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İçindekiler

Sıra no	Konu	Sayfa no
1	A Phenomenological Study Of Computer Education And Instructional Technology Graduate Students' Research Education Needs: Illuminating Challenges, Obstacles And Experiences I. YAKIN	2
2	A Qualitative Study Of 3rd Grade Student's Use Of Information Technology As Literacy Tools M.Y. ERYAMAN	19
3	An Analysis Of Turkish Prospective Teachers' Perceptions About Technology In Education M. S. KÖKSAL, S. YAMAN	29
4	Ab Sürecinde Müzik Eğitiminde Bilgisayarla Öğretim Teknolojileri H.Y. KÜÇÜKÖNCÜ, M. ÖZDEMİR	44
5	Ağrı İl Merkezindeki Okul İdarecileri Ve Öğretmenlerin Bilgisayar Destekli Eğitime Yönelik Düşünceleri M. GÖKALP	66
6	Are We Having Fun With Angrams?, G. HACİÖMEROĞLU	81
7	Bağlaşık Öğrenmenin İlköğretim 4. Sınıf Matematik Dersi Problem Çözme Konusunda Uygulanması Ve Değerlendirilmesi R. DEMİRALAY	88
8	Bellek Destekleyicilerin Öğrenme Ve Hatırlamaya Etkisi Ö. KORKMAZ ,A.MAHİROĞLU	109
9	Bilgisayar Destekli İlk Okuma Yazma Öğretimine İlişkin Öğretmen Görüşlerinin İncelenmesi H. G. ORHAN	123
10	Bilgisayar Destekli Materyalle "Işık", "Işık Kaynakları" Ve "Görme" Kavramlarındaki Yanılgıların Giderilmesi Üzerine Bir Çalışma H.İPEK, Ç. ŞAHİN ve S. ÇEPNİ	145
11	Bilgisayar Destekli Öğretim'de Yakından Öğretim Süreci (Anlamsal Yakınlık) C. YAŞAR, Z. KARADAYI, A. SALAHLİ	164
12	Bilgisayar Destekli Öğretimde Öğretmenlerin Yeterlilik Düzeyleri (Çanakkale Ve İstanbul İlleri Örneği) G. BATDAL, L. ÇETINKAYA	172
13	Bilgisayar Eğitiminde Aktif Ve Klasik Eğitimin Karşılaştırılması Üzerine Araştırma E. KAHYA	180
14	Bilgisayar Mimarisinin Benzetim Animasyonları İle Öğretimi H. KARAL, Y. AYDIN	187
15	Bilgisayar Ortamında Hazırlanan Kavram Haritalarının Bir Öğretim Materyali Olarak Fen Bilgisi Dersinde Kullanılmasının İlköğretim Öğrencilerinin Başarılarına Etkisi A. Y. ALTUNAY , R. ŞEKER	202
16	Bilgisayar Öğretmenlerinin Etkileşim Ve İletişim Yeterliklerinin Değerlendirilmesi N. ÇALIŞKAN, E. KARADAĞ, T. KORKMAZ	219
17	Bilgisayar Ve İnsan Hafızaları E.T. RIZA	229
18	Bilgisayar Ve Öğretim Teknolojileri Eğitimi (Böte) Bölümü Lisans Öğrencilerinin Öğrenme Stilleri İle Bilgisayara Yönelik Tutumları Ve Bilgisayarla İlgili Öz-Yeterlik Algıları Arasındaki İlişkilerin Değerlendirilmesi G. EKİCİ H. G. BERKANT	247
19	Bilgisayar Ve Öğretim Teknolojileri Eğitimi Bölümü Öğrencilerinin Bilgisayar Destekli Eğitime İlişkin Düşünceleri K. YENİLMEZ, R. GÖKMEN	268

**A PHENOMENOLOGICAL STUDY OF COMPUTER EDUCATION AND
INSTRUCTIONAL TECHNOLOGY GRADUATE STUDENTS'
RESEARCH EDUCATION NEEDS: ILLUMINATING CHALLENGES,
OBSTACLES AND EXPERIENCES**

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Abstract

Many countries invest billion dollars for developing research and development activities. A pervasive and largely benign effect of the research on governments and societies endures as unchallengeable fact in global world. Because research is valuable process for societies, research education has gained importance as a result of this new regularity; universities have taken cognizance of research and research education. Throughout the history, educational researchers and also Instructional Technology (IT) researches have been criticized for many reasons. In fact, both educational research and IT researches are considered too soft, squishy, and unreliable. Computer Education and Instructional Technology (CEIT) departments have root in different disciplines, psychology, instructional systems design, cognitive engineering, information technology, educational sciences and so on. Beside theoretical critique to the field, some practical problems can be seen for research education for CEIT. This study aims to explore and understand CEIT graduate students' research education needs, more specifically; challenges, obstacles and experiences. This study follows the phenomenological approach. After transcribing, coding categories were grouped in two major criteria, personal-related and field-related. While codes related to perceived requirements and preferences were grouped under the personal-related criteria, IT-field and research training as codes were grouped under the field-related criteria. Under the light of the study results, recommendations are suggested for both implication and further studies that may provide some insights into the possible future development of IT researches.

Keywords: Research Training, Instructional Technology Research, Phenomenology, Research Education

INTRODUCTION

In today's world, research and R&D applications have gained importance for societies and countries to lead to economical development, ability to contend global worlds and knowledge creation. OECD (2002) defined research as research and experimental development comprising creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications. From a macro perspective, research affects countries' and societies' physical and actual conditions; therefore, research education for all disciplines should be important equally in size with research and R&D. Pearson and Brew (2002) characterized their views on research and research education, "As research becomes increasingly recognized as vital to innovation and national economic growth, research education has become a matter of more concern for both government and public" (p.135).

Research and Research Education in Educational Science

Education is a field that by definition is multidisciplinary (Young, 2001). Because of its' multidisciplinary nature educational researches have been under attacked for many years for their researches. Sometimes, researches in educational science have been criticized to be poor researches. In fact, educational research is considered too soft, squishy, and unreliable (Berliner, 2002). One of the reasons for these critiques is that educational researches face in many directions, as noted by Metz (2001), "It draws on many different disciplinary roots. It sometimes addresses itself to the classic concerns of theory and advancement of empirical knowledge in the manner of research in the liberal arts, but questions of practice and policy are never far away and often one or the other is central" (p. 12). This argument causes that educational researches deal with particular problems and local conditions that limit generalizations unlike other disciplines. Another

difference for educational science for research education was pointed out by McClintock (2005), as cited in Shulman, Golde, Bueschel and Garabedian (2006), that “unlike other fields, ours uses the doctorate both to prepare scholars and to prepare the highest level of leading practitioners” (p.26).

Because educational researches have been criticized for many aspects, the quality of research and research education has gained importance for faculties. Although many endeavors have been seen to improve the quality; it is possible to see that these efforts have not been easy to accomplish. Gallagher (2000, as cited in Pearson & Brew (2002), the quality of research education is highlighted, measured by timely completion (efficient use of government money), student satisfaction, adequacy of resources and attention to the effectiveness of supervision/supervisors. According to the Gelso (1988, as cited in O'Brien, 1995), “three aspects of the research training should be addressed to improve quality and quantity of research activity of counseling professionals: scientific self-efficacy, interest in participating in meaningful research, and value attributed to research” (p.188).

As National Research Council (NRC) (2005) stated faculties of education should need to articulate some competencies for graduate students at the level of doctoral program to educate high-quality researchers. Metz (2001) suggested that graduate education should be enough depth and breadth to prepare creative and effective new researchers in the field. Young (2001) approached to preparing future researchers in the field with the way out improvement of education.

As for graduate students’ research education, Eisenhart and DeHaan (2005) proposed that “education researchers need training in five broad areas: a) diverse epistemological perspectives b) diverse methodological strategies c) the varied contexts of educational practice d) the principles of scientific inquiry e) an interdisciplinary research orientation” (p.7).

Research and Research Education in Instructional Technology

Instructional Technology (IT) was defined as “the systemic and systematic application of strategies and techniques derived from behavior and physical sciences concepts and other knowledge to the solution of instructional analysis” (Gentry, 1995). Like educational science, IT is a discipline that roots in psychology, instructional systems design, cognitive engineering, information technology, educational sciences etc. Therefore, IT has been borrowed theories, models and methods from the physical and social sciences throughout the history.

Hannafin and Hannafin (1995) reviewed the research literature of the IT, and they pointed out that “IT will continue its emphasis on training practitioners, but will be unable to forge its own destiny and advance its own research. The field will continue to grow, becoming more diffuse, moving current IT researchers into disciplines where research is nourished” (p.320). Their future estimation has been come true for the field; an increasing number of students are entering graduate programs, and IT continues to grow. However, field has problems like educational science because of its nature. The problematic concepts and understandings are also valid for research in IT. No single accepted paradigm, multiple reference disciplines and a variety of research approaches could be used in IT research.

As Hope and Fergusson (2002) noted “students are graduating from their first degrees in IT with limited research training and under-developed critical thinking skills” (p.171). This procedure might be also valid for Turkey. Student experiences of conducting research in IT generally begin in graduate programs. At the undergraduate level, IT education does not offer any research knowledge, concepts or skills. Therefore, graduate students enter the graduate programs without understanding the research process and without possessing research skills.

Challenges, Obstacles and Experiences in Research Education

In the literature limited numbers of study have analyzed the challenges, obstacles and experiences that graduate students face in their research education. Studies, researches or dissertations have been written to explore students' experiences. It is possible to find out the studies which pointed out the these issues from variety of departments; to illustrate, psychology, sociology,

educational psychology, psychiatry, medical science. Researchers has focused on mainly to find out predictors of research productivity, career goals, research efficacy, research training environment, interest and their relation to dissertation progress, and process.

Amulya (1998) investigated the experiences of doctoral researchers in creating and carrying out their dissertation research. Likewise, Bako-Okolo (1993) conducted the research to determine the perceptions of doctoral candidates' research self-efficacy during their doctoral dissertation research. He pointed out that research training and goal-setting significantly correlated with research self-efficacy.

Although experience on research activities, dissertations, relationships and predictors of the research activities and research productivities have been studied in different disciplines, these researches should also be conducted in IT field to give a chance via providing some insights into the possible future development of IT researches.

PURPOSE AND QUESTIONS OF THE STUDY

The purpose of the study is to explore CEIT graduate students' research education needs, more specifically; challenges, obstacles and experiences.

Research questions:

1. What are the required knowledge, skills and abilities of an IT researcher?
2. What are the major issues, challenges or obstacles do graduate students face while becoming competent researcher in the field of IT?
3. How can do graduate students overcome these challenges?

METHODOLOGY

Because this study aims to understand IT graduate students' research education needs, more specifically; challenges, obstacles and experiences, a qualitative research methodology were selected as most appropriate. Because qualitative methodologies try to understand social phenomena from participants' own perspective; how the world is experienced and what people perceive the

reality to be is important, the selection is depended on the expediency of the qualitative methodology and purpose of the study. As there are different approaches to doing qualitative research, this study was followed the phenomenological approach. As Patton (1990) stated phenomenology focus on the implication, what is important to know is what people experience and how they interpret the world. In this study, the subject matter of the phenomenology and aim of the study show a congruent relation, in that research is aimed to explore what are the graduate students' obstacles, challenges and experiences while in research education.

Data Source

To explore the experiences of different students' interpretations, understandings and perspectives, shortly, gathering detailed information from participants; in-depth interviews were selected as methods of the study. Interviews with graduate students from CEIT department were primary data source of the research.

The questions were related to capture graduate students' experiences about their research education that be faced in their research courses or doctoral process. Writing a proposal, methodological knowledge, writing a paper, preparing assignments in coursework, field's general trends in research etc. were the general topics and themes of the interview.

Sampling Strategy

The purposeful sampling was used in the study. The criterion was for graduate students to be interviewed was having at least one research course in the department of CEIT. The reason laid beneath for choosing the students that have taken a course is to understand their research education needs.

The sample consisted of three females from CEIT department in Middle East Technical University. The aim of the interviews were informed them before the interviews and participation was voluntary. All three interviews were carried out individually in one session. They were conducted in office in department and

they were recorded with the permission of interviewees. Each interview lasted approximately 30 minutes each.

Data Analysis

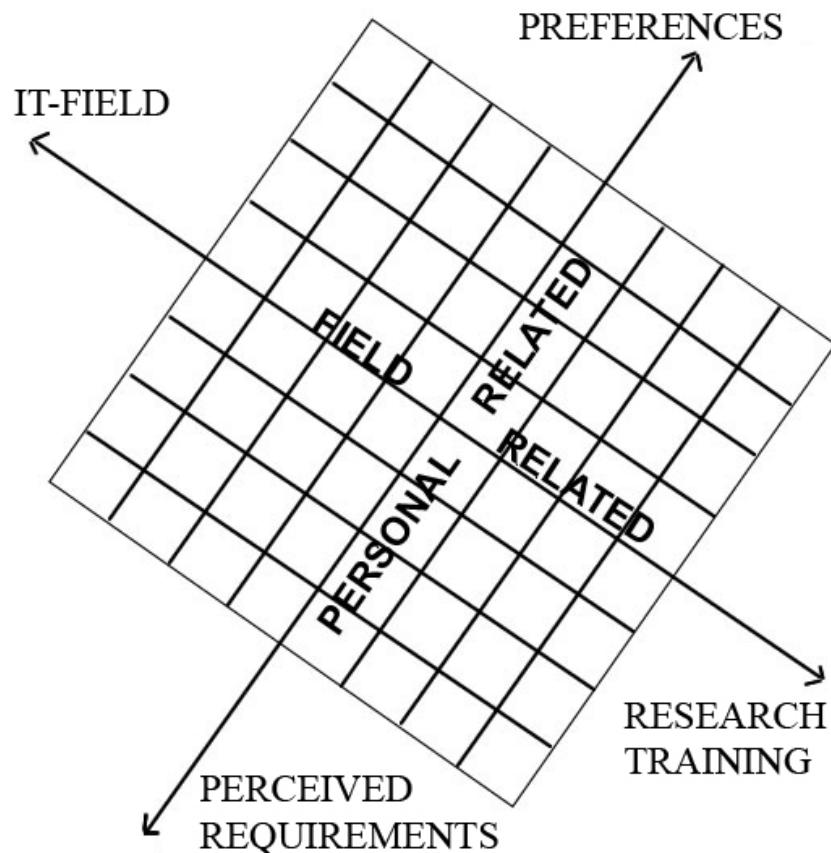
Data were analyzed and collected concurrently so that the phase of data collection merged with that of data analysis. The general strategy for this analysis was based on procedures outlined by Strauss and Corbin (1998). They permitted the categories to emerge from the data. In initial phase (open coding) of the analysis was run for each different data source separately, as Patton (1990) noted it is appropriate to begin with individual case studies where variations in individuals are the primary focus of the study. During open coding, data were broken down into discrete parts, closely examined, and compared for similarities and differences with line-by-line analysis that involves close examination of data, phrase by phrase and sometimes word by word (Strauss & Corbin, 1998). In the second stage of the analysis (axial coding), categories were linked at the level of properties and dimensions. In third stage (selective coding) major categories were finally integrated to form a larger theoretical scheme. Lastly, a graphic model of the categories was constructed to show procedure of the integration of concepts (Figure 1).

In order to build trustworthiness, many strategies were used. Firstly, with purposeful sampling strategy, transferability was tried to build in the research. Because sample was selected purposively with criteria, it might give a chance to be applied in other contexts (other universities or departments) or other respondents (graduate students). Secondly, for objectivity and confirmability, audit trail was used to determine trustworthiness of the research. In coding process, especially for interviews, with dependability audit, it made possible for an external check by other colleagues. Also colleagues were requested to judge about findings of the study, conclusions, interpretations and recommendations as an external reviewer.

RESULTS

After transcribing, coding categories were grouped in two major criteria, personal-related and field-related. While perceived requirements and preferences as codes were grouped under the personal-related criteria, IT-field and research training as codes were grouped under the field-related criteria (Figure 1).

Figure 1: A Graphic Model of Categories



Research Training

All the interviewees focused on the research training that is a part of their requirement process for both their doctoral education and professional development as an academician. Courses, curricula, their research training and support mechanisms are important aspects of research education.

Courses that can be must or elective play a particularly significant role in the research training. The groups mentioned courses' role in their success or failure in research. One of the participants clarified this situation.

“...I think that I am not successful, courses I have taken are responsible for this situation. ...” (Participant3)

Throughout the doctoral training, graduates students should take numbers of research courses. These courses' sequences and contents are defined in the graduate curricula. In present, CEIT curricula gives to graduate students to take research courses from their own department and from other departments. However, this situation accompanies some problems for them. Firstly, required numbers of courses for research training is one of the problems. The number of available courses is not enough for graduate students to be a well-trained researcher. Participant 2 stated “...To me, doctoral training is a form of the philosophical change process and the point that people can understand this fact. Therefore, I think that the number of research courses that are intended for education process should be increased.”. Participant 1 added that graduate students in CEIT should take four or five research courses to be an IT researcher.

Although the numbers of courses are important for education, interviewees complain about courses' content and sequences of these courses. While Participant 1 offered the idea that two introductory courses should be in the graduate curricula. Participant 2 approached this problem differently and pointed out that research training should begin with graduate level insomuch as two courses are taken by students. Participants asserted that introductory courses' content should include fundamental concepts, ethical behaviors and philosophy of the research. For advanced research courses, Participant 2 suggested that graduates students should specialize in those courses.

Secondly, they gave voice to limited research training. Complaints began with research courses' content and coursework modes. Participant 2 argued that “...it is not so effective to just present content in the courses...one semester is not adequate to cover loaded contents...”. Their complaint about course work points out other problems about training, limited practice for research. All interviewees

made a point this issue in different degree. Participant 3 noted that "...Generally, our research courses are theory-based, and so our understandings are too shallow...". Participant 1 stated this issue like "...In that point, courses can be devoted to practice. At least, courses can be designed to include some practices about 20% or 30%..."

Thirdly, consistency of courses and courses that support research courses are seen as challenges. All interviewees seen themselves insufficient about statistical knowledge and they stated this situation as technical knowledge. Participant 2 noted that "...I do not see myself to competent about research because my statistical knowledge is limited...". Participant 3 clarified as "...sometimes I cannot write research questions, for example, because I get stuck in that position, technical knowledge [statistical knowledge] begins problematic...". Moreover, they also complaint the consistency of courses means that linkage between research courses and statistics. Participant 3 argued "...I have not taken research courses and statistics at the same semester. Therefore, I cannot relate these courses' contents with each other. To illustrate, we learn what ANOVA, MANOVA, etc. are at the statistics but I cannot understand how these technical knowledge put into practice or adapt in situations?...".

Lastly, interviewees indicated a problem with courses' progress. They mainly pointed out instructors' role and lack of help mechanisms, lack of feedback. They offered apprenticeship and mentoring systems in research courses. Apprenticeship with advisor and colleagues are the main points that they pointed out. Participant 1 noted advisor position "...for example, while I am writing a proposal, I ask questions to my instructor, but my advisor help mainly one-to-one about writing at literature and research questions while preparing proceedings or papers...". If the advisors or instructors are not reachable, colleagues' help are seen as a help mechanism. Participant 2 pointed out that "...you have two chances at most situations, you can go to your advisor or instructor. Fortunately, I have also one more alternative when I cannot reach them. I share my ideas or understandings with my colleagues. It is useful for me while I say "I have a problem with this" they make a remark about my trouble...".

IT-Field

IT is seen as to give birth to main obstacles and problems. Distinctiveness and historical development of the IT, paradigm shifts and personal views to the field are the main factors that interviewees mentioned as a problematic theme for the field of IT.

Firstly, IT has own research methodologies and research areas. Interviewees stated that difficulties in IT come from its own position. Participant 2 strongly expressed the opinion that IT differs from other fields and IT covers lots of things, therefore research methodologies of IT should be different. However, Participant 3 see this distinctiveness as a threat "...I do not know but I think that educational technology as a term should not be too broad, but today this term covers many applications and core terms. I believe that this situation is inconvenient ...".

Of course this distinctiveness is related with the historical development of the field. The relation with field's history and research comprise both paradigm wars and comparison of method-process discussions. The obstacles and difficulties come from the taking position to these issues. Participant 1 stated that "...the field was affected from behaviorism in infancy. Then cognitivist and constructivist approaches have begin to dominate the field's progress.... To illustrate, while quantitative methods were prevalent among field's research studies; qualitative methods have been popular today. Researchers have been conducted to examine how rather than relationships via qualitative methods in their studies....". Participant 2 approached this issue differently and noted that IT will develop with qualitative studies; therefore, she is convenient with qualitative studies.

Because personal understandings and interpretations of the field of IT is related to the research education closely, it is possible to assert that it causes obstacles to research training. Therefore, interviewees slog on to today's discussions about paradigm wars and new trends. In these situations, interviewees focus on mixed research, as a new paradigm. Participant 2 noted this issue "...I

am aware that the nature of social science brings about some problems. However, I believe that mixed method as a new paradigm has not been understood very well, therefore all studies in which are used qualitative and quantitative methods has been labeled as mixed method...”. But both participant 2 and participant 1 argued that IT researcher should not label themselves to support or favor one method or paradigm. They asserted that researchers should be open to all paradigms, so they should use all according to their topics that be searched. Participant 1 argued her position that “...first and foremost, people should open to all ideas, they should not state only I conduct only qualitative research or quantitative research. They cannot close their eyes to other paradigms or approaches...”.

Perceived Requirements

All interviewees stated that all IT researchers should know the fundamental concepts of the research and methodological knowledge. They should be also strong enough for statistical knowledge to practicing real research problems. For this purpose they must show some abilities, cognitive skills and techniques. As techniques and cognitive abilities, they can search the literature, develop a research design, experience in collecting data, and practice with real research problems and synthesize the research findings. Participant 1 pointed out this research process and added “...I pay attention to instruments used in the studies. If one instrument, which is used in one study, includes observations or interviews, researchers should clarify the whole data collection process. To illustrate, s/he must explain environment in which study is conducted, sample size and sample criteria, and researches questions. I believe that researchers should make all these questions clear in their researches...”. All participants stated that first problem begins with selection of topic in any research process. Participant 2 argued that “...first problem is to decide topic of the study, in other words, thinking about the research questions. After this issue is determined, other steps progress readily...”. Participant 3 stated that about the first problem “...first problem is topic, this is the biggest problem. I can find lots of options but it is

difficult to specify in your mind whether this study can be conducted or not...”. And then they have a problem with defining research questions. These problems are also valid for both research courses assignments and professional developments. Moreover, another characteristic is the selection of research method that researchers should use in their research. Participant 1 stated that “...while you come to method section in your study, you realize that it is different process...”. Participant 2 expressed this issue “...In other words, identifying methodology is one of the major problems. How do you underline the points? What do you do? What are the problems that you may face at this process? You should think all these and state solutions...”.

Moreover, interviewees indicated that IT researchers should also have some abilities for being success in courses and being a good researcher. In addition, they have to possess these abilities for courses to complete assignments, write proposal, and criticize researches and other coursework. These abilities are required also for conducting any research for professional development. Participant 2 noted that “...to me, the most important thing is that research should be understandable. In other words, other researchers can understand the study while reading the methodology part. Therefore, researchers should write this section in a clear and fluent way and they should also point out methodology part in step by step strategy....”. According to the interviewees, IT researchers should have ability to analyze the literature, criticize sampling selection and methodologies of the studies and briefly they must evaluate, criticize and analyze the researches.

Preferences

The results showed that, in most cases, personal preferences emerge as critical to compose obstacles and problems. Reaching the ideal, professional endeavor, academic prerequisites, trying to make a contribution to field and ethical behaviors and also course preferences play a critical role for problems.

Firstly, all interviewees showed professional endeavor for research training. They are aware of the importance of the research training for their

professional development. Participant 3 noted her preferences to the researches that "...I really desire that my researches should also serve the purpose of the social meaning. It is not meaningful while the researches are conducted for only academic purpose...". Participant 1 noted this effort as "...I always think that what I can add something while reading a study... Suppose that I really want to study in that topic or conduct parallel study. My thinking process progress to specify the contribution to the field....".

Lastly, it is possible to add that enthusiasm and personal deficiencies are also important factors for them. According to the interviewees, researchers should feel enthusiasm in their researches and academic works. All the courses taken should point out some aims and targets, and researchers should analyze or evaluate any works from this point whether they are required for courses or not.

CONCLUSIONS

The results of this study indicate that all four dimensions contributed to the CEIT graduate students' research education needs, more specifically; challenges, obstacles and experiences, but to different degrees and aspects. While courses, graduate and undergraduate curricula, and support mechanisms are important factors for research training, diversity and historical development of the field of IT, and paradigm shifts that brings about the personal views in the field form the another important factors for field-related category. As for personal-related dimension, perceived requirements, such as abilities, skills, techniques and knowledge and also preferences included academic priorities and personal endeavor play an instrumental role in that major category.

The small sample size of the study causes limited generalizability of the findings. Further studies should investigate CEIT graduate students from varied backgrounds and locations to reveal research education needs.

Research into CEIT graduate students' challenges, obstacles and experiences for research training is important for several reasons. Firstly, IT research focuses on questions and solutions of how people learn and perform, more specifically; with respect to how learning and performance are influenced,

supported, and caused by technology. However, students are graduating from CEIT departments with limited research training and under developed core skills in Turkey. In graduate level, students struggle to criticize, analyze and reach a deep understanding of research knowledge, so understanding the research process and possessing the research skills are one of the challenges they face. If the outputs of the graduate programs (published papers, thesis and dissertation etc.) are taken into consideration, it is possible to assert that learning core research skills plays an instrumental role for graduate students.

Moreover, IT field has own dynamics in research, to illustrate; discipline borrows theories, models and methods from different disciplines; it requires additional research approaches. Fundamental concepts, applications and skills for practice in IT research are vital to researchers. Therefore, researches should be relevant and rigorous. As a consequence, research education and approaches gain importance for graduate education in IT.

Thus, understanding CEIT graduate students' research education needs, more specifically; challenges, obstacles and experiences may provide some insights into the possible future development of IT researches to become good researchers.

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