Current Trends in Research in the Field of Computer Education and Instructional Technologies

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Abstract: - This study was conducted to determine the trend in studies carried out in department of Computer Education and Instructional Technologies (CEIT) at postgraduate level. For this purpose, a total of 106 documents of theses completed in the department of CEIT – 90 M.A. theses and 16 PhD. Theses – were examined focusing on their subject matters. It was concluded in the present study that the most-studied subject area was online learning, which was followed by technology, teaching-learning approaches, multimedia, individual differences and evaluation, respectively. The least-studied subject area was found to be special education. It was also revealed that the studies were mostly conducted through quantitative paradigm. In addition, according to the results of the present study, the most-studied universe included higher education students followed by adults and elementary school students, respectively. Lastly, most of the studies were found to have a survey design. Especially the M.A. theses involved basic statistical techniques at the beginning, while they included advanced statistical techniques today.

Key-Words: - Department of computer education and instructional technologies, Thesis, Postgraduate education

1 Introduction

Rapid developments in information and communication technologies in the 21st century have influence on every area of our lives especially on the field of education. Besides these developments, changes in the expectations from individuals, globalization, and the increasing need for life-long learning have all influenced educational institutions to a great extent like other institutions [1]. These developments have led to the necessity to train more qualified man-force for educational institutions, which is appropriate to the structure of the current information society and open to universal values and is as able to contribute to the production of information [2]. Therefore, for the purpose of meeting these expectations brought about by the developing and changing process in the world, it is a must in the first place to train teachers well who will teach individuals of the society. In this respect, in order to provide a standard regarding teacher training and teacher efficacy and thus to equip teachers with the necessary qualifications for the new vocational roles and responsibilities in Turkey [3], teacher-training institutions, known as education faculties, were restructured in 1997. In this process of restructuring, 16 teacher-training programs were developed at undergraduate level. One of these programs is the department of Computer Education and Instructional Technologies (CEIT). The number of the departments of CEIT started with one program in the academic year of 1997-1998 became 12 [4] in the academic year of 1998-1999. The increasing number of CEIT departments has now become 29 in total in Turkey. However, no other undergraduate program matching the department of CEIT exists in the world yet there are M.A. and PhD programs in this field. In Turkey, there are M.A. and PhD programs besides undergraduate education in CEIT. Today, 10 M.A. and four PhD postgraduate programs are executed in the field. Sharing especially the theses studies carried out in the scope of these programs will not only prevent such studies from just standing in the book shelves of libraries, but also help establish the link between theory and practice. In addition, this will also provide the opportunity to observe the trend in such

studies carried out in the field of instructional technology or information and communication technology. In this respect, it is important to examine the theses studies carried out in CEIT departments that give postgraduate education. In order to determine the study-areas of today's CEIT departments which do not match any other departments in the international arena, it is necessary to examine the theses as well as research conducted in the field of educational technology.

Coutinho and Gomes [5] examined 446 papers and theses carried out in the field of educational technology between 2000 and 2005 in Portugal. The research findings revealed that there were such study-areas as virtual learning environments, e-learning/distance learning, internet/www, hypermedia /multimedia/software, image/audiovisual/video applications, teacher training, and curriculum integration. Among all these areas, e-learning/distance learning was the most-studied area.

Masood [6], in order to determine the trends in educational technology, examined 200 papers published in the journal of Educational Technology of Research and Development (ETR&D) between 1993 and 2002. As a result of the content analysis, delivery system was found to be the most-studied subject, and a transition to a web-based structure via distance learning was observed. The second most-studied subject was instructional development, which requires the development of the tools used to improve computer-based teaching.

According to Castro (2001) cited in Deutsch [7], the current and future trend in educational technology is digital learning. It is also reported that there will be an increase in the flexibility in online learning and web-enabled environments.

Winn [8] categorized the studies carried out in the field of educational technology in terms of era. The first era was the instructional design era that focuses on content, and the others were the message design era that focuses on form and the simulation era that focuses on interaction, respectively. It was also reported in the study that research on educational technology focusing on the learning environments in 2000s entered a new era and that the studies in this era investigated such subjects as artificial intelligence environments, social aspects of learning, and distributed cognition in learning societies.

Şimşek, Özdamar, Becit, Kılıçer, Akbulut and Yıldırım [9] aimed at determining the current trend in the field of educational technology. For this purpose, the researchers have examined 64 PhD theses conducted in this field in five different universities in Turkey in the last ten years. It was revealed in the study that the PhD theses frequently had a quantitative research design and that in recent years, there has occurred a mixed research design which requires the use of quantitative and qualitative approaches together. Furthermore, according

to the results of the study, it was also reported that there has been a recent increase in the number of experimental studies. In addition, in terms of statistical techniques used in studies, basic statistical techniques were used at the beginning, while studies today use a wide variety of tools for data collection and advanced statistical techniques for data analysis. Besides this, in early years, most studies were based on only one variable, whereas current research data are collected and interpreted through more variables. Another related study was carried out by Şimşek, Özdamar, Kobak, Uysal, Berk, Kılıçer and Çiğdem [10]. In their study, the researchers provided a general evaluation of a total of 259 M.A. theses conducted in the field of educational technology between 2000 and 2007. It was also reported in the study that due to the rapid developments in information and communication technologies and the increasing popularity of the field of educational technology, there has been an increase in the number of theses since 2000 and the quantity and quality of the studies have differed to a great extent with respect to the university.

When CEIT is considered as merely educational technology in the international arena, this means that the teacher-training mission, one of the basic goals of these departments, is avoided. Therefore, in order to determine the current trend in the field of CEIT, it would be a better approach to evaluate the M.A. and PhD theses in CEIT within the scope of the department itself. In this respect, the purpose of the present study is to determine the subject areas of the postgraduate theses conducted in the departments of CEIT and to reveal the trend in such studies carried out in CEIT.

2 Method

The present study employed document analysis that covers the analysis of written materials including information about one or more phenomena to be investigated. Within the scope of the study, a total of 106 postgraduate theses carried out in 10 different universities that give postgraduate education in Turkey. Among all the theses investigated, 90 of them were M.A. and 16 were PhD theses. All the theses were examined in terms of their theses-subjects, paradigm, research design, population and the statistical techniques used for data analysis.

3 Findings

In this study, first, the number of postgraduate theses was examined with respect to their distribution by the year-of-completion. The distribution obtained is presented in Chart 1.

Chart 1. The Number of Theses by Years
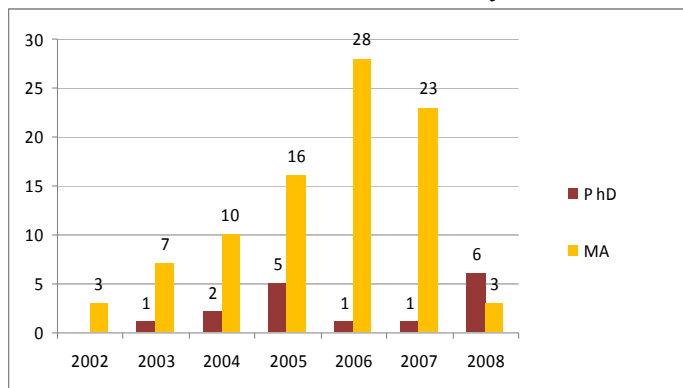
As shown in the chart, there has been an increase in the number of both M.A. and PhD theses since 2002. Considering the PhD theses, the year with the largest number of completed theses was found to be 2008, while it was 2006 for the M.A. theses. The increase in the number of postgraduate CEIT programs opened in different universities also led to an increase in the number of theses in both postgraduate programs.

Table 1 shows the subject-areas and the frequency of the theses completed in the postgraduate field of CEIT.

Table 1. The subject-areas

Subject Areas	Frequency
Online learning/distance education	36
Technology	29
Teaching-learning approaches	20
Multimedia	5
Individual differences	5
Evaluation	5
Professional development	3
Inservice training	2
Special education	1

As can be seen in Table 1, the most-studied subject-area investigated in the postgraduate theses was found to be online learning, which was followed by technology, teaching-learning approaches, multimedia, individual differences and evaluation, respectively. The theses on online learning were found to focus mostly on such subjects as web-enabled and internet-based learning. One of the reasons why online learning was the most-studied subject-area could be the fact that learning environments have changed due to the opportunities provided by technology. Another reason could be the desire of researchers to reveal what effects such learning environments – with the possible limitations as well as advantages - have on individuals. In addition, rapid developments and the related changes in information and communication technologies have caused researchers to focus on the use of audio-visual technology in education,

the integration of information and communication technologies, and literacy skills. The underlying reason for this trend is that any innovation in information and communication technologies can be integrated into different environments. For such a purpose, individuals are expected to be literate in the integration of an innovation in information and communication technologies into educational environments. As for the theses on teaching-learning approaches, researchers mostly focused on the subject of computer-based education. In addition, there were studies carried out to investigate the effects of different instructional approaches on technology-based environments. Besides this, the teaching-learning processes in educational environments changed by information and communication technologies were also found to differ in time. Therefore, it is important to investigate the teaching-learning processes in such environments in order for the process to function better. In this way, the functioning and non-functioning aspects of the process will be revealed. Depending on this, certain measures to improve the process could be taken. However, it was harrowing to find out that there were few studies on individuals who need special education despite the opportunities provided by information and communication technologies for them to lead an easier life.

Table 2. The Research Paradigms

Universities		Quantitative	Qualitative	Mixed	Total
Anadolu	M.A.	19	1		20
	PhD	9	2		11
Balıkesir	M.A	4			4
ÇU	M.A	1			1
Ege	M.A	1		1	2
Gazi	M.A	20			20
	PhD	1			1
Hacettepe	M.A	8			8
KATÜ	M.A	5	1		6
Marmara	M.A	5			5
ODTÜ	M.A	20			20
	PhD	5	1		6
Sakarya	M.A	4			4
Total		102	5	1	108

Table 2 demonstrates the distribution of the theses according to the universities with respect to the research paradigms taken as the basis of the theses. According to the table, the majority of the theses conducted in the field of CEIT were based on quantitative paradigm, while few of them were based on qualitative paradigm. The reason for this could be the fact that experts in the field are trained through the quantitative paradigm led by the positivist approach and that similarly, these experts

train their students through this paradigm. In other words, the qualitative paradigm is new in the field and thus not familiar to the experts. In this respect, it is important to investigate the reasons why there are not enough studies conducted through the qualitative research paradigm.

Table 3 shows the distribution of the population of the postgraduate theses according to the universities.

Table 3. Populations of the Theses

Universities		K1-8	K9-12	HE	Adult	Other
Anadolu	M.A	3	1	2	13	1
	PhD			9	2	
Balıkesir	M.A	1		1	3	
	PhD					
ÇU	M.A	1				
Ege	M.A		1	1		
Gazi	M.A	6	4	7	4	
	PhD			1		
Hacettepe	M.A	4	1	2	2	
	PhD					
KATÜ	M.A	4		1	2	
	PhD					
Marmara	M.A	3	1		1	
	PhD					
ODTÜ	M.A	3		13	3	2
	PhD			1	6	
Sakarya	M.A	2	1		1	
	PhD					
Total		**27**	**9**	**38**	**37**	**3**

According to Table 3, the most-studied population included higher education students, which was followed by adults and elementary school students, respectively. One of the reasons why there were more studies carried out with higher education students could be the fact that researchers are likely to prefer conducting studies with their own students who are always available at the time of their studies. Also, another reason for the large number of studies conducted with higher education students could be the fact that individuals who teach as information technology teachers and trainer teachers within the system are graduate students from the departments of CEIT. In addition, the fact that information technology teachers teach in elementary schools within the system could be the reason why there were a number of studies conducted with elementary school students. Moreover, one of the reasons for the lowest number of studies conducted with secondary school students could be the fact that more teachers graduating from the departments of CEIT teach in elementary schools than in secondary schools.

Table 4 presents the distribution of the research designs of the theses according to the universities. As can be seen in the table, it was revealed that parallel to the research paradigms taken as basis, mostly survey-based studies were carried out, which was followed by such studies conducted through qualitative paradigm as action research, and case studies, respectively.

Table 4. Research Designs

Universities		Research Design		
		Quantitative		Qualitative
		Survey Model	Experimental Model	
Anadolu	M.A	17	2	1
	PhD	5	4	2
Balıkesir	M.A	2	2	
ÇU	M.A		1	
Ege	M.A	1		1
Gazi	M.A	5	15	
	PhD		1	
Hacettepe	M.A	5	3	
	PhD			
KATÜ	M.A	1	4	1
	PhD			
Marmara	M.A	2	3	
	PhD			
ODTÜ	M.A	12	8	
	PhD	5		1
Sakarya	M.A	2	2	
	PhD			
Total		**57**	**45**	**6**

Table 5 illustrates the statistics applied in the postgraduate theses.

Table 5. Statistical Techniques

Universities		M, SD	χ2	KS	Correlation	ANCOVA	KW	MW	REG	t-test	ANOVA
Anadolu	MA	15	2	1	2		1		1	7	6
	PhD	7	1		1	1		1		6	6
Balıkesir	MA	2					1	1		2	3
Ege	MA	1								1	
Gazi	MA	18	1	1	2	2	4	6	1	12	7
	PhD	1									1
Hacettepe	MA	5			1					5	5
ÇU	MA	1								1	
KATÜ	MA	6			1					2	2
Marmara	MA		1		1			1	3	4	3
ODTÜ	MA	18				1				2	4
	PhD	6							1		1
Sakarya	MA	4			1					3	2
Total		**84**	**5**	**2**	**9**	**4**	**7**	**11**	**3**	**45**	**40**

As shown in Table 5, the most-frequently used techniques were descriptive statistics like the mean and standard deviation. One of the reasons for this could be the fact that descriptive statistics are necessary to determine the main trend although medium- or upper-level statistical techniques can be used for similar purposes. In addition, according to the results presented in the table, descriptive statistics were followed by such statistical techniques as variance analysis and t-test used for the analysis of the differences. Moreover, the M.A. theses applied basic-level statistical techniques, while PhD. theses used medium-level techniques to determine the relationships or casualty. The results also revealed that the techniques used were mostly parametric techniques besides few non-parametric ones. The reason for this could be the fact that there were few studies investigating whether the prerequisites for the parametric tests were provided or not.

4 Conclusion

This study was carried out to determine the trend in the field of CEIT within the scope of the M.A. and PhD theses conducted in the field. The most-studied subject-area of the theses examined was found to be online learning. This finding is consistent with those of the studies by Coutinho and Gomes (2006) and Şimşek et. al. (2008). However, it is striking that there are few studies that focus on individual differences of learners in new learning environments and on the evaluation of these new environments. Considering especially the opportunities provided by technology, there are scarcely any studies that focus on individuals who are in need of special education. It could be stated that it is necessary to carry out more studies in this field. It was also revealed that the theses examined in the present study were conducted mostly through quantitative research paradigm and that there were few studies conducted through qualitative research paradigm. Moreover, it was found out that there were hardly any studies that integrated quantitative and qualitative approaches together. However, in the study carried out by Şimşek et. al. (2008) who investigated the theses conducted in the field of educational technology, it was concluded that there has been a recent tendency towards mixed studies that use quantitative and qualitative approaches together. In this respect, taking the trend in the international arena into consideration, it could be stated that there should be more studies to be conducted through mixed or qualitative paradigm.

In addition, it was concluded that the theses examined in the present study were frequently carried out with students available for research at the time of research. Furthermore, according to the results of the present study, most of the theses conducted through quantitative paradigm were survey-model studies. On the other hand, there were also a good number of studies based on the experimental model. In addition, it was observed that there were not detailed explanations regarding the method of the theses examined in the scope of the present study. In this respect, it could be stated that the methods of studies should include more details, which will, as a model, help future studies. As for the statistics applied in the theses examined in the present study, basic statistical techniques were used more in M.A. theses, while advanced statistical techniques have been applied especially in recent PhD theses. The reason for this could be the fact that the PhD education process requires relatively more challenging and upper-level skills than the M.A. education process.

Another result obtained by the researchers of the present study was that the findings of studies are not sufficiently used in the related field. In this respect, the research findings that will help establish the link between theory and practice should be prevented from just standing in the book shelves of libraries. In other words, the research findings should be shared by those interested in the related field. In addition, studies like the present one that aims at determining the trend in the M.A. and PhD theses carried out in the field of CEIT should be replicated periodically, and the results obtained should be shared with other sharers. An increase in the number of such studies will be beneficial for the researchers in the field.

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