning. It is argued in the literature that the new instructional technologies which are provided by the internet and other technologies are not used sufficiently (Turan & Çolakoğlu 2008). In order to benefit from ICT effectively, complementary and descriptive studies are required. To do so, the benefits and ease of use of ICT should be demonstrated and explained to the educators. Recent studies showed that educators need continuous training for the using of technology more efficiently, more technical support, and time for integrating those technologies into teaching and learning (Seyal et al., 2002).

5.2.2 Perceived Advantages in Use of Technology

Findings indicated that there are several advantages of using technology in teaching and learning process. With the use of technology, academic staff spend their time more efficiently. Technology usage saves time in terms of classroom lecturing and course related activities. In addition to this, technology makes the teaching and learning available outside of class hours. Likewise, technology increases the quality of lecturing, for instance, it makes the lecture more visual, and thanks to this, easier to follow. These findings are parallel with Zayim (2004)'s study. In the study, it was found that one of the benefits of the use of technology was an increased efficiency and effectiveness for both classroom and course related activities (p. 95). Another advantage is that, since the target group are characterised as technology natives, it not only affects the long term memory in a positive way for visual learners, but also meets students' different learning styles. Similar results were also discussed in the literature. According to Zayim (2004), participants in that study stated that technology provided them with a range of visual materials on their courses and it increased the motivation and participation of the students (p. 95). It increased the quality and effectiveness of the instruction, ease of sharing and updating of course materials, and renewal of knowledge by accessing up-to-date information as well (p. 104). On the other hand, the faculty benefits from technology in terms of its flexibility and ease of access as, according to the sample of this study, sustainable access is important for a course. This facility makes academic staff feel an increased confidence in themselves and are more motivated. Communication and immediate feedback is another advantage and reason for using technology in the teaching and learning process. Interactive and effective communication not only increases the efficiency of lectures and increases students' motivation, but also reduces the time wasted on a large campus. In the same manner, technology has the ability to facilitate immediate electronic feedback, which reduces the response time of that feedback, and reduces the necessity for hardcopies, creating a paper saving. Ease of update is also perceived as an advantage by academic staff as course contents, course related documents such as syllabus, schedule, and environment (delivering methods) etc. can be updated easily. Supported by findings presented in the study conducted by Göktaş (2006), it was stated that the importance of integrating technology was not only at a subject-matter level, but rather as an institutional approach (p. 100). A majority of the

participants had positive perceptions in both "belief of the positive effect of technology in education" (p. 101).

5.2.3 Influence on Use of Technology Decision

There are two main factors that affect academic staff's decisions about the use of technology: incident or people effect and department/unit effect. As for the incident and people effect, academic staff generally decided to use technology due to personal interest and self-motivation, and target group characteristics. According to Roberts, Kelly, and Medlin (2007) there are social factors that affect technology adoption. These are "peer support, shared departmental values, friends, and students" (p. 428). Although this study's findings were not examined in exactly the same way, there are similarities with those findings. METU academic staff may see technology somewhere or their decision is affected by the demands of technology native students. Similarly, their decision about technology use are also based on the infrastructure and also their colleagues. Where there is ready to use technology like projectors and computers, LMS, smart classes etc. they tend to use it. Roberts et al. (2007) also found some organisational factors that significantly influence the faculty members' decision to adopt technology. These were "physical resources" (p. 429) and that "technology must be available, easy to use, and reliable" (p. 429). They may also observe good practices from their colleagues and understand how easy it is to use technology, both of which can influence academic staff to change their decision about the use of technology.

As a department/unit, mainly it was infrastructure readiness and departmental or administrative incentives that affected academic staff's decision on using technology. Similar to recent findings, ready to use equipment such as projectors and computers, specific software, web-based technologies etc. make academic staff tend to use them. Additionally, opportunities provided by departments or administrates encourage academic staff to use, or at least to try out those technologies. Sometimes this effect may be due to an obligation in some departments to comply, where all of the academic staff who are registered to a particular department have to use those technologies. As a result, the use of technology in teaching and learning increases automatically. The question is simply, "Is it effective?" According to findings, to some extent, the answer is "Yes". On the other hand, departments or units do not affect some academic staff at all, neither by incentive or obstacle. It depends on the perception of academic staff.

According to Butler and Sellbom (2002), a barrier not previously mentioned is the thought that faculty perceive technology as worthless.

Many faculty wonder whether it is worth their effort to learn many of the available technologies, given the scepticism that those technologies facilitate learning in higher education. Faculty cannot easily find convincing data that technology matters, nor can they easily determine if this is because technology doesn't matter or because the right studies aren't widely available. (p. 26)

Based on the study of Butler and Sellbom (2002) and findings of this study, it is shown that there should be incentives in order to encourage academic staff to use technology, however, there are insufficient policies about this issue. METU generally want their academic staff to

publish papers, and do not evaluate if faculty members use technology or not, so academic staff normally spend their time writing publications and researching, rather than using technology to enhance their courses. Instead, if METU instigated such a policy, which encouraged and incentivised faculty members to use technology within their lectures, the use of technology would automatically increase. Additional supporting findings were discussed by Gilbert (1996) and Walcott and Betts (1999). Gilbert (1996) reported that many institutions did not provide obtainable information for "good practices" (p. 11). In addition, research, such as a study by Wolcott and Betts (1999) has identified limited institutional reward practices and incentives for faculty members who encourage participating in technology supported activities. Faculty members identified little or no financial support and stated a need to devote extended working hours to the use of technology.

5.2.4 Barriers in Use of Technology, Preferred Sources and Solutions

5.2.4.1 Barriers

On the use of instructional technology in teaching and learning process, the academic staff stated that from the factors available in the survey, there are no factors considered as a barrier. The faculty members have self-confidence in using instructional technology and have neither a lack of computers, nor a lack of experience using computers that could be constituted as a block to their use of instructional technology. While participants of the quantitative phase indicated that the number of computers was not considered as a barrier, some of the qualitative phase participants did consider this as a barrier - those academic staff were from DBE and DML. This may be explained as that while those academic staff had answered the questionnaire, they did not think that this was a barrier. On the other hand, during in-depth questioning, since real cases were argued they identified it as a barrier. Additionally, it may be said that language teaching departments experience some financial problems to provide and manage such equipment. In addition to this, the lack of role models about how to use computers in education and a lack of administrative support are not perceived as barriers.

On the other hand, as mentioned, although there no barriers, some factors partly block the use of instructional technology in teaching and learning process. The most frequently identified barriers cited in the literature were lack of technical support, equipment, administrative support, time, and student acceptance (Hall & Elliot, 2003; Massey & Zembrey, 1995; Richard, 1999; Spodark, 2003; Wolcott, 2003).

Findings of this study were in line with those barriers. In addition to those, Göktaş (2006) stated that the most important barrier was the lack of easily accessible resources in his study, from a general perspective this is also valid for this study. According to Göktaş (2006), academic staff considered the following as barriers: "lack of successful models, inadequate support from above (administrative support) for faculty members who successfully integrate ICT into their courses, lack of hardware, lack of in-service training about ICT, lack of technical support for integration ICT and preparation of instructional materials, inadequate range of knowledge and skills on the integration of ICT in instruction". Similarly, in this study, faculty members think that there is not enough training about how to use instructional technology in education, time for learning how to use new software, or help available about

alternative instructional methods. These are the factors that are considered as partial barriers. Similarly, a lack of information about software that fits their discipline, a lack of a campus-wide technology coordinator, and a lack of budgetary and financial resources partly block the use of instructional technology in teaching and learning process. When looking from another perspective, academic staff are faced with some obstacles while using instructional technologies for teaching and learning. Technical problems are the most common problem. Other obstacles are time, financial and equipment problems. Academic staff may not have enough time for the preparation and learning processes of using technology. Although technical and time problems are not vital, they do affect decisions made about using technology. Additionally, financial and equipment problems happen because of uncoordinated finance and bureaucracy, and from scattershot learning environments. Well planned finance and the procurement of devices which are suitable to the learning environment, or, changing the learning environment according to the technology, will be the key to addressing these problems. Those were barriers that were discussed in the literature. Besides, there were some different thoughts that were not expressed in the literature. For instance, METU Online is the other issue that was considered as an obstacle by the academic staff. As discussed above, almost all of the faculty use LMS, especially METU Online. However, all of the academic staff either complained about it or chose not to use it. They found it complex and stated that it is not user friendly. Almost all of METU Online users demanded a better LMS.

5.2.4.2 Preferred Sources

Academic staff prefer dealing with obstacles themselves, as well as using external (out-) sources. Both sources are similar to the preferred methods of learning technology and for receiving support. Although there were generally external (out-) sources rather than self-sources in the literature, METU academic staff preferred self-sources as well. As for self-sources, faculty members prefer an internet search, YouTube videos or tutorials, as well as discovery methods (trial and error). Besides these, they also prefer the department technical coordinator or technical assistants as out sources, as well as colleagues, research assistants and students as the other sources. Those findings were in line with Göktaş (2006) study. As sited by Göktaş (2006), in the study the following items might also be enablers to overcome the significant barriers: adequate equipment and resources in the literature (Becker, 1994; Fabry & Higgs, 1997; Hadley & Sheingold, 1993; OTA, 1995; Topp, Mortensen, and Grandgenett, 1995); allocating specific units or personnel for peer support and to help reduce the teacher workload (Becker, 1994; Japonite, 2001; OTA, 1995; PricewaterhouseCoopers 2001; Ronnkvist, Dexter, & Anderson, 2000); staff development (OTA, 1995; Willis, 1993); and preparation of technology plans for implementing ICT in STE and universities (UNESCO, 2002).

Looking at the findings, it may be said that faculty members prefer flexible and easy to access sources, which take up little time, and require little experience in order to overcome obstacles they are faced with during the use of technology in teaching and learning process.

5.2.4.3 Solution Suggestions

Solutions suggestions Academic staff indicated some solutions to prevent or reduce such obstacles. Although there were lots of enablers and suggestions about technology use, four main suggestions came up in this study. Those four main solution topics are: (1) training, (2) infrastructure and equipment, (3) technical support system, (4) a better LMS. For training, the faculty members want more frequent seminars or training about instructional technologies. The reason for this demand may be time concern and/or a lack of training or seminars about instructional technologies. The in-service training for ICT should be improved in both terms of quality and quantity (Göktaş, 2006). Also Roberts and Ferris (1994) explained that training, support, time and leadership were necessary for the successful integration of technology into the classroom" (p. 335).

On the other hand, slightly different from the literature, there is another idea which states that instead of face-to-face campus-wide or group based training or seminars, webinars or training videos such as tutorials etc. should be provided by ITSO. This strategy may reduce the time problems and improve the function of ITSO.

Findings indicate that for infrastructure obstacles, METU should revise the old infrastructure or devices. Where there are devices or items of infrastructure required, they should be purchased. As a summation, METU should invest more money for infrastructure and equipment. Göktaş (2006) also stated in his study that there should be more budget allocation for ICT.

Faculty members expressed their opinion about the technical support system. They suggested three solutions about that. According to the results, technical support offices or coordinators should be more accessible. In the literature, there were some supporting findings. In one study it was stated that specific units and personnel should be allocated for peer support and the public use of ICT tools and materials in instruction (Göktaş, 2006). Additionally, if statistics about technical problems were recorded, it could be used as a preventive strategic tool. Instructional technology units should invest less of their efforts in solving the technical problems of individual faculty members and more in serving the faculty in general (Chizmar and Williams, 2001). Relevant to statistical records, once troubleshooting steps are provided in all classrooms or for technologies used in teaching and education, it may be able to reduce the number of minor technical problems that faculty members are faced with while using technology. The last but by no means the least important solution, is that of a permanent technical assistant or coordinator. Chizmar and Williams (2001) also argued that campuses need to create venues for faculty to come together to share and trade experiences, development efforts, templates, products and the like. Administrations need to insure technology works flawlessly, when technology administrators decide to adopt a new technology they should over – not under-, estimate its capacity.

For LMS, as it has been discussed before, a better LMS should be provided by METU. METU Online does not meet the academic staff's expectations. A less complex and user friendly LMS needs to be provided.

In the literature there were more suggestions that were different from this study. Brzycki and Dudt recommended that administrators must provide reward and incentive for the "desired outcomes and products" (p. 19). The rewards and incentives need to be well publicised or

well documented, including "support staff that can both use and teach technology and technology needs to be incorporated into faculty evaluation" (Brzycki & Dudt, p. 19). Also, Göktaş (2006) suggested that the faculty members who integrate ICT into their courses should be supported.

5.2.5 Acquiring Knowledge about New Technologies and Support

Academic staff gain their knowledge about new technologies from the internet, from the people around them and from published documents. However, the most preferred option for academic staff was online materials and the internet. The reason for this choice may be the flexibility and ease of access. The faculty members can access documents whenever they want. Those who prefer using the internet get information from search engines, social media, by following websites, groups and blogs. On the other hand, since academic staff sometimes attend discipline-specific training, they receive information about technologies from such events. In addition to this, there are regular workshops and presentations held at METU and some faculty members heard about technologies from these kinds of activities. While colleagues, friends and relatives are the other sources mentioned, articles, ITSO booklets, books, magazines, and newspapers are also sources of information used for the acquisition of knowledge about new technologies.

According to these findings, faculty generally prefer personal efforts like internet search, reading from somewhere etc., or people around them who are accessible in order to get information about technology or to learn how to use it. In other words, although there are a variety of options, in terms of getting help and receiving support, academic staff generally prefer research assistants, one to one help, colleagues' support or help from the technical coordinator of their department. According to Zayim (2004), colleagues within the university or other institutions, act as a source of new technologies as well as a source of support (p. 97). Graduate students provide information and support because they have more expertise than academic staff (p. 107). This may be as a result of the faculty tendency to prefer the shortest and easiest way to receiving support. These ways might simply be to do with time or distance. The common point is that all of these options contain face-to-face and individual communication. Faculty members prefer such direct rather than indirect forms of support.

Faculty learn how to use technology from different sources. Although there are holistic similarities among the quantitative and qualitative findings, preferences differ from each other. While phase I participants mostly prefer their colleagues, the qualitative participants mostly learn new technologies through the self-exploration (discovery – observation) method. They mostly prefer to learn new technologies by the trial and error method, or by experimenting with it. Apart from that, the courses that they took in their undergraduate education is the other method referred to as a way of learning how to use technology. In other words, academic staff consult their colleagues, students or relatives or by using internet – tutorials, YouTube, and forums – in order to learn how to use new technologies. It may therefore be interpreted from the data that academic staff mostly learned how to use technology by themselves, from their colleagues, and courses that they took in their undergraduate education. In a similar study, Zayim (2004) explained that academic staff become aware of new technologies through four main sources: colleagues, mass media

channels, graduate students, technology fairs and conferences (p. 97). These four sources are parallel with the study findings.

Acquiring knowledge, receiving support, and methods of learning how to use technology have some preferences in common. For all of these, faculty prefer flexibility, ease of access, not very time consuming, and experience based sources. Thus, for learning technology and receiving support, if those parameters are provided, the faculty members may increase their knowledge about technology and the use of technology in teaching and learning process.

In their study, Roberts, Kelley, and Medlin (2007) investigated various "social, organisational and personal factors influencing accounting faculties' technology usages". Social factors in this study included, "peer support, peer pressure, mentors, shared values in my department, friends and students" (p. 429). Organisational factors included in this study were "a mandate from the university; institutional reward system; formal recognition by a department, college, university level; and physical resources (equipment, hardware, software)" (p. 429).

On another issue, some enablers for the obstacles faced exist in academic life. In the literature Ertmer et al. (1999) classified enablers as being either intrinsic or extrinsic. For example, access to hardware, quality software, the Internet, technical support, as well as administrative and peer support might be viewed as being extrinsic whereas personal beliefs, previous success with technology, and self-efficacy might be viewed as being intrinsic enablers (Göktaş, 2006). According to results, many of the academic staff are not faced with obstacles in learning and using new technologies in the teaching and learning process. However, those who have such problems stated the obstacles as being technical problems, time concerns, and equipment problems. Academic staff use several methods in order to deal with those problems. They generally prefer internet or asking the people around them, technical coordinators or workshop trainers for help with their technical problems. For the obstacle of time, there are two opinions; the first one is sleeping less, the other one is staying at work, or applying the trial and error method instead of doing something else. To prevent equipment problems, which mostly occur in DBE and DML – departments that generally have insufficient infrastructure – the faculty need to make arrangements for such equipment.

5.2.6 Preferred Methods of Training for the Use of Instructional Technology

Academic staff prefer hands-on practical training as a method of instructional technology training. Faculty's thoughts indicate that training should be routine and might even be two phase: (1) introductive phase, and (2) hands-on practice phase. In addition to this, training sessions should be arranged for similar and minor groups; and the trainer should be permanent and accessible. Another opinion is that experience or good practice sharing systems, like forums, should be provided in order to increase the awareness about using technology in teaching and learning process. On the other hand, webinars and/or training videos are the preference of faculty members. Instead of campus-wide face-to-face training, which may not be appropriate for all academic staff's time schedule, webinars and tutorial videos might be a better option for academic staff who cannot schedule their time for current training.

Faculty technology literacy training should begin with low level personal use and slowly increase toward higher level pedagogical use (Cardwell-Hampton, 2008). Low level technology use may serve as a way for faculty to introduce technology slowly into their pedagogy and it may assist faculty learning by supporting their immediate pedagogical needs (Ertmer, 2005).

Brown (2003) suggests that "whenever possible, introduce faculty to technology through agencies that they know and trust" (p. 12). Learning to integrate technology into pedagogy usually begins as a personal trial and error approach into simple daily use, and then expands into more collaborative exploration as the tools and practices become more familiar (Garrison & Kanuka, 2004).

Schrum (1999) offers four useful points relating to teacher technology training: one, it takes considerably longer to learn about technology for personal or pedagogical use than learning a new teaching model; two, access to the new technology at school and at home is essential; three, fear of the unknown must be addressed; four, the use of new technology may require teachers to reconceptualise the ways in which they teach.

Academic staff have different perspectives on the use and the needs of technology. Although there are different needs about instructional technology, the majority feel that they are in themselves proficient in the basic use of computers, e-mail, internet search, and packed programs like word processors and presentation tools etc.

In a study it is indicated that a majority of the participants perceive themselves "completely sufficient" in basic ICT competencies and they are "sufficient" in advanced ICT competencies. (Göktaş, 2006)

It may be said from the findings that academic staff prefer training about the integration of technology into the teaching and learning process for improved and more exciting lectures. How to set curriculum with the support of technology, andragogy approaches, and different instructional methods are their main needs. Additionally, their other demand is about using technology as a production tool. Digital image editing, video editing, how to make animation, how to make an effective website, course material production, and disciplinary-specific software are the preferences of academic staff for training. Introductive seminars about new technologies are also listed as training needs. The last but not least preferred training need is about examination, evaluation and distance education. Faculty members want to use technology to evaluate students' work and products.

Taking a wider look at the results, academic staff seem to demand instructional technology training for the integration of technology into their teaching and learning process as a tool, rather than just using it. Recent studies have found that technology literacy training should be as uniquely individual as is the constituent faculty - put simply, the individual departmental cultures should be considered before training begins (Brown, 2003: Ertmer, 2005; Mayo, Kajs, & Tanguma, 2005).

Spotts and Bowman (1995) found that faculty members generally possessed a foundational knowledge of audio, film, video, and word processing, but fewer had a foundational knowledge of technologies that incorporate spreadsheets, statistics, e-mail, and course management systems for computer-assisted instruction. Furthermore, faculty members had limited knowledge of technologies that use instructional methods such as presentation software, multimedia, and distance learning.

Generally, academic staff are aware of ITSO, but those from SOC and DBE were not. The reason for this may be the department profile. These departments either do not prefer to use technology in their courses, so they did not have a need for those kinds of services, or were just not told about it before. According to the findings, there are no ITSOs in departments, but there are technical support units. Except for two departments, academic staff would like to have an ITSO in their departments or at least one in their faculties or schools. Additionally, the number of academic staff who received support from ITSO is very low. Generally ITSO meets faculty expectations about receiving support.

5.3 Suggestions for Future Studies

Although the results of the study reveal a detailed description of current technology use of METU academic staff, some other characteristics should be determined, such as; self-efficacy, intrinsic motivation of faculty members, discipline profiles, technology diffusion strategies. These features would provide a more complete and understandable picture of faculty technology use.

Similar studies from other universities would provide useful information for understanding the effects of institutional culture. Studies about strategic plans about the implementation of technology into education would also contribute to a better understanding of institution influence.

5.4 Implications for Practitioners

Based on the study some implications are come up into researcher's mind. According to him:

- Beside the publication profits best practices of technology usage should be awarded.
- Incentives about technology integration should be provided by METU.
- Annual best ptactices or good examples workshops should be organised.
- Online discussion or forums should be provided to academic staff for experience sharing.
- Instead of complex technologies, easy to use technologies should be introduced to academic staff.
- Trainings and use of technology, to some extend, should be mandatory. This obligation may not serve just for course delivery but classroom management, course document sharing, communication etc.

5.5 Conclusion

The findings show that academic staff mostly use computer and projector, board, and course web sites as instructional technology. In addition to these, LMS, educational videos, personal web sites and multimedia are used in teaching and learning. As a general opinion, academic staff tend to prefer ready to use technologies. If the technology is available, then the faculty members use it. This argument is acceptable for basic and easy to use technologies. There

are different purposes for using videos in teaching and learning. Multimedia, especially videos, are generally used as a complementary tool in courses. On the other hand, some faculty, record their course videos and share it with students or use videos as field visit courses. Awareness is the one of the criteria about technology use patterns. Although the percentage of academic staff who aware of OCW and smart classrooms is more than 70%, the amount of faculty who use them is really much lower. For OCW, it can be said that although there are ready to use technologies like OCW, which needs more content management and/or time to coordinate, faculty members really do not prefer using it much. Low usage of smart classrooms may be a result of an insufficient number of smart classrooms, or no real need for using them. On the other hand, even academic staff were not very aware of ITSO. The consensus of academic staff was that they wanted an ITSO in their department. Interestingly, most technology support offices serve as ITSO as well, therefore, most academic staff admit that they don't see a clear distinction between ITSO and TSO in their minds.

Findings indicated that there are several advantages of using technology in teaching and learning process. With technology, academic staff spend their time more efficiently. With the use of technology, they save time in terms of classroom lecturing and course related activities. In addition to this, technology makes teaching and learning available outside of the classroom. Likewise, technology increases the quality of lecturing.

To acquire knowledge about technology, the most preferred option of the academic staff is reference to online materials. On the other hand, since academic staff sometimes attend discipline-specific training, they receive information about technologies from these events. In addition to this, there are regular workshops and presentations held at METU, and some faculty members heard about technologies from these kinds of activities. Although there are a variety of options, in terms of getting help and receiving support, academic staff generally prefer to consult with research assistants, seek one-to-one help, and get help from colleagues' or technical coordinators in their department. The common point is that all of these options contain face to face and individual communication. Faculty prefer such direct methods of support rather than indirect support. Faculty members learn how to use technology from different sources. It may be interpreted from the data that academic staff mostly learned how to use technology from their colleagues, courses that they took in their undergraduate education, and by themselves. Acquiring knowledge, receiving support, and the methods of learning how to use technology have these preferences in common. For all of these, faculty members prefer flexible, easy to access, low time consuming, and experience based sources. Thus, for learning technology and receiving support, if those parameters are provided, faculty members may increase their knowledge about technology and the use of technology in teaching and learning process.

Academic staff stated that from the factors that were asked, there are none considered as barriers. Faculty members think that the following factors are considered as partial barriers: there is not enough training about how to use instructional technology in education; time for learning how to use new software; receiving help about alternative instructional methods; lack of information about software that fits with their discipline; the lack of a campus-wide technology coordinator; and, a lack of budget and financial resource.

There are two main factors that affect academic staff's use of technology decisions: incident or people effect and department/unit effect. As for incident and people effect, academic staff generally decided to use technology due to their own personal interest and self-motivation,

and target group characteristics. Infrastructure and their colleagues also affects their technology use decision. Where there is ready-to-use technology like projectors and computers, LMS, smart classes etc. they use it. As for department/unit, mainly, infrastructure readiness, and departmental or administrative incentives affect academic staff's decision on using technology. Opportunities provided by departments or administrates encourage academic staff to use, or at least to try those technologies. On the other hand, departments or units do not affect some academic staff at all, either as an incentive, or as an obstacle. It depends on the perception of academic staff. Findings show that, there should be incentives in order to encourage academic staff to use technology. However, there are insufficient policies on this issue.

Academic staff face some obstacles while using instructional technologies for teaching and learning, with technical problems being the most common problem. Other obstacles are time, financial constraints and equipment problems. METU Online is the other issue that was considered as an obstacle by the academic staff. As discussed above, almost all of the faculty use LMS, especially METU Online. However, all of the academic staff either complained about it, or choose not to use it. Academic staff prefer self- and out- sources in order to deal with obstacles. As for self-sources, faculty members prefer an internet search, YouTube videos or tutorials, and discovery methods (trial and error). Besides these, they also prefer department technical coordinator or technical assistants as out sources. Additionally, colleagues, research assistants and students are the other sources. Academic staff indicated some solutions in order to prevent or reduce such obstacles. There are four main solution topics: (1) training; (2) infrastructure and equipment; (3) technical support system; and (4) a better LMS. For training, the faculty members want more frequent seminars or training about instructional technologies. On the other hand, there is another idea which states that instead of face-to-face campus-wide or group based training or seminars, webinars or training videos such as tutorials etc. should be provided by ITSO. For infrastructure obstacles, METU should revise old infrastructures or replace devices. Technical support offices or coordinators should be more accessible. Additionally, if statistics about technical problems are recorded, it could be used as a preventive strategic tool. For LMS, METU Online does not meet the academic staff's expectations – a less complex and user friendly LMS needs to be provided.

Academic staff gain their knowledge about new technologies from the internet, people around them and from published documents. Faculty members use several methods to learn how to use new technologies. Findings indicated that academic staff mostly learn new technologies by the discovery method. Similarly, academic staff consult colleagues, students or relatives or using the internet – tutorials, YouTube, forums – in order to learn how to use new technologies. Many academic staff do not face any obstacles in learning and using new technologies in teaching and learning process. However, those who do stated the obstacles as technical problems, time concerns, and equipment problems. Faculty members generally prefer personal efforts like performing an internet search, reading from somewhere, or from people around them who are accessible in order to get information about technology or to learn how to use it. On the other hand, to prevent or decrease the problems, they also prefer the internet or people around them; to sleep less or to focus more on the technology that they use in order to gain time; or to try to arrange equipment earlier.

Academic staff prefer hands-on practical training as a method of instructional technology training. Training sessions should be arranged for similar and minor groups; and the trainer should be permanent and accessible. Another opinion is that experience or good practice

sharing systems, like forums, should be provided in order to increase the awareness about using technology in teaching and learning process. On the other hand, webinars and/or training videos are the preference of the faculty members. Instead of campus-wide face-to-face training, which may not be appropriate to the academic staff's time schedule, webinars and tutorial videos might be a better option for academic staff who cannot schedule their time for the current training. Although there are different needs about instructional technology, the majority feel themselves sufficient in the basic use of computers, e-mail, internet search, and packed programs like word processor, presentation tools etc. Academic staff prefer training about the integration of technology into the teaching and learning process for improved and more exciting lectures. How to set curriculum with the support of technology, andragogy approaches, and different instructional methods are the main training needs. Their other demand is about using technology as a production tool. Additionally, academic staff prefer training about examinations, evaluation and distance education. Faculty want to use technology to evaluate students' work and products.

Generally, academic staff aware of ITSO. Faculty members from SOC and DBE are not aware of ITSO. The reason for this may be the department profile. These departments either do not prefer to use technology in their courses, so they do not need any of those kinds of services, or are not told about it before. Generally ITSO meets faculty expectations about receiving support.

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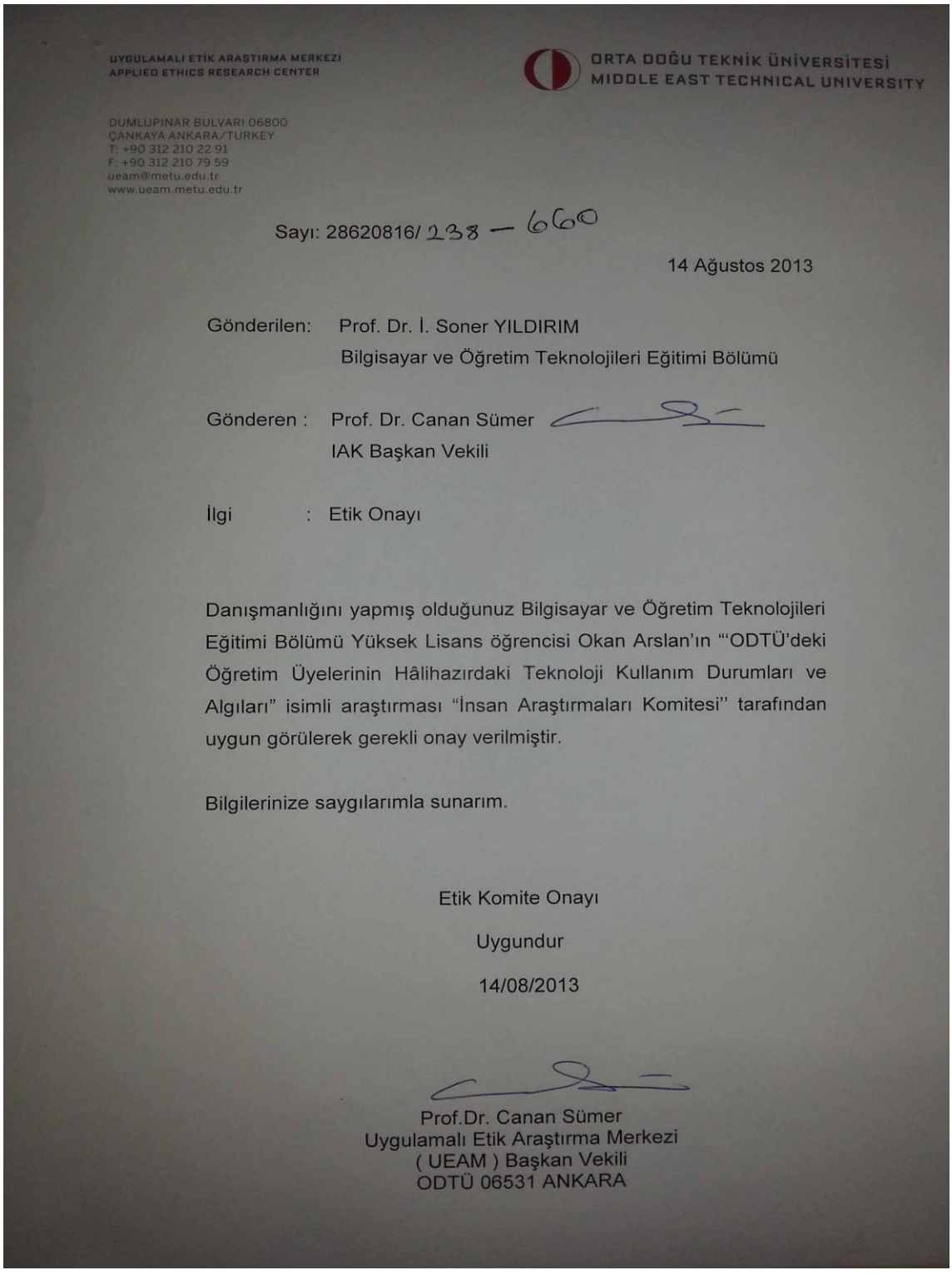
APPENDIX A

ETHICS COMMITTEE APPROVAL



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14 Ağustos 2013

Gönderilen: Prof. Dr. İ. Soner YILDIRIM
Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümü

Gönderen : Prof. Dr. Canan Sümer
IAK Başkan Vekili

İlgi : Etik Onayı

Danışmanlığını yapmış olduğunuz Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümü Yüksek Lisans öğrencisi Okan Arslan'ın "'ODTÜ'deki Öğretim Üyelerinin Hâlihazırdaki Teknoloji Kullanım Durumları ve Algıları" isimli araştırması "İnsan Araştırmaları Komitesi'' tarafından uygun görülerek gerekli onay verilmiştir.

Bilgilerinize saygılarımla sunarım.

Etik Komite Onayı

Uygundur

14/08/2013

Prof.Dr. Canan Sümer
Uygulamalı Etik Araştırma Merkezi
(UEAM) Başkan Vekili
ODTÜ 06531 ANKARA

APPENDIX B

QUESTIONNAIRE (IN TURKISH)

Öğretim Üyeleri Öğretim Teknolojileri Anketi

Öğretim Üyeleri Öğretim Teknolojileri Anketi
Bu anket ODTÜ'deki öğretim üyelerinin hâlihazırdaki teknoloji kullanım düzeyleri ve algıları ölçmek amacı ile Hazırlanmıştır. Bu anketten elde edilen veriler, ODTÜ Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümü Yüksek Lisans programı bünyesinde yürüttüğüm yüksek lisans tezimde kullanılacaktır. Vereceğiniz cevaplar gizli tutulacaktır. Lütfen, tüm soruları yanıtlamaya çalışın. Katılımınız için teşekkür ederiz.

Bu ankette 18 soru vardır.

Demografik bölüm

1- Bölümünüz: *

Lütfen yanıtınızı buraya yazınız:

2- Yaşınız:

Lütfen yanıtınızı buraya yazınız:

3- Cinsiyetiniz:

Lütfen aşağıdakilerden yalnız birini seçiniz:

◯ Kadın

◯ Erkek

4- Akademik Unvanınız:

Lütfen aşağıdakilerden yalnız birini seçiniz:

◯ Profesör

◯ Doçent

◯ Yrd. Doçent

◯ Öğretim Görevlisi

○ Okutman

◯ Uzman

◯ Arş. Görevlisi

5- Kaç yıldır akademisyen olarak çalışmaktasınız?

Lütfen yanıtınızı buraya yazınız:

6- Ne kadar süredir öğrencilere eğitim veriyorsunuz? (Lütfen yıl olarak giriş yapınız)

Lütfen yanıtınızı buraya yazınız:

7- Araştırmanın sonucundan haberdar olmak isterseniz, iletişim için e-posta adresiniz:

Lütfen yanıtınızı buraya yazınız:

ÖĞRETİM TEKNOLOJİLERİ KULLANIMI

8- Bilgisayarınız var mı?

Lütfen uygun olanların tümünü seçiniz:

☐ Evde

☐ Ofiste

9- İnternet erişiminiz var mı?

Lütfen uygun olanların tümünü seçiniz:

☐ Evde

☐ Ofiste

10- Lütfen son yıllarda eğitim öğretim süresince sıkça kullandığınız öğretim teknolojilerini işaretleyiniz.

Lütfen uygun olanların tümünü seçiniz:

☐ Tahta

☐ Tepegöz

☐ Bilgisayar ve Projeksiyon cihazı

☐ Ders materyali hazırlama yazılımları

☐ Video/TV (Büyük ekrana yansıtma)

☐ Ses kayıtları

☐ Eğitsel videolar

☐ Akıllı tahta

☐ Akıllı sınıf

☐ Ders web sayfaları

☐ Kişisel web sayfaları

☐ İçerik/Öğretim Yönetim Sistemi (LMS-CMS – Moodle/Sakai vb.)

☐ Diğer:

11- Lütfen aşağıdaki her bir soruyu cevaplandırınız.

Lütfen her bir öge için uygun yanıtı seçiniz:

	Evet	Hayır
Kendinize ait bir web sayfanız var mı?	○	○
Ders dokümanlarınızı web üzerinden paylaşıyor musunuz?	○	○
Bölüm bazında dönem içerisindeki derslerin dokümanlarının paylaşıldığı bir web sitesi var mı?	○	○
ODTÜ'deki Akıllı sınıf ortamlarını kullanıyor musunuz?	○	○
Öğretim teknolojileri desteği alabildiğiniz bir birim var mı?	○	○
Ders içeriği ile ilgili videolar çekiliyor mu?	○	○
Ders videoları web üzerinden paylaşılıyor mu?	○	○
Öğretim Teknolojileri Destek (ITS) ofisinden haberdar mısınız?	○	○
Online.metu.edu.tr'yi kullanılıyor musunuz?	○	○
Açık ders malzemelerinden (Open Courseware) haberiniz var mı?	○	○
Açık ders malzemelerini (Open Courseware)kullanılıyor musunuz?	○	○
Bölümünüzde öğretim teknolojileri konusunda öğretim üyeleri ve araştırma görevlilerine destek verecek bir birim oluşturulmasını ister misiniz?	○	○

12- Ders videoları paylaşılıyorsa hangi yolla yapılıyor?

Lütfen uygun olanların tümünü seçiniz:

☐ ODTÜ TV

☐ Bölüm web sitesi

☐ Açık Ders Malzemeleri (Open Courseware)

☐ Online METU

☐ Diğer:

13- Teknoloji kullanmayı aşağıdaki yollardan hangisi/hangileri sayesinde öğrendiniz?

Lütfen uygun olanların tümünü seçiniz:

☐ Genel teknoloji eğitimleri

☐ Yüksek Öğretimdeki Dersler

☐ Meslektaşlardan Yardım Alarak

☐ Okul teknoloji koordinatörüne danışarak

☐ Diğer:

Yardım ve Destek

Teknoloji hakkında bilgi edinme(Lütfen teknoloji kullanımına yönelik bilgi edinme ve destek almada tercih ettiğiniz metotlar için katılma derecenizi belirtiniz.)

14- Bilgi edinme

Lütfen her bir öge için uygun yanıtı seçiniz:

	Kesinlikle tercih etmem	Tercih etmem	Kararsızım	Tercih ederim	Kesinlikle tercih ederim
Teknolojiye yönelik genel eğitimler	○	○	○	○	○
Disiplin alanıma yönelik eğitimler	○	○	○	○	○
Online materyaller	○	○	○	○	○
Basılı materyaller	○	○	○	○	○
Kendi kendime deneyerek	○	○	○	○	○
Workshop ve sunular	○	○	○	○	○
Üniversite bünyesindeki düzenli seminerler	○	○	○	○	○

15- Destek alma

Lütfen her bir öge için uygun yanıtı seçiniz:

	Kesinlikle tercih etmem	Tercih etmem	Kararsızım	Tercih ederim	Kesinlikle tercih ederim
Deneyimli asistanlar	○	○	○	○	○
Üniversitedeki çalışma arkadaşlarım	○	○	○	○	○
Diğer üniversitedeki meslektaşlarım	○	○	○	○	○
Üniversite dışından uzmanlar	○	○	○	○	○
Bölüm Teknik koordinatörleri	○	○	○	○	○
Öğretim teknolojileri destek ofisi	○	○	○	○	○
AGEB (Akademik Gelişim programı)	○	○	○	○	○
ODTU TV	○	○	○	○	○
Telefonla yardım birimi	○	○	○	○	○
Bire-bir yardım	○	○	○	○	○
Diğer(belirtiniz)	○	○	○	○	○

16- "Diğer" için açıklama giriniz:

Lütfen yanıtınızı buraya yazınız:

17- Aşağıdaki sebeplerin hangisinin/hangilerinin bilgisayarı ve ilgili teknolojileri öğrenme-öğretme sürecinde kullanmanızı ne derece engelleyip engellemediğini seçeneklerinden birini işaretleyerek belirtiniz?

Lütfen her bir öge için uygun yanıtı seçiniz:

	Engellemiyor	Kısmen Engelliyor	Önemli Derecede Engelliyor
Yazılım programlarını öğrenmek için yeterli zamanın olmayışı	○	○	○
Eğitim eksikliği	○	○	○
Alternatif öğretim yöntemlerine ilişkin yardım eksikliği	○	○	○
Okulda yeterli sayıda bilgisayarın olmayışı	○	○	○
Teknolojiye ilişkin kendime güvenimin olmayışı	○	○	○
Bilgisayarın öğretimde kullanımına ilişkin tecrübe eksikliği	○	○	○
Bilgisayarın öğretimde nasıl kullanılacağına ilişkin model eksikliği	○	○	○
Alanıma uygun yazılım programları hakkında bilgi eksikliği	○	○	○
Bütçe ve mali kaynak eksikliği	○	○	○
Teknolojiye ilişkin ilgi eksikliği	○	○	○
Yönetimsel destek eksikliği	○	○	○
Okul teknoloji koordinatörünün olmayışı (teknik destek eksikliği)	○	○	○

18- Teknolojiye ilişkin olarak aşağıdakilerden hangisinde/hangilerinde daha çok eğitime ihtiyaç duymaktasınız? Aşağıdaki tabloda yer alan maddelerin her birine "Evet" veya "Hayır" diyerek teknolojiye ilişkin eğitime en çok ihtiyaç duyduğunuz alanları belirtiniz.

Lütfen her bir öge için uygun yanıtı seçiniz:

	Evet	Hayır
Temel bilgisayar becerileri (programlara erişim, çıktı almak, vb)	○	○
Elektronik postayı kullanma (mesaj yazma ve yollama, mesaja dosya ekleme, vb)	○	○
Elektronik posta yönetim programı kullanma (Outlook / Thunderbird vb.)	○	○
İnterneti kullanma (araştırma yapmak, dosya indirmek, vb)	○	○
Spesifik yazılım programlarını kullanma (PowerPoint, vb)	○	○
Teknolojiyi öğretim programına entegre etme	○	○
Teknolojiyi farklı öğrenme stillerine sahip öğrenciler için kullanma	○	○
Teknolojiyi üretim araçları olarak kullanma	○	○
Teknolojiyi sınıf yönetimi amaçlı olarak kullanma	○	○
Teknolojiyi öğrenci çalışmalarını ve ürünlerini değerlendirmek için kullanma	○	○

APPENDIX C

INTERVIEW GUIDELINE – DRAFT VERSION (IN TURKISH)

GÖRÜŞME REHBERİ

Görüşülen Kişi:

Görüşmeyi Yapan:

Tarih & Saat:

Görüşme Süresi:

Merhaba,

Ben ODTÜ Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümü Yüksek Lisans Öğrencisiyim. Öncelikle ODTÜ'deki öğretim üyelerinin hâlihazırdaki teknoloji kullanım düzeyleri ve algıları ile ilgili yapmış olduğum bu araştırmaya görüşlerinizi bildirmeyi istediğiniz için çok teşekkür ediyorum.

Eğitim öğretim sürecinde teknoloji konusundaki kişisel tecrübeleriniz, fikir ve görüşleriniz bu araştırma için büyük önem taşımaktadır. Size eğitim öğretim sürecinde kullandığınız teknolojiler, bu teknolojileri kullanmaya karar vermenizi etkileyen faktörler, kullanımda karşılaştığınız güçlükler ve yeni teknolojiler hakkında bilgi edinme ve destekler konusundaki görüşlerinizi almak için bazı sorular yönelteceğim.

Görüşmeye başlamadan önce, bir takım bilgi vermek istiyorum. Yapacağımız görüşme sadece araştırma amacıyla kullanılacaktır. Bu araştırma ile oluşturulacak dokümanlarda adınız doğrudan kullanılmayacaktır.

Sizin sormak istediğiniz bir soru var mı?

GİRİŞ

Size yönelteceğim sorular; eğitim öğretim sürecinde kullanıldığınız teknolojiler, kullanma kararınızı etkileyen faktörler, karşılaştığınıoz güçlükler ve bu konuda beklentilerinize yönelik olacaktır.

DEMOGRAFİ

Adınız – Soyadınız:

Yaşınız:

Bölümünüz:

Unvanınız:

Kaç Yıldır Öğretim Görevlisi Olarak Çalışıyorsunuz?

TEKNOLOJİ KULLANIMI

1. Derslerinizde ya da derslere yönelik aktivitelerinizde öğretim teknolojilerini kullanıyor musunuz?
    a. Ne tür teknolojileri kullanıyorsunuz
        i. Ders videoları çekiyor musunuz?
            1. Çekiyorsanız hangi ortamlarda paylaşıyorsunuz?
    b. Bu teknolojileri hangi amaçlar için kullanıyorsunuz?

2. Bu süreçlerde teknoloji kullanımının size sağladığı avantaj ya da dezavantajlar nelerdir?

    a. Öğretim üyesi olarak size katkıları?
    b. Öğrencilere katkısı?
    c. Öğretim etkinliği açısından katkıları?

KARAR VERME SÜRECİNE ETKİ EDEN FAKTÖRLER

1. Eğitim öğretim sürecinde teknoloji kullanmaya karar vermenizde sizi etkileyen faktörler nelerdir?

    a. Bu unsurlar kararınızı nasıl etkiledi?

2. Teknoloji kullanma kararınızı bulunduğunuz bölüm/birim ortamı etkiledi mi?

    Nasıl?

KULLANIMDA KARŞILAŞILAN GÜÇLÜKLER

1. Yeni teknolojileri öğrenme ve derslerinizde bu teknolojileri kullanmada karşılaştığınız güçlükler var mı?

    Örnek verebilir misiniz? (İdari problemler, teknik problemler, kişisel problemler vb.)

    a. Teknoloji ile ilgili bir probleminizde onları çözmek için hangi kaynaklara başvuruyorsunuz?

    b. Beklentileriniz karşılanıyor mu?

    c. Bu konuda beklentileriniz nelerdir? (Beklenti karşılanmıyorsa)

2. Karşılaşılan güçlüklerin azaltılması/giderilmesi için yapılması gereken çözümler nasıl olmalıdır?

YENİ TEKNOLOJİLER HAKKINDA BİLGİLENME VE DESTEK

1. Yeni teknolojilerden nasıl haberdar oluyorsunuz?

2. Yeni teknolojileri nasıl öğreniyorsunuz?

3. Öğrenme ve uygulama aşamasında karşılaştığınız herhangi bir güçlük var mı?

    a. Bu güçlükleri nasıl çözüyorsunuz?

4. Okul çapında eğitim verilse, bu konuda beklentileriniz nelerdir? Nasıl bir öğrenme süreci tercih edersiniz?
    a. Hangi konularda eğitim almayı daha çok tercih edersiniz?

5. Öğretim Teknolojileri Destek Ofisi (ÖTDO)'nden haberdar mısınız?

    a. Bölümünüzde/biriminizde ÖTDO var mı?

        i. Yoksa olsun ister misiniz?

    b. Daha önce hiç ÖTDO'dan destek aldınız mı?

        i. Aldıysanız, aldığınız bu destek beklentilerinizi karşıladı mı?

APPENDIX D

INTERVIEW GUIDELINE (IN TURKISH)

GÖRÜŞME REHBERİ

Görüşülen Kişi:

Görüşmeyi Yapan:

Tarih & Saat:

Görüşme Süresi:

Merhaba,

Ben ODTÜ Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümü Yüksek Lisans Öğrencisiyim. Öncelikle ODTÜ'deki öğretim üyelerinin hâlihazırdaki teknoloji kullanım düzeyleri ve algıları ile ilgili yapmış olduğum bu araştırmaya görüşlerinizi bildirmeyi istediğiniz için çok teşekkür ediyorum.

Eğitim öğretim sürecinde teknoloji konusundaki kişisel tecrübeleriniz, fikir ve görüşleriniz bu araştırma için büyük önem taşımaktadır. Size eğitim öğretim sürecinde kullandığınız teknolojiler, bu teknolojileri kullanmaya karar vermenizi etkileyen faktörler, kullanımda karşılaştığınız güçlükler ve yeni teknolojiler hakkında bilgi edinme ve destekler konusundaki görüşlerinizi almak için bazı sorular yönelteceğim.

Görüşmeye başlamadan önce, bir takım bilgi vermek istiyorum. Yapacağımız görüşme sadece araştırma amacıyla kullanılacaktır. Bu araştırma ile oluşturulacak dokümanlarda adınız doğrudan kullanılmayacaktır.

Sizin sormak istediğiniz bir soru var mı?

GİRİŞ

Size yönelteceğim sorular; eğitim öğretim sürecinde kullanıldığınız teknolojiler, kullanma kararınızı etkileyen faktörler, karşılaştığınıoz güçlükler ve bu konuda beklentilerinize yönelik olacaktır.

DEMOGRAFİ

Adınız – Soyadınız:

Yaşınız:

Bölümünüz:

Unvanınız:

Kaç Yıldır Öğretim Görevlisi Olarak Çalışıyorsunuz?

TEKNOLOJİ KULLANIMI

3. Derslerinizde ya da derslere yönelik aktivitelerinizde öğretim teknolojilerini kullanıyor musunuz?
    a. Ne tür teknolojileri/uygulamaları kullanıyorsunuz
        i. Ders videoları çekiyor musunuz?
            1. Çekiyorsanız hangi ortamlarda paylaşıyorsunuz?
    b. Bu teknolojileri hangi amaçlar için kullanıyorsunuz?

4. Bu süreçlerde teknoloji kullanımının size sağladığı avantaj ya da dezavantajlar nelerdir?

    a. Öğretim üyesi olarak size katkıları?
    b. Öğrencilere katkısı?
    c. Öğretim etkinliği açısından katkıları?

KARAR VERME SÜRECİNE ETKİ EDEN FAKTÖRLER

3. Eğitim öğretim sürecinde teknoloji kullanmaya karar vermenizde sizi etkileyen faktör, kişi ya da olaylar var mı?

    a. Bu unsurlar kararınızı nasıl etkiledi?

4. Teknoloji kullanma kararınızı bulunduğunuz bölüm/birim ortamı etkiledi mi?

    Nasıl? (idarenin tutumu, sağlanan olanaklar vb.)

KULLANIMDA KARŞILAŞILAN GÜÇLÜKLER

3. Yeni teknolojileri öğrenme ve derslerinize adaptasyonda karşılaştığınız güçlükler var mı?

    Örnek verebilir misiniz? (İdari problemler, teknik problemler, kişisel problemler vb.)

    a. Teknoloji ile ilgili bir probleminizde hangi kaynaklara başvuruyorsunuz?

    b. Beklentileriniz karşılanıyor mu?

    c. Bu konuda beklentileriniz nelerdir? (Beklenti karşılanmıyorsa)

4. Karşılaşılan güçlüklerin azaltılması/giderilmesi için yapılması gereken çözümler nasıl olmalıdır?

YENİ TEKNOLOJİLER HAKKINDA BİLGİLENME VE DESTEK

6. Yeni teknolojilerden nasıl haberdar oluyorsunuz?

7. Yeni teknolojileri nasıl öğreniyorsunuz?

8. Öğrenme ve uygulama aşamasında karşılaştığınız herhangi bir güçlük var mı?

    a. Bu güçlüklerle nasıl başa çıkıyorsunuz?

9. Okul çapında eğitim verilse, bu konuda beklentileriniz nelerdir? Nasıl bir öğrenme süreci tercih edersiniz?
    a. Hangi konularda eğitim almayı daha çok tercih edersiniz?

10. Öğretim Teknolojileri Destek Ofisi (ÖTDO)'nden haberdar mısınız?

    a. Bölümünüzde/biriminizde ÖTDO var mı?

        i. Yoksa olsun ister misiniz?

    b. Daha önce hiç ÖTDO'dan destek aldınız mı?

        i. Aldıysanız, aldığınız bu destek beklentilerinizi karşıladı mı?

APPENDIX E

DEFINITION OF THE DEPARTMENT ABBREVIATIONS

Table - E.1 Department Abbreviations.

Abbreviation	Department Name
ADM	Political Science and Public Administration
AE	Aerospace Engineering
ARCH	Architecture
BA	Business Administration
BIO	Biology
CE	Civil Engineering
CEIT	Computer Education and Instructional Technology
CENG	Computer Engineering
CHE	Chemical Engineering
CHEM	Chemistry
CRP	City and Regional Planning
DBE	Department of Basic English
DML	Department of Modern Languages
ECON	Economics
EDS	Educational Science
EE	Electrical and Electronics Engineering
ELE	Elementary Education
ENVE	Environmental Engineering
ES	Engineering Sciences
ESE	Elementary Science Teacher Education
FDE	Food Engineering
FLE	Foreign Language Education
GEOE	Geological Engineering
GGIT	Geodetic and Geographic Information Technologies

Abbreviation	Department Name
ID	Industrial Design
IR	International Relations
IS	Information Systems
MARIN	Marine Science
MATH	Mathematics
ME	Mechanical Engineering
METE	Metallurgical and Materials Engineering
MINE	Mining Engineering
PHIL	Philosophy
PHYS	Physics
PSY	Psychology
SSI	Social Sciences Institute
SOC	Sociology
SSME	Secondary Science and Mathematics Education
STAT	Statistics
TEKPOL	Technological Policy
TURK	Turkish
TVS	Technical Vocational School