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Research Trends in Computer Education Technologies in Turkey[8]

Berkay ÇELİK[9], Kerim GÜNDOĞDU[10], Mehmet ALTIN[11], Nuri KARASAKALOĞLU[12]

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[9] Doctoral student in Curriculum and Instruction, Adnan Menderes University, e-mail: berkaycelik09@gmail.com
[10] Assoc. Prof. Dr., Adnan Menderes University, e-mail: kerim.gundogdu@adu.edu.tr
[11] Res. Assist. Adnan Menderes University, e-mail: mehmet.altin@adu.edu.tr
[12] Assoc. Prof. Dr. Adnan Menderes University, nkarasakaloglu@adu.edu.tr

Abstract
The purpose of this study is to find out research trends in the field of "Computer Education Technologies" in Turkey by exploring the articles that were published between 2005 and 2013. For the purpose, articles were evaluated in terms of their publishing dates, number of authors, methods, data collection procedures, sample characteristics, data analysis techniques, subject areas and their topics. The articles were explored by investigating the documents within the framework of descriptive approach and research trends in the field of Computer Education Technologies were attempted to be described. In the study, 35 journals that are published in the field of Computer Education Technologies, which are all included in the ULAKBIM Database, were covered in the study. According to results it was determined that the majority of the articles were written either by a single author or two authors, used quantitative research method, descriptive studies, used questionnaires and likert type scale, studied with graduate students and used frequency, mean, t-test and variance analysis. Also it was determined that more than half of the articles subject areas were educational technology, student-teacher characteristics and teaching.

Key Words: Information technology, computer, research, trends, meta-analysis, scientific research, education, technology

Introduction

Increase in technological developments in informatics has affected the field of education as well as all other fields. The adaptation of a development in technology to education and how the technologic development will be used in educational planning, managing, training or other fields have been explored. Technology is defined as systematic application of concepts and information of behavioral and physical sciences for the solution of problems (Gentry, 1995). In this context, educational technologies can be defined as application of information and concepts produced by behavioral and physical sciences and technology occurring in consequence of that on problems in education and as creation of better learning environment and design (Erdoğmuş & Çağıltay, 2009). Integration of the technological developments to academic fields and developments of academic fields are closely related with the wealth of literature review about these fields. Computer Education Technologies as well as all academic fields has increased in recent years. Cross-sectional studies for revealing developments in any fields in literature review are common. A general assessment of the literature of Turkish education not only gives information about a specific period but also sheds light on future research (Erdem 2011). While examination and analysis of dissertations about a subject, on the one hand, give information about the depth and extent of the subject, they, on the other hand, deliver overall appearance of the area surveyed (Göktaş & Erdem, 2006). When the literature is reviewed, it is seen that there are studies in which theses in several fields and articles in academic journals have been analyzed by using specific criteria. For example, trends in information technologies and educational technologies have been subject studied by many researchers (Caffarella,1999; Costa, 2007, Şimşek et al., 2008; Şimşek et al., 2009; Erdoğmuş & Çağıltay, 2009; Akça & Üstündağ, 2009; Sert, 2010; Göktaş et al., 2012; Kurtoğlu & Seferoğlu, 2012).

Especially, Caffarella analyzed trends in PhD theses completed about educational technologies in USA since 1977. Costa (2007) analyzed master's theses in his study. Researchers tried to reveal the current trends by analyzing which methods had been used in the researches, which tools the data had been collected, of whom the sample had consisted and how the analysis had been carried out (Kurtoğlu ve Seferoğlu, 2012).

There are a number of researches made in Turkey in the field of educational technology. Şimşek et al. (2008) analyzed doctoral dissertations in educational technologies in our country for the last decades. According to researchers, doctoral theses in educational technologies focused on learning-teaching approaches, online learning and multimedia topics.

There are a number of researches in educational technologies in Turkey. Akça-Üstündağ (2009) analyzed 133 theses carried out by the end of the 2007 in her master's thesis. As a result of the thesis, it is emphasized that there is an increasing interest in distance education and there is a decreasing interest in computer-managed instruction. Şimşek et al. (2009) analyzed 259 master's theses between the years 2000-2007 in educational technologies in our country in their other study. When Erdoğmuş and Çağıltay (2009) analyzed master's and doctoral theses in Computer Education Technologies, they concluded that the three most common topics discussed are the media, media comparisons and student variables.

There have been only a few studies to determine research trends in Computer Education Technologies, and these studies generally analyzed master's and doctoral theses. However, when the literature is reviewed, any study analyzing articles in "Information Technology Training" in Turkey and determining the research trends hasn't been found. Also, scientific researches to determine the research trends set light to identification of on which subjects there is deficiency and selection of subjects needing to be searched. In this sense, this study is expected to meet a need in the literature and thought to be important to determine the research trends in "Information Technology Training". In this respect, the aim of this study is to determine the research trends in "Information Technology Training" by analyzing the articles published in the years between 2005-2013 in that field in Turkey. Thus, the articles have been evaluated in terms of publication year, the number of the authors, method, data collection tools, characteristics of the sample, data analysis techniques, fields of subjects and topics.

Method

Research Model

This research is a descriptive study. Articles were analyzed with document analysis within the framework of the descriptive approach, and we tried to describe the research trends in " Computer Education Technologies ".

Sample

35 journals in “Computer Education Technologies” reviewed in ULAKBİM National Database were included in the scope of the analysis, and the research was limited to the years between 2005-2013. Totally 225 articles published in the field of " Computer Education Technologies " in those 35 journals were sampled and analyzed. The journals reviewed and the number of articles have been given in Appendix 1.

Data Collection Tool

Content analysis method was applied on each article by using “Article Classification Form”. “Article Classification Form” was developed by Sözbilir and Kutu (2008) and used in his study. The form consists of 5 basic charters: article tag, research pattern/method, data collection tools, sample and data analysis methods. Data collection tool has been given in Appendix 2.

Data Analysis

Content analysis method was used to analyze the collected data. The procedure in content analysis is to put together the similar data within the framework of specific concepts and themes and to comment it in a way the reader can understand (Yıldırım & Şimşek, 2011). The results of the analysis are expressed with the frequency and percent values.

Findings

Content analysis method was applied to totally 225 articles in 35 journals in order to determine the research trends in " Computer Education Technologies" by analyzing articles published in that field in the years between 2005-2013. Frequency and percent values about publication year of the articles have been given in Table 1.

Table 1: *Publication Year of the Articles*

Category	f	%	Category	f	%
2005	13	5.7	2010	34	15.1
2006	15	6.6	2011	29	12.9
2007	33	14.7	2012	43	19.1
2008	18	8.0	2013	21	9.3
2009	19	8.4			
Total	225	100			

43 articles (19.1%) were published in 2012, 34 articles (15.1%) were published in 2010, 33 articles (14.7%) were published in 2007, 29 articles (12.9%) were published in 2011 and 21 articles (9.3%) were published in 2013. If it is taken into the consideration that this study was carried out in the first half of the 2013, a year by year increase in the number of the articles in the field of "Computer Education Technologies" has been observed. Frequency and percent values about the number of authors of the articles have been given in Table 2.

Table 2*: the Number of Authors of the Articles*

Category	f	%	Category	f	%
1 author	70	31.1	5 authors	0	0
2 authors	104	46.2	6 authors	0	0
3 authors	35	15.6	7 authors	1	0.4
4 authors	15	6.7			
Total	225	100			

When it is analyzed in terms of the number of authors of the articles, it is seen that 70 articles (31.1%) were written by one author, 104 articles (46.2%) were written by two authors, 35 articles (15.6%) were written by three authors, 15 articles (6.7%) were written by four authors and 1 article (0.4%) was written by seven authors. The frequency and percent values about research type of the articles have been given in Table 3.

Table 3: *Type of the Articles*

Category	f	%
Research-review	197	87.6
Theoretical (Compilation)	28	12.4
Total	225	100

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197 articles (87.6%) are in research-review type and 28 articles (12.4%) are in theoretical (compilation) type. Frequency and percent values about research methods of the articles have been given in Table 4.

Table 4: *Pattern/Method in the Articles*

	Research Pattern	**Research Method**	**f**	**%**
Quantitative	Experimental	True experimental	3	1.3
		Quasi experimental	28	12.4
		Poor experimental	0	0
		Single subject	3	1.3
		Sub total	34	15.10
	Non-experimental	Descriptive survey	123	54.70
		Correlational	3	1.3
		Comparative	2	0.9
		Structural equation model	0	0
		Sub total	128	56.90
Qualitative	Interactive	Cultural analysis	7	3.1
		Phenomenology	3	1.3
		Grounded theory	1	0.4
		Case study	8	3.6
		Critical study	0	0
		Activity research	1	0.4
		Other	0	0
		Sub total	20	8.90
	Non-interactive	Concept analysis	26	11.6
		Historical analysis	4	1.8
		Meta analysis	0	0
		Other	0	0
		Sub total	30	13.30
Mixed	Mixed	Explanatory	12	5.3
		Exploratory	1	0.4
		Triangulation	0	0
		Sub total	13	5.80
		Total	225	100

162 articles (72%) has quantitative method, 50 articles (22.2%) has qualitative method and 13 articles (5.8%) has mixed method. 28 quantitative articles (12.4%) in experimental pattern are semi-experimental. 123 quantitative articles (%54.7) in non-experimental pattern are descriptive. 8 qualitative articles (3.6%) in interactive pattern are in case study type, 26 qualitative articles (7.2%) in non-interactive pattern are in concept analysis type. 12 studies (5.3%) in mixed type are in explanatory type. There isn't any research in poor experimental model, structural equation model, critical study or triangulation type. Frequency values about data collection tools of the articles based on research-review type have been given in Table-5.

Table 5: *Data Collection Tools in the Articles*

Category	Sub category	f	Category	Sub category	f
Observation	Participant	5	Questionnaire/Scale	Open-ended	8
	Non-participant	0		Likert	148
	Unstated	0		Other	0
	Total	5		**Total**	156
Interview	Structured	0	Documents		30
	Semi-structured	28			
	Unstructured	0			
	Focus group	3			
	Unstated	0			
	Total	31			
Achievement test	Open-ended	4	Complementary (Alternative) evaluation		1
	Likert	29			
	Other	0			
	Total	33			
Ability/personality test	Open-ended	0	Other		1
	Multiple choices	0			
	Other	0			
	Total	0			

Considering the research-review based articles, it was found that questionnaire/scale (f=156) and achievement test (f=33) were used in the articles. Most of the questionnaires/scales were in likert type (f=148). Most of the achievement tests consisted of multiple choice questions. Most of the interviews were carried out with semi-structured forms (f=10). Most of the observations were in participant observation type (f=5). Frequency values about sample groups can be seen in the Table 6.

Table 6: *Samples in the Articles*

Category	f	Category	f
Pre-school	0	Teachers	31
Elementary (1-5)	3	Administors	7
Elementary (6-8)	26	Parents	0
Secondary	17	Instructors	1
Undergraduate	98	Inspectors	0
Post-graduate	2	Other	17

From the Table 6, it was seen that mostly undergraduate students (f=98) and teachers (f=31) were included in the articles. Frequency and percent values about the sample sizes of the articles are given in Table 7.

Table 7: *Sample Sizes in the Articles*

Category	f	%	Category	f	%
between 1-10	13	5.8	between 101-300	71	31.6
between 11-30	15	6.7	between 301-1000	28	12.4
between 31-100	65	28.9	between 1000	6	2.7
Total	198	100			

72.9% of the articles have sample between 30 and 1000. Frequency values about data analysis techniques of the articles have been given in Table 8.

Table 8: *Data Analysis Techniques in the Articles*

Category	Sub category		f
Descriptive	Frequence/percent		82
	Mean/Standard Deviation		56
	Graphs		0
		Total	138
Inferential	Correlation		12
	t-test		86
	ANOVA		51
	ANCOVA		6
	MANOVA		41
	MANCOVA		1
	Factor Analysis		12
	Regression		2
	Non-Parametric Tests		5
	Structural Equity Models		0
	Other		0
		Total	216
Qualitative	Content Analysis		28
	Descriptive Analysis		34
	Other		0
		Total	62

Regarding data analysis techniques, it is clearly seen that descriptive analysis techniques were used in 138 articles, inferential analysis techniques were used in 216 articles and qualitative analysis techniques are used in 62 articles. Frequency/percent values were calculated in 82 articles with descriptive analysis, and mean/standard deviation values were calculated in 56 articles with descriptive analysis. Mostly t-test (f=86), ANOVA (f=51), MANOVA (F=41), correlation and factor analysis (f=12), ANCOVA (f=6) and non-parametric tests (f=5) were used in articles with inferential analysis. When qualitative analysis techniques are analyzed, it is seen that content analysis was used in 28 articles and descriptive analysis techniques were used in 34 articles. Frequency values about subjects of the articles have been given in Table 9.

Table 9: *Subjects of the Articles*

Category	f	Category	f
Instruction	47	Assessment and evaluation	1
Teacher-student characteristics	70	Training technologies	96
Learning	2	Philosophy of education	1
Teacher training	0	Classroom management	0
Curriculum evaluation	3	History of education	0
Education system	0	Scale development/adaptation/testing	4
Values education	0		

Most of the articles (215) were carried out in the subjects; training technologies, instruction and student-teacher characteristics. Also, 4 articles were carried out in scale development/adaptation/testing, 3 articles were carried out in curriculum evaluation and 2 articles were carried out in learning. Frequency values about instruction have been given in Table 10.

Table 10: *Instruction*

Instruction			
Category	**f**	**Category**	**f**
Computer assisted instruction	40	Constructivism	1
Project based learning	3	Concept caricatures	1
Cooperative learning	1	Teaching Learning Strategies	1

When articles with the subject "instruction" are analyzed, it is seen that most of the articles were carried out in the subject "computer assisted instruction" (f=40). Frequency values about the subject "student-teacher characteristics" have been given in Table 11.

Table 11: *Student-Teacher Characteristics*

Category	**f**	**Category**	**f**
Attitudes/preferences towards teaching profession	13	Critical thinking skill	2
Self-efficacy perception/belief	23	Computer/technology literacy	11
Teacher competencies	7	Media literacy	1
Attitude toward the lesson	8	Other	2
Problem solving skill	3		

Mostly, subjects; self-efficacy perception (f=23), attitude/preference towards teaching profession (f=13), computer/technology literacy (f=11), attitude towards the lesson (f=8), teacher competencies (f=7) and problem solving skill (f=3) were studied in the subject "student-teacher characteristics". Frequency values about the subject "training technologies" have been given in Table 12.

Table 12: *Training Technologies*

Category	**f**	**Category**	**f**
ICT	23	Material development	8
Virtual education	18	Course book evaluation	4
Training technologies	16	Use of equipment	3
Internet	15	PowerPoint presentations	1
Educational software	8		

Considering the Table 12, it is seen that mostly, subjects; information and communication technology (f=23), virtual education (f=18), training technologies (f=16), internet (f=15), education software and material development (f=8), course book evaluation (f=4) and use of equipment (f=3) were studied within the framework of the subject "training technologies".

Discussion and Conclusion

In this research, it is aimed to evaluate the articles published in the field of "Computer Education Technologies" in the years between 2005-2013 in Turkey in terms of publication year, the number of authors, method, data collection tool, characteristics of the samples, data analysis techniques, fields of the subjects and subjects and to determine the research trends in the field of "Computer Education Technologies". For this purpose, the following conclusions have been drawn:

The articles published in the years between 2005-2013 have pursued a graph showing an increase year by year. Thus, it can be said that the developments in Computer Education

Technologies increase day by day, that the increase affects the field of education and that there is a need for further researches. Most of the articles (77.3%) have one author or two authors. There is a trend that articles have no more than three authors. Most of the articles (87.6%) are in research-review type, and the vast majority of these articles (72%) are based on quantitative method. Most of the theses (70.7%) in the study that Şimşek et al. (2008) evaluated 82 master's theses are based on quantitative method. Erdem (2011) suggested that the vast majority of scientific researches in the field of education in Turkey had been based on quantitative method. Erdoğmuş and Çağıltay (2009) determined in their study on master's and doctoral theses that quantitative research type had been used in theses. That quantitative method has been preferred in the vast of researches shows that the researches haven't gone beyond the existing condition, that mixed methods haven't been used, and thus that the limitations occurring due to use of only quantitative or qualitative research method still continue.

When the patterns of the articles were analyzed, it was determined that mostly, non-experimental quantitative patterns had been used. The vast majority of the experimental articles (82.35%) are quasi-experimental. The vast majority of the non-experimental articles (96%) are descriptive survey type. It is determined that while 8 articles having interactive qualitative pattern are case study and 7 articles having interactive qualitative pattern are cultural analysis, there are only a few interactive studies such as phenomenology, grounded theory and action research and no study with cultural analysis. There are 30 non-interactive qualitative studies. 26 non-interactive qualitative studies (86.6%) are with concept analysis, and 4 non-interactive qualitative studies (13.4%) are with historical analysis. Hence, it can be said that there is a need for meta-analysis. 12 articles having mixed pattern are in explanatory type, and one article is in exploratory type.

In terms of data collection tools, mostly surveys or scales were used. Şimşek et al. (2008) suggested that mostly "rating scales" and secondly surveys were used in theses they analyzed. Erdoğmuş and Çağıltay (2009) similarly came to the conclusion that respectively survey, scale and achievement test had been mostly used. Thus, it can be concluded that articles in the field of Computer Education Technologies are superficial studies for due diligence rather than in-depth research. In terms of sample, mostly respectively undergraduate students (98 articles), teachers (31 articles), elementary (6-8) students (26 articles), secondary students (17 articles) and administers (7 articles) were included in studies. There is no study about preschool students, parents and inspectors. Also, the number of studies that post-graduate students, elementary (1-5) students and instructors were included are relatively less. The reason why there have been so many studies undergraduate students were included is that these students can be easily reached; the reason why there have been so few studies with other samples is that the permissions for scientific researches require long and difficult processes or that instructors prefer to lessen the time they spare for scientific studies as they have too many course loads. In addition, it can be commented that researchers in Computer Education Technologies don't show tendency to study with preschool and elementary (1-5) students as the students don't have enough physical competence to use technology. Şimşek et al. (2008) stated that mostly undergraduate students were included in the studies as it was easy to reach them.

In terms of sample size, mostly 101-300 people (71 articles) and 31-100 people (65 articles) comprise the research sample. When it is thought that quantitative studies constitute the majority of the studies, it can be said that the sample sizes in the studies are generally sufficient. In terms of data analysis techniques, respectively, t-test (86 articles), frequency/percent value (82 articles), mean/standard deviation values (56 articles), ANOVA (51 articles), MANOVA (41 articles), factor analysis (12 articles), correlation (12 articles) and

ANCOVA (6 articles) have been used most. In terms of qualitative analysis techniques, descriptive analysis (34 articles) and content analysis (28 articles) have been mostly used. Non-parametric tests, regression analysis, MANCOVA and structural equitation model are the least used analyzes. It can be interpreted that statistical analyzes such as ANCOVA and MANOVA are rarely used in the field where quantitative research rate is very high because researchers don't have enough knowledge about those techniques. Şimşek et al. (2008) determined that respectively frequency and percent values, mean, variance analysis and t-test were most frequently used.

When articles are analyzed in terms of subject, it is determined that articles have been published mostly about respectively education technologies (96 articles), student-teacher characteristics (70 articles) and teaching (47 articles). When features and scopes of the field of Computer Education Technologies are considered, it can be said that distribution in terms of the field of subjects is at the expected level. Respectively ICT (Information and Communication Technologies), virtual education, education technologies, internet, educational software, material development, course book evaluation, use of equipment and powerpoint presentations have been mostly studied; in terms of the field of subject of student-teacher characteristics, self-sufficiency perception/belief, attitude/preference towards teaching profession, problem solving skill, critical thinking skill, computer/technology literacy and media literacy have been studied; and in terms of the field of subject of teaching, computer based teaching, project based teaching, cooperative teaching, constructivism, concept caricatures and learning strategies have been studied.

Consequently, it is determined that in the articles published in the field of Computer Education Technologies in the years between 2005-2013, fewer authors, single method (quantitative or qualitative), scales in survey or likert type, easily reachable samples are chosen, and relatively easier statistical techniques are carried out, and specific sub-fields of Computer Technologies are preferred. Thus, it indicates that researchers haven't chosen in-depth research topics having different dimensions and preferred mixed methods, multiple techniques and samples from which they will able to obtain more reliable data, and hence, they have used easy statistical techniques. Thus, it can be said that researchers struggle to meet the conditions to advance in their academic career rather than to contribute to science.

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