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Technology integration levels of teacher education faculty

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ABSTRACT. As a consequence of the recent progressions in web-based technologies, online learning, and professional development, technology has taken responsibility of a leading role in teacher education. This study aimed to portray technology diffusion models through the literature and purport technology integration levels and technology related instructional practices of teacher education faculty in a group of Turkish universities. Data gathered through a technology implementation survey from academics employed at education faculties at six different Turkish universities. The results of the study revealed that participated academics have exposed to some hindrances to implement the current technology into their educational settings and their perceived technology implementation levels are not promising. Consequences also pointed out that there is a shortage of imbedding contemporary learning models garnered with technologic facilities. Some further suggestions were made in accordance with the outcomes.

Keywords: Technology diffusion models, level of technology integration, teacher education.

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ÖZET

Öğretmenlerin güncel teknolojik ortam ve araçlardan yararlanmaları gerektiği yönündeki güçlü vurgunun altında, teknolojinin genelde insan öğrenmesi özelde düşünme, karar verme, problem çözme ve sebeplendirme gibi bilişsel davranışlar üzerindeki olumlu etki yer almaktadır. Diğer taraftan, teknolojinin eğitim alanındaki hızlı gelişimi, kimi zaman eğitimin paydaşları olan yöneticiler, program geliştiriciler, öğretim tasarımcıları, öğretmenler, veliler ve hatta öğrenciler üzerinde kafa karıştırıcı bir etki yaratmaktadır. Bunun nedenini teknolojinin uyarlanması söz konusu olduğunda her biri kendi özel koşul, durum ve özelliği ile birlikte ele alınması gereken eğitim ortamlarında teknolojinin olanaklarını yansıtmak için tekil ve mükemmel bir yöntem arayışının oluşturduğu problem ile birlikte değerlendirmek gerekmektedir. İlgili alanyazın ise ısrarla teknolojinin eğitim ortamlarında işe dönük olarak kullanılmasının ve yayılımının başat unsurları olarak öğretmenlerin teknolojik yenilikleri takip etmelerini ve kullanmalarını görmektedir. Bu bağlamda teknolojinin öğretme ve öğrenme ortamlarına uyarlanması hedefine dönük olarak öğretmen öğretmenlerin çağdaş öğrenme yaklaşımları ışığında farklılaşan göreve sorumluluklarına ve dolayısıyla öğretmen eğitimine vurgu yapmak gerekmektedir. Bu doğrultuda çalışmanın amacı farklı akademik unvanlara sahip öğretmen yetiştiricilerin teknolojiden öğrenme ve öğretme amaçlı yararlanma düzeylerini belirlemek, konuyla ilgili hali hazırdaki uygulamalarını ortaya çıkarmak ve alanyazında değinilen teknolojinin yayılmasına dönük modelleri incelemek olarak belirlenmiştir.

Tekil tarama yöntemi ile gerçekleştirilen ve verilerin güvenirlik ve geçerlik çalışmaları yapılmış bir anket aracılığıyla toplandığı bu çalışmada, Kirikkale, Pamukkale, Osmangazi, Aksaray, Niğde ve Ahi Üniversiteleri bünyesindeki Eğitim Fakültelerinde görev yapan ve farklı akademik unvanlara sahip124 akademisyen yer almıştır.

Çalışmada, Microsoft Excel ve SPSS 15.0 yazılımları aracılığı ile işlenen verilerin raporlaştırılmasında yüzde, frekans, ortalama ve standart sapma gibi tanımlayıcı istatistiklerden yararlanılmıştır. Çalışmanın bulguları araştırma sorularına paralel olarak, öğretim elemanlarının teknolojiden yararlanma düzeylerinin unvanlarına göre farklılaşma durumları, teknoloji uyarlama sürecinde karşılaşılan problemlerin öngörülen nedenleri,

akademisyenlerin teknoloji uyarlama düzeyleri ve hali hazırdaki teknolojiyi mesleki amaçla kullanma deneyimleri başlıkları altında incelenmiştir.

Elde edilen verilerin incelenmesi sonucunda, öğretmen yetiştiren kurumlarda görev yapan akademisyenlerin teknolojiyi mesleki amaçlı kulanım düzeylerinin sahip oldukları akademik unvanlara göre farklılık göstermediği gözlenmiştir. Diğer taraftan, çalışmaya katılan öğretmen eğitimcilerinin etkili mesleki gelişim programlarının yetersizliği ve yoğun çalışma (öğretim) saatleri (yükleri) gibi nedenlerle teknolojik gelişimleri öğrenme ve öğretme ortamlarına yansıtmada bazı engel ve sınırlıklara sahip oldukları saptanmıştır. Her ne kadar, katılımcıların teknolojik okuryazarlık öz değerlendirmeleri üst seviyelerde gerçekleşmiş olsa da, ileri düzey teknolojik ortam ve araçların öğrenmeyi kolaylaştırma amaçlı olarak öğretimsel görevlerle ilişkilendirilmesinde öğretmen eğitimcileri arasında günceli yakalama noktasında henüz tatminkâr bir durum oluşmadığı değerlendirilmiştir. Çalışmanın bir diğer sonucu ise, zamanı sınırlı, tek oturumluk, geleneksel çalıştay tarzı hizmet içi eğitim tipi programlardan ziyade, süreklilik gösteren ve teknoloji planlaması kapsamında ele alınan etkili mesleki gelişim programlarına yönelinmesi gerektiğidir. Bu noktada, öğretmen yetiştiren kurumların üzerine yoğunlaşması gereken unsurlar hem daha fazla sayıda üst düzey teknolojik okuryazarlık seviyesine sahip öğretim elemanı istihdam etmek, hem de mevcut koşullar altında teknolojinin öğrenme öğretmen ortamlarına uyarlanmasının önündeki idari, zamansal ve ekonomik engelleri ortadan kaldırmak olmalıdır.

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Eğitim Fakültesi Öğretim Elemanlarının Teknoloji Uyarlama Düzeyleri

Serkan ÇELİK*

ÖZ. Web'e dayalı teknolojiler, çevrimiçi öğrenme ve mesleki gelişim alanında yenilikler, teknolojinin öğretmen yetiştirme sürecindeki önemini arttırmıştır. Bu çalışma, altı farklı üniversite bünyesindeki Eğitim fakültelerinde görev yapan 124 öğretim elemanının teknolojiden öğrenme ve öğretme amaçlı yararlanma düzeylerini belirlemeyi, konuyla ilgili hali hazırdaki uygulamalarını ortaya çıkarmayı ve alanyazında değinilen teknolojinin yayılmasına dönük modelleri incelemeyi amaçlamaktadır. Veriler, altı farklı üniversitede görev yapan öğretim elemanlarından, teknolojinin eğitim ortamlarına uyarlanma düzeylerini ortaya koyma amaçlı hazırlanmış olan bir anket aracılığıyla elde edilmiştir. Çalışmanın sonuçları, katılımcı akademisyenlerin çalışma ortamlarına teknolojinin güncel yönelimlerini yeterli ölçüde yansıtmaları önünde çeşitli engeller bulunduğunu ve dolayısıyla öğretmen yetiştiricilerin teknolojiden mesleki anlamda yararlanmada sınırlıkları bulunduğunu göstermektedir. Sonuçlar, ayrıca, teknolojik unsurlarla güçlendirilmiş güncel öğrenme modellerinin katılımcıların mesleki ortamlarında yeterince kullanılmadığına işaret etmektedir. Bulgular, ilgili alanyazın doğrultusunda tartışılmış ve çeşitli önerilerde bulunulmuştur.

Anahtar Sözcükler: Teknoloji yayılım modelleri, teknoloji uyarlama düzeyleri, öğretmen eğitimi

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INTRODUCTION

Instead of checking old sources for information, in recent times, human being is expected to participate in the creation of new information, evaluate current and old information, and retool thoughts and ideas. Hence, involving the generation of knowledge and processes to develop systems that solve problems and broaden human capabilities, technology attained a solid consensus among many educators and researchers regarding its potential of use for widening educational opportunities, (Jonassen & Reeves, 1996; Means, 1994; Çağıltay, Çakıroğlu, Çağıltay & Çakıroğlu, 2001; Kozma & Anderson, 2002; Webber, 2003; Gülbahar, 2008; Akbulut, 2010). In accordance with this perspective, Grabe and Grabe (2001) maintain that teachers should utilize technology to enhance their student learning due to its positive effect on learners` cognitive behaviors such as thinking, decision making, problem solving and reasoning. On the other hand, the rapid prevalence of educational technologies has somehow caused confusion among all of the stakeholders of education such as administrators, curriculum developers, syllabus designers, teachers, parents, and students. The reason is that it has become a problem to find the best ways for integration of technology into teaching and learning environments which every single one possesses its unique traits. However, a conspicuous part of the literature underlines the reality that deployment and implementation of educational technologies mostly depend on teachers` adoptions and effective use of these novelties. (Fullan, 1991; Van den Berg, Vandenberghe & Sleegers, 1999; Becker, 2001). This context put the emphasis on teachers' changing role in the millennium which is to be the leader for implementing technological innovations to teaching and learning.

The pros of technology in education are well-documented through the literature though; the methodology of technology integration in teaching and learning processes needs to be examined profoundly. Admittedly, transformation of learning and teaching paradigm is must of taking advantage on technology for pedagogical purposes. In other words, rather than what or which technology is used in the classroom, the current focus should be on how it is utilized to serve learning goals. Plomp, Ten Brummelhuis, and Rapmund (1996) mention about three objectives for the use of technology in education which are: the use of technology as object of study, the use of technology as aspect of a discipline; and the use of technology as medium for teaching and learning. According to Drent and Meelissen (2007) use of technology as object means learning about it, the use of technology as aspect means the development of technologic skills for

professional or vocational purposes, and the use of technology as medium refers to its use for the enhancement of teaching and learning process.

Technology Diffusion Models in Teacher Training

A number of models for effectively integrating technology into teacher education programs have been proposed (Davis, 1989; Grantson, 2004; Koehler & Mishra, 2006; Kortecamp & Croninger, 1996; McKenzie, Elizabeth & Nancy, 1996; Rogers, 1983; Schmidt, 1988: Surry, Robinson & Marcinkiewics, 2001). However, there is no single, unified, universally accepted theory of adoption and diffusion of technology (Kohler & Mishra, 2009). Surry and Farquhar (1997) classify technology diffusion theories into two categories — general diffusion theories, which are applicable to a wide range of organizations and instructional technology diffusion theories, which are specific to innovations in instructional settings. Schmidt (1998) postulates that two technology integration approaches have been utilized in teacher training programs; `offering an instructional technology course` or `integrating technology throughout all courses'.

Rogers' (1995) ideas have been regarded as a basis to theories of technology adoption and diffusion. The diffusion process outlined by Rogers includes five steps; knowledge, persuasion, decision, implementation, and confirmation. According to the theory, potential adopters of an innovation must learn about an innovation and be persuaded to test it before making a decision to adopt or refuse. Following the adoption and implementation, the adopters may decide to either continue using the innovation or reject it. Stockdill and Morehouse (1992) also proposed a checklist of critical factors in adoption which provides a comprehensive overview of the factors that facilitate adoption of innovations in educational settings. The categories in the checklist are educational need, user characteristics, content characteristics, technology considerations, and organizational capacity.

Kortecamp and Croninger (1996) proposed a technology integration model consisted of five interrelated components which are familiarization with hardware and software, partnering with mentors, developing personal projects, becoming mentors, and keeping current. McKenzie and his colleagues proposed the `systematic design model`, (SDM) in 1996 depending on the Gagne`s system approach. SDM is consisted of three distinct stages: planning, implementation, and evaluation. SDM was designed based on a written technology plan which defined what should be taught, how it should be taught, and which technology should be utilized in teacher education programs. Also, a technology planning team is included

into SDM in order to determine the school's current level of technology use, and to conduct needs analysis to organize professional development activities. Ely (1999) also developed a technology implementation strategy underlining the notions of dissatisfaction with the status quo, knowledge and skills exist, availability of resources and time, rewards and/or incentives exist, participation, commitment, and leadership.

One of the other technology integration models receiving attention in recent times is named as TPACK which stands for technology, pedagogy and content knowledge. Its supporters in the literature claim that the prerequisites of teachers` competence on integrating technology into the curriculum involves the knowledge of technology, pedagogy and content (Archambault & Crippen, 2009; Koehler & Mishra, 2006, 2008). TPACK model emphasizes the new types of knowledge that located at the intersections between the concepts of technology, pedagogy and content. According to Koehler and Mishra (2008) TPACK is a way of thinking about the knowledge teachers' requirement to comprehend efficient integration of technology into their classrooms. Koehler and Mishra (2006) argue that pedagogical exploitation of technology needs the development of a multifaceted and situated form of knowledge that is called Technological Pedagogical Content Knowledge (TPCK) which is fed from mutual interactions among content, pedagogical, and technological knowledge. The model is figured as below.

TPACK may serve teachers delve into planning, organizing, implementing, revising and reflecting on teaching content (Niess, 2005). Koehler and Mishra (2009) also maintain that it is not an easy job to combine all the knowledge to reach TPACK all the time. On the other hand, *Technology Acceptance Model (TAM*) developed by Davis (1989) suggests that when users are presented with a new technology, a number of factors influence their decision about how and when they will use it. The factors are **perceived usefulness** (PU) which means the degree to which a person believes that using a particular system would enhance his or her job performance and **perceived ease-of-use** (PEOU) as the degree to which a person believes that using a particular system would be free from effort (Davis, 1989). On the other hand, Chuttur (2009) criticizes TAM due to its lack of falsifiability, questionable heuristic value, limited explanatory and predictive power, triviality, and lack of any practical contribution.

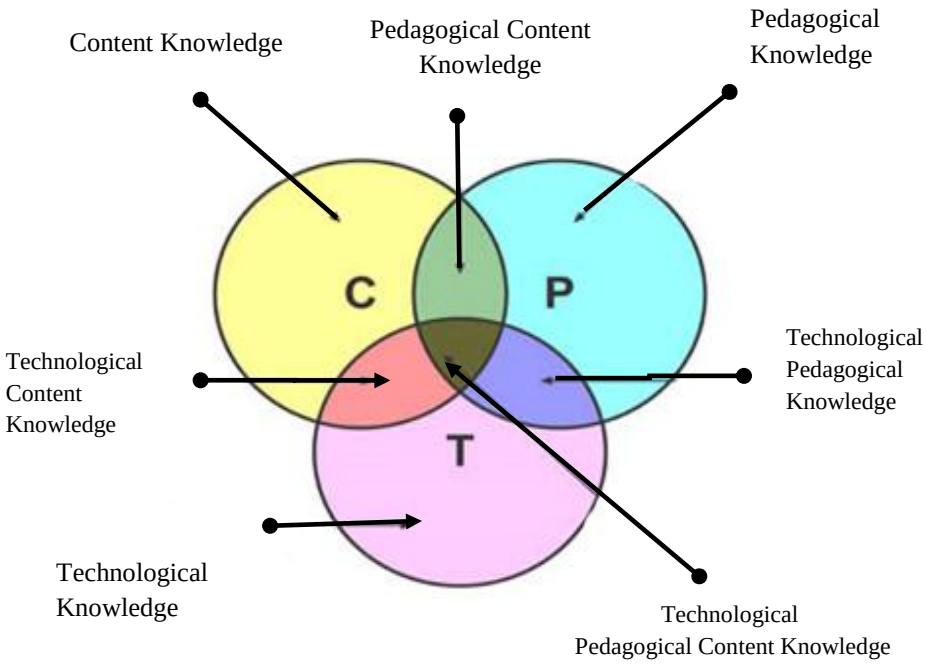

Figure 1. *The components of Technology, Pedagogy, and Content Knowledge* (TPACK, Koehler & Mishra, 2006, p. 1025)

Another model for enhancing the incorporation of technology into teacher training programs developed by Surry, Robinson and Marcinkiewics (2001) at the end of a systematic review of the existing literature and focusing on the results of responses to questionnaires replied by the deans of colleges of education. The model consists of seven elements: resources, infrastructure, people, policies, learning, evaluation and support, hence the acronym **RIPPLES** occurs. Surry, et. al (2001) also mentions about the **s-curve theory** which is another widely referred model which argues that any successful innovation goes through a period of relatively slow growth before experiencing a sharp increase in adoption, and then leveling off. When drawn on a paper, this slow growth, rapid expansion, and leveling off will reflect the shape of `S` sign.

Granston (2004) elaborates on another technology integration model called `$IT_3P$ framework` which is based on a synthesis of the literature on technology and teacher training. IT_3P model is divided into two parts: prerequisite factors and process factors. Prerequisite factors are relevant to features that should be in place in colleges of education to facilitate technology integration. These include the presence of a technology plan,

opportunities for staff development, access to resources required to facilitate the integration process, and both technical and administrative support. Process factors, which include the second section of the framework, arise while students and faculty interact in an effort to implement technology in teaching and learning. This section includes modeling technology use, modeling a positive attitude towards technology, training, and providing pre-service teachers with opportunities for practice through coursework activities. The framework is figured by Granston (2004) as follows.

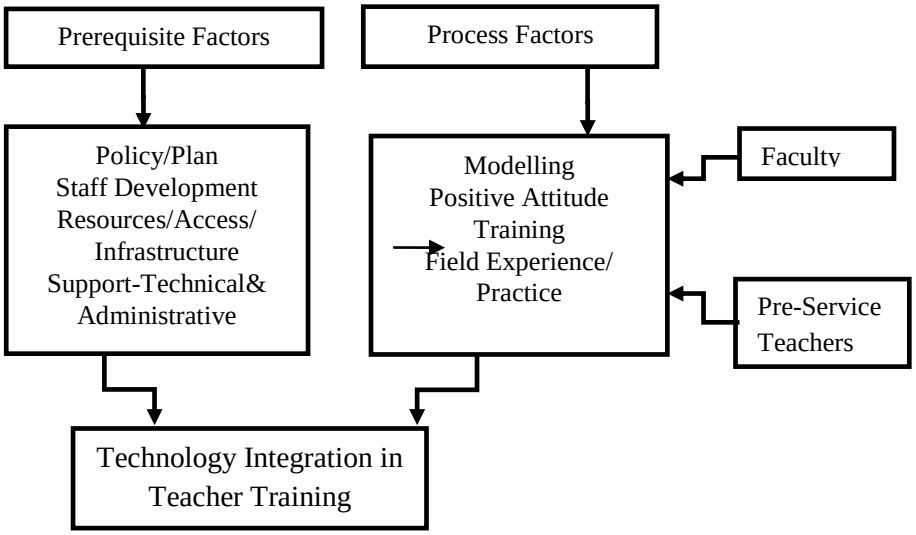

Figure 2. *The components of IT_3P framework*
(Granston, 2004, p. 14)

Teacher Education and Technology

Despite the gigantic investments in computers and related technologies, the deployment and implementation level of educational technologies in teacher education do not allow stakeholders to be sure that future teachers are adequately prepared to integrate technology in their teaching (Ma, Anderson & Streith, 2005; National Center for Educational Statistics, 2000; Office of Technology Assessment Report, 1995). Admittedly, academics employed at schools of education are gradually more challenged to

implement technology into teaching to meet the needs of prospective teachers.

However, studies done in Turkey revealed that teachers employed at primary and secondary levels of educational system and academics at schools of education possess a pro stand for technology use in teaching and perceive technology as a critical need for education (Aşkar & Usluel, 2002; Çağıltay et. al, 2001; Çelik & Bindak, 2005; Deniz, 2005; Erkan, 2004; Goktas, Yildirim & Yildirim, 2008; Sadi, Sekerci, Kurban, Topu, Demirel, Tosun, Demirci & Goktas, 2008; Usluel-Koçak, Aşkar & Baş, 2008). However, due to technologic illiteracy and technophobia (Gökdaş & Kayri, 2005), technology use of faculty at various higher education settings is not satisfactory (Çağıltay & Yıldırım, 2007; Goktas, Yildirim & Yildirim, 2008).

Turkish primary education system has undertaken a curriculum renewal reform in the beginning of the millennium and a constructivist learning paradigm has been attempted to incorporate into the educational environments in the meantime. In respect of such developments, schools of education which are the only official teacher education institutions revised their programs with a contemporary point of view. Nevertheless, providing would-be teachers with an effective technology education is still in the period of incubation. Despite the fact that a great part of the literature posits that technology in education should be handled as a means rather than the core issue, Turkish teacher education settings pursue technology education via a basic technology course aiming to train students to recognize and use hardware and software at an elementary level. Obviously, such a way will not help prospective teachers to enhance their skills of domain specific perspectives and how technology can be used to improve human learning. In preparing student teachers to integrate technology into their future professions they need to tutor with faculty that utilizes a variety of technologies. Hence, in order to design a pathway for graduating more skillful teachers in instructional technologies, a broader picture on technology integration and use profiles of faculty at schools of education is needed. This study aimed to depict technology integration models and also investigate technology implementation levels of teacher education faculty and their technology related instructional practices in Turkish higher education context. The findings could inform administrations and policymakers on the required steps that should be taken to promote the use of instructional technology among faculty members. The findings of this study could also serve as a base-line for future studies on technology integration in Turkish universities and teacher education institutions.

METHOD

Participants

124 academics lecturing at six different Turkish universities contributed to the study by responding to questionnaires either delivered in person or by mail. The participated universities were Kirikkale, Ahi, Pamukkale, Osmangazi, Aksaray, and Nigde Universities. The criterion of defining the participating universities was the foundation periods of them that all these institutions are regarded as belonging to the same generation and developing universities of Turkey. The academic titles of the participants were shown in the Table 1.

Table 1. *Academic titles of the participants*

	F	**%**
A (Prof.)	6	4,8
B (Associate Prof.)	14	11,3
C (Assistant Prof.)	78	62,9
D (Lecturer / Instructor)	26	21,0
Total	124	100,0

Research Questions

The research questions through which the current study sought answers were as follows:

1. What are the differences among teacher education faculty having various posts in terms of utilizing ICT in teaching?
2. Which factors does teacher education faculty perceive as barriers of technology integration?
3. What are the technology implementation levels of teacher education faculty into the curriculum?
4. What are the current technology related instructional practices of teacher education faculty?

Data Collection Instrument

A modified version of the Level of Technology Implementation (LoTi) Technology Use survey (Moersch, 1994) was used to collect the data with the written consent of the LoTi Agency. The survey was created in an effort to measure classroom technology use with a focus on the use of technology

as an interactive learning medium. The questionnaire was translated into Turkish by the researcher and an English instructor re-translated it in English to ascertain that it conveys the exact messages. Besides, another English language instructor checked and compared the English and Turkish versions of the survey. The Cronbach`s Alpha value of the survey was found out as .96 which evidences that a high level reliability was attain. The LoTi Survey is known to be aligned both with ISTE's National Educational Technology Standards (NETS) for Teachers and Administrators, and with the initiatives set forth by the Partnership for 21st Century Skills.

The LoTi survey has undergone extensive research over the past 20 years and has emerged as a statistically-valid tool achieving (1) content, (2) construct, and (3) criterion validity; In 1995, a team of instructional technology professionals evaluated the LoTi Questionnaire for content validity. In spring, 2006, the standard (inservice teacher) version of the LoTi Questionnaire was the topic of an extensive construct validation study conducted by Dr. Jill Stoltzfus at Temple University in Philadelphia, Pennsylvania. The LoTi Digital-Age survey was the topic of a criterion-based validation study conducted by Dr. Jill Stoltzfus in the Fall of 2009. Additionally, a .95 Cronbach's alpha value was observed within the data collection instrument used in the current study.

DATA ANALYSIS

Data were analyzed through statistical package for social sciences (SPSS) version 15.0 for quantitative analysis. Microsoft Excel was also utilized for the tabulation of data. Since the main purpose of this research was to understand academics` technology adoption and related issues, descriptive statistics such as frequency, percentage, mean and standard deviation were calculated to summarize the data.

This section will summarize the data in four dimensions: variance of academics' level of ICT use according to their titles, faculty perceptions of the barriers in terms of technology implementation, technology implementation levels of the faculty, and current technology related instructional practices of the faculty. The scale was consisted of five items (Never-1, At least once in a semester-2, At least once in a month-3, At least once in a week-4, At least a few times a week-5).

In order to seek answer for the first research question, a two way chi square test was administered to see whether there were any variances among academics with different titles. Although the test results indicated some significant differences, the expected values at slots were below 5 and the total percentages were over 20 %. So, no further comments on chi square

test results were possible (Büyüköztürk, 2002). Since there was no statistical significance, chi square tests results were not given.

Participants` perceptions toward factors preventing technology integration were figured below. The results revealed that what academics perceive as obstacle in technology implementation is mostly heavy teaching schedules (58.1 %) and lack of professional development programs (38.7). 37.1 % of the participants also complained about lack of time to focus on technology enhanced learning. On the other hand, deficiency in technologic facilities was not regarded as a primary barrier (11.3 %).

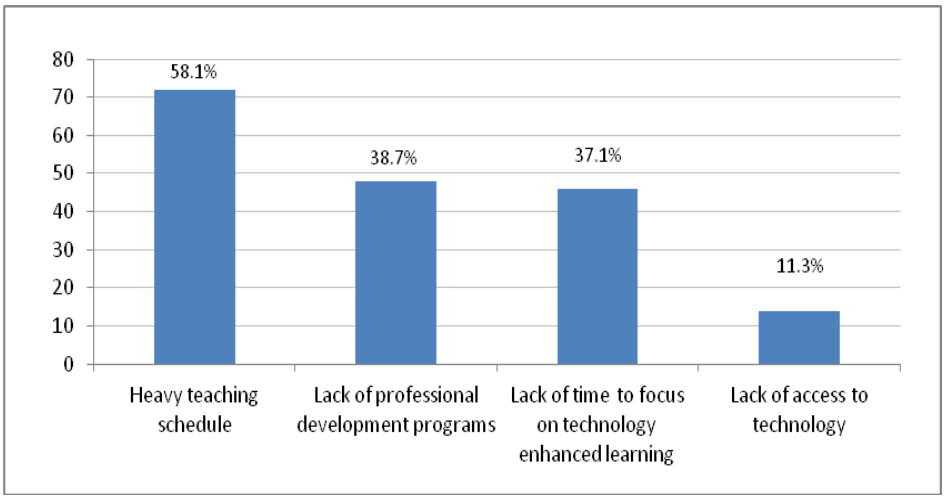

Figure 3. *Academics` perceptions of barriers to implement technology into curriculum*

Table 2 depicts the academics` technology implementation levels according to LoTi framework. The results about the frequency of academics` technology use indicated a staunchly high level of technology use (56.5 % at least a few times a week and 17.7 % at least once in a week) in the educational setting. The relatively high rate was observed again on academics` technology use for promoting student creativity and innovative thinking (40.3 % at least a few times a week and 4.8 % at least once in a week). However, respondents` participations in local and global learning communities to explore creative applications of technology toward improving student learning were found out as considerably low (45.2 % never and 17.7 % once in a semester). The data also revealed except for a minor group who stated their attempts (12.9 % at least once in a week and 9.7 % at least a few times a week) more than half of the participated faculty

(58.0 %) never modeled and facilitated the effective use of current and emerging digital tools and resources. Another deficient use (56.5 % never and 12.9 % once in a semester) was occurred within academics` use of different digital media and formats (e.g, blogs, online newsletters, online lesson plans, podcasting, digital documents) to communicate to students, parents, and peers. Besides, use of different technology systems unique to your grade level or content area (e.g., online courseware, Moodle, interactive online curriculum tools) to support student success and innovation were observed not to be prevalent enough (64.5 % never) among participants. Another unproductive level of technology use and implementation among participants was designing and/or implementation of web-based projects that emphasize the higher levels of student cognition such as analyzing, evaluating, and creating (61.3 % never). The following item in the survey also indicated that students tutored by the participants do not widely use digital tools and resources for research purposes (e.g., data collection, online questionnaires, and Internet research) that require them to investigate an issue/problem, take a position, make decisions, and/or seek out a solution (53.2 & never and 11.3 % once in a semester). Noticeably, just a minority of the participants (11.3 % at least a few times in a week) declared that their students use the digital tools and resources to create web-based (e.g., web posters, student blogs or wikis, basic WebPages) or multimedia presentations (e.g., PowerPoint) that showcase digitally their research on topics. Furthermore, a remarkable amount of the academics (35.4 %) pointed out that they do not offer students learning activities that emphasize the use of digital tools and resources to solve "real-world" problems or issues at all. Only 27.4 % of the faculty claimed a high frequency to this item. However, the negative scene aroused with previous questions turned out to be promising in terms of participants` and their students` use of the digital tools and resources (e.g., interactive whiteboard, digital student response system, online tutorials) primarily to supplement the curriculum and reinforce specific content standards (38.7 % at least a few times a week and 9.7 % at least once in a week). The overall interpretation of the data above notes a negative level of technology implementation on behalf of academics lecturing at faculties of education.

Table 2. *Academics` levels of technology implementation into learning and teaching processes*

How often…	1	2	3	4	5	sd
	%	%	%	%	%	
1…are you using digital tools and resources in your educational setting?	11.3	11.3	3.2	17.7	56.5	1.48
2…do you use the digital tools and resources to promote student creativity and innovative thinking?	19.0	6.5	19.4	4.8	0.3	1.86
3…you participate in local and global learning communities to explore creative applications of technology toward improving student learning?	45.2	17.7	12.9	12.9	1.3	1.66
4…you model and facilitate the effective use of current and emerging digital tools and resources (e.g., streaming media, wikis, podcasting) to support teaching and learning?	58.0	11.3	8.1	12.9	9.7	1.79
5…do you use different digital media and formats (e.g, blogs, online newsletters, online lesson plans, podcasting, digital documents) to communicate information effectively to students, parents, and peers?	56.5	12.9	4.8	16.1	9.7	1.76
6…do you use different technology systems unique to your grade level or content area (e.g., online courseware, Moodle, interactive online curriculum tools) to support student success and innovation?	64.5	4.8	8.1	9.7	12.9	1.85
7…do you design and/or implement web-based projects in my classroom that emphasize the higher levels of student cognition (e.g., analyzing, evaluating, and creating)?	61.3	11.3	9.7	3.2	14.5	1.87
8. do your students use digital tools and resources for research purposes (e.g., data collection, online questionnaires, and Internet research) that require them to investigate an issue/problem, take a position, make decisions, and/or seek out a solution?	53.2	11.3	14.5	6.5	14.5	1.75
9…do your students use the digital tools and resources to create web-based (e.g., web posters, student blogs or wikis, basic web pages) or multimedia presentations (e.g., PowerPoint) that showcase digitally their research on topics that you assign?	48.4	9.7	24.2	6.5	11.3	1.63
10…do you offer students learning activities that emphasize the use of digital tools and resources to solve "real-world" problems or issues?	35.4	6.5	9.7	21.0	27.4	1.91
11…do your students and you use the digital tools and resources (e.g., interactive whiteboard, digital student response system, online tutorials) primarily to supplement the curriculum and reinforce specific content standards?	21.0	16.1	14.5	9.7	38.7	1.71

Academics` responses toward their current instructional practices imbedding technology were tabulated below. Firstly, academics were asked whether they employ learner-centered strategies (e.g., communities of inquiry, learning stations/centers) to address the diverse needs of all students using developmentally-appropriate digital tools and resources. The results showed that mostly checked option was `at least a few times a week` with a percentage of 38.7. However, while 19.3 % of the academics checked never, nearly 30 % of them chose once in a semester and once in a week options. The results on academics` attempts to engage students in learning activities that require them to analyze information, think creatively, make predictions, and/or draw conclusions using the digital tools and resources also pointed out that more than half of the respondents (53.2 %) somehow try to implement technology to enhance cognitive skills. More than half of the participants checked two most frequent options in the scale when they were asked how often their students use the digital tools and resources to increase their content understanding and to improve their basic math and literacy skills. On the other hand, 30.6 % of the academics acknowledged that their students never had a chance to use the digital tools and resources to engage in relevant, challenging, and self-directed learning experiences that address the content standards. The ratio of those chose once in a semester option within this item was 22.6 %. Participants` responses toward the item on whether they prefer using standards-based instructional units and related student learning experiences recommended by colleagues that emphasize innovative thinking, student use of digital tools and resources showed that half of the participants checked the options of at least once a week or more. On the implementation of problem-based learning through digital tools and resources to enhance higher-order thinking and personal inquiry skills of the students, the highest option checked by the respondents was `never` at a rate of 35.4 %. On whether participants` students apply their classroom content learning to real-world problems within the local or global community using the digital tools and resources, half of the respondents uttered the word `never`. Furthermore, the frequency rates of the following items were also observed as skewing to the `never` option. The scarcity of participants assigning web-based projects (e.g., web collaborations, WebQuests) emphasizing complex thinking strategies aligned to the content standards was also remarkable. While 27.4 % of them checked at least once a week or more, 59.6 % of the participants reported that they never do it. Similarly, more than half of the participants (53.2 %) said that their students could not use all forms of the most advanced digital tools (e.g., digital media authoring tools, graphics programs, handheld devices) and resources (e.g., publishing software, media production software, advanced web design

software) to pursue collaborative problem-solving opportunities at all. Additionally, 63.7 % of the academics stated that their students never participate in collaborative projects involving face-to-face and/or virtual environments with students of other cultures that address current problems, issues, and/or theme. Moreover, only 8.1 % of the participants chose highest frequent option as at least a few times a week.

Table 3. *Academics` current instructional practices pertaining to technology*

How often…	**1**	**2**	**3**	**4**	**5**	**sd**
	%	**%**	**%**	**%**	**%**	
1…do you employ learner-centered strategies (e.g., communities of inquiry, learning stations/centers) to address the diverse needs of all students using developmentally-appropriate digital tools and resources?	19.3	14.5	16.1	11.3	38.7	1.65
2…do you engage students in learning activities that require them to analyze information, think creatively, make predictions, and/or draw conclusions using the digital tools and resources available?	12.9	19.4	14.5	32.3	21.0	1.43
3…do your students use the digital tools and resources to increase their content understanding and to improve their basic math and literacy skills?	17.8	17.7	14.5	22.6	27.4	1.58
4…do your students use the classroom digital tools and resources to engage in relevant, challenging, and self-directed learning experiences that address the content standards?	30.6	22.6	12.9	19.4	14.5	1.67
5…do you prefer using standards-based instructional units and related student learning experiences recommended by colleagues that emphasize innovative thinking, student use of digital tools and resources.	25.9	12.9	11.3	22.6	27.4	1.68
6…do you implement Problem-based learning in your classroom since it allows students to use the classroom digital tools and resources for higher-order thinking (e.g., analyzing, evaluating, creating) and personal inquiry?	35.4	9.7	11.3	25.4	18.1	1.73
7…do your students apply their classroom content learning to real-world problems within the local or global community using the digital tools and resources at our disposal?	50.0	12.9	9.7	12.9	14.5	1.78
8…do you assign web-based projects (e.g., web collaborations, WebQuests) to my students that emphasize complex thinking strategies (e.g., problem-solving, decision-making, experimental inquiry) aligned to the content standards?	59.6	9.7	3.2	14.5	12.9	1.88

9…do your students use all forms of the most advanced digital tools (e.g., digital media authoring tools, graphics programs, handheld devices) and resources (e.g., publishing software, media production software, advanced web design software) to pursue collaborative problem-solving opportunities?	53.2	6.5	16.1	9.7	14.5	1.88
10…do your students participate in collaborative projects involving face-to-face and/or virtual environments with students of other cultures that address current problems, issues, and/or themes?	63.7	10.5	9.7	8.1	8.1	1.65

DISCUSSION AND CONCLUSION

The current study revealed that there is not a dependency between the academic titles of the teacher education faculty and their level of technology use in their teaching activities. Although various types of instructional technologies are available, an efficient pathway for the implementation of these technologies is still on the drawing boards. Similarly, outcomes above indicate that Turkish academics do have some fundamental hindrances in integrating technology into their educational environments due to high teaching loads and deficiency of professional development initiatives. No matter how many technologically high literate academic staff you employed, institutions should seriously consider about the reasons of not devoting enough time and energy to learning technology integration.

Although participants declared a high technology use in general terms their attempts to have professional development experiences to explore creative applications of technology, to model and facilitate the effective use of current and emerging digital tools and resources were actually under average. The further results also maintain that participants` perceived technology use level started declining as it reached to more sophisticated examples of technology imbedded learning environments. Apparently, teacher education faculty contributed to this study does not have adequate skills and background of using emerging learning tools and media for pedagogical purposes. Nearly none of the examples of identical technology use in the survey such as designing media or utilizing media for research and problem solving were checked as being used in a reasonable frequency. That is to say, Turkish academics do not keep up with the current technology used to improve teaching and learning process in an established way. All those deductions drawn from the results of the study are also in

accordance with the relevant literature (Askar & Usluel, 2002; Çağıltay & Yıldırım, 2007; Goktas, Yildirim & Yildirim, 2008; Kirkup & Kirkwood, 2005). Hence, the plain "use of technology" is not something to be impressed with unless that use is supported by a deliberately designed pedagogy. Similarly, Surry and Land (2000) argue that lack of awareness of technology hinders its implementation. Providing opportunities to become familiar with various types of technology will advance the implementation of technology in teacher education.

Current study revealed that participated academics` current instructional practices exploiting technology is not promising enough. Nearly one third of the academics affirmed that they try to employ technology rich pedagogic activities aiming to enhance prospective teachers` thinking skills. However, most of them acknowledged that their teaching environments cannot be regarded as fruitful in terms of challenging, self-directed, innovative, creative, and inquiry based learning experiences which are supported by emerging media. Teacher education faculty was also asked about their efforts of implementing collaboration and problem based learning into the instructional programs and the results were definitely not in favor of a wide use of these learning notions.

Moursund and Bielefeldt (1999) argued that faculty information technology skills tended to be comparable with those skills of their students, yet faculty were not modeling the use of technology in their instruction. The results of the current study also underscored the vital role of ongoing professional development to model the new pedagogies and tools for learning with the aim of enhancing the teaching and learning process. However, traditional sit and- get training sessions or one-time-only workshops have not been effective in making teachers comfortable with using technology or adept at integrating it into their lesson plans.

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