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**DEVELOPMENT AND CURRENT STATUS OF EDUCATION RESEARCHES ON VISUALS IN TURKEY**

**ABSTRACT**

The aim of this study is to find out the development and current status of educational researches on visuals in Turkey. The data was collected in two different ways. The first way is to search of MA and PhD theses about visuals in education in Turkey. In the second way, Educational journals which are involved in ULAKBİM (Database of The Turkish Academic Network and Information Centre) are scanned. For the study, 247 graduated theses, and 157 articles published between 2002 and 2011 were selected to be analyzed according to their research area, methodology, universe, and sample. The number of researches on visuals has dramatically increased from 2002 to 2011. At the same time, studies on visuals have taken place most frequently in science education. Most of the theses and articles are experimental studies. Finally, it has been found out that maps, computer assisted materials, and web designed shapes have been investigated in graduate theses and articles.

**Keywords:** Visualisation, Visual materials, Education, Education Researches, Document Analysis

**TÜRKİYE'DE GÖRSELLER ÜZERİNE YAPILAN EĞİTİM ARAŞTIRMALARININ MEVCUT DURUMU VE GELİŞİMİ**

**ÖZET**

Bu çalışmanın amacı Türkiye'de görseller üzerine yapılmış eğitim araştırmalarının mevcut durumunu ortaya koymaktır. Veriler iki aşamada toplanmıştır. İlk olarak Türkiye'de eğitim alanında görsellerle ilgili yüksek lisans ve doktora tezleri incelenmiştir. İkinci olarak, ULAKBİM (Türkiye Ulusal Akademik Ağ ve Bilgi Merkezi) veri tabanında bulunan eğitim dergileri taranmıştır. Bu çalışmada 2002 ve 2011 yılları arasında yayımlanmış 247 tez ve 157 makale; araştırma alanı, metodu, evreni ve çalışmada kullanılan material türüne göre incelenmiştir. 2002 yılından 2011 yılına kadar görsellerle ilgili yapılmış çalışmalar çarpıcı biçimde artmıştır. Bununla birlikte, görseller üzerine yapılan çalışmalar çoğunlukla fen eğitimi alanındadır. Tezlerin ve makalelerin çoğunluğu deneysel çalışmalardır. Sonuç olarak, haritaların, bilgisayar destekli materyallerin ve web destekli materyallerin tezlerde ve makalelerde daha çok kullanıldığı tespit edilmiştir.

**Anahtar Kelimeler:** Görselleştirme, Görsel Materyaller, Eğitim, Eğitim Araştırmaları, Doküman Analizi

## 1. INTRODUCTION (GİRİŞ)

When learning notion, if a symbol or a subject is supported with a visual, learning becomes permanent. Illustrating what is stated as visualization [1] or objectifying the abstract notions is also a method that provides an observation of the invisible [2]. If knowledge is supported with visual aids or it is presented via visual ways, acquisition of knowledge by individual becomes easier [3]. Kabapınar [4] suggests that visuals assist students with using their existing thinking skills and comprehending new information. That's why visuals are essential for an effective learning which starts in the family and then gets developed in educational contexts. For the last three decades studies on visuals have had a great importance among educational researches [5]. Although there have been a lot of changes in education in recent years, visuals are one of the most prominent concepts. A great number of studies show that students who use integrated learning (diagram-based) can learn better [6, 7 and 8].

In view of the effect of classical textbooks on students' perceptions towards new learning, the importance of visuals can be understood easily. Visuals have been designed and developed mostly in order to satisfy this need. Graphics, posters, banners, pictures, photographs, cartoons, diagrams, diorams, computer assisted programs, and web based models are all used as visual elements in education. Although using visual in education has gained a huge importance, there is a lack of document analysis of "using visuals in education" in graduate theses and articles published in Turkey.

## 2. RESEARCH SIGNIFICANCE (ÇALIŞMANIN ÖNEMİ)

The goal of this research is to analyze both graduate theses and articles published in Turkey which have visual elements. That's why graduate theses and articles published in Turkey were collected to be analyzed according to their visual types, study area, methods, universe, and sample.

## 3. METHODOLOGY (YÖNTEM)

- **Research Design of the Study:** This is a content analysis study. Content analysis is described by Krippendorff [9] as follows: Content analysis entails a systematic reading of a body of texts, images and symbolic matter, not necessary from an author's or user's perspective [9]. In this study, content analysis is meant to be a process of systematic analysis of graduate theses and articles published in Turkey in 2002 and 2011 about visualization.
- **Data Collection:** The data were collected in two ways. In the first way, MA and PhD theses which consist of visual and are placed on "Council of High Education online thesis database" are collected and analyzed. Some of the theses were not be able to be reached. Researchers tried to contact authors and supervisors via email to obtain these theses. Unattained theses are described as missing data in this study. In the second way, articles in educational journals which are on ULAKBIM were selected and analyzed.
- **Data Analysis:** Both articles and theses analyzed according to their study area, methods, visual material categories, and sample in this study were published between 2002 and 2011. To highlight what visual material category means, the following definitions are presented.
- **Web-Based Material:** It is used for educational programmes that are supported via internet.

- **Education Software:** It is used for the educational and instructive software that was prepared by using formal content at digital media.
- **Computer-Aided Material:** It is used for electronic boards, DVDs, VCDs, mp3, mp4, and the materials that are prepared at computer media .
- **Usage of Maps:** It is used for the studies containing concept maps, mind maps, information maps, and conflict maps.
- **Usage of Caricatures:** It contains concept caricatures, and science caricatures.
- **Visual Perception:** It contains visual intelligence, visual memory, and visual perception concepts.
- **Visual Material:** It is used for visual images, analogies, study pages and drawings based on photos.
- **Usage of the Model:** It is used for three dimensional models such as world model and human's body model.
- **Book Design Review:** This is the evaluation of the course books, and the students books according to images, content, language, and expression.

Analyzing the data, both of the researchers categorized the graduate theses and articles separately. Inter-rater consistency was quite high (approximately %90) and disagreements were negotiated.

#### 4. FINDINGS (BULGULAR)

The findings of this study are given in tables.

Table 1. Frequencies of articles in regard to years and journals published in Turkey

(Tablo 1. Türkiye’de yayımlanmış makalelerin yıllara ve dergilere göre frekansı)

Journal	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	TN
GK				1							1
CEJ			1				1				2
JKEF					1	2	2	5	3	4	17
ESTP		1		1		1	1		5	1	10
MAEU							3				3
UJEF								2		1	3
AUJ				1			1	1			3
EJEF		1					2	1		1	5
MU						1	1				2
TUSED			1	1	2	1	4		6	1	16
BU							1	2	1	5	9
NE			1	2	1	4	1	1	5	1	16
OMU				1	2	1		3	2		9
KEJ		3	2	1	2	1	1	3	2	3	18
CDE					1						1
ÇU				2		2			1	1	6
JTES			1		1	3		1	1	2	9
ES			1		2		1	2	2	2	10
EJER			1	3	2	2	4	5			17
TN		5	8	13	14	18	23	27	28	21	157

Key Note: **GK:** Gazi University Journal of Kırşehir Education Faculty; **CEJ:** Contemporary Education Journal; **JKEF:** Ahi Evran University Journal of Kırşehir Education Faculty; **ESTP:** Educational Sciences: Theory & Practice; **MAEU:** Mehmet Akif Ersoy University Journal of Education Faculty; **UJEF:** Uludağ Journal of Education Faculty; **AUJ:** Ankara University Journal of Education Faculty; **EJEF:** Erzinçan Journal of Education Faculty; **MU:** Mersin University Journal of the Faculty of Education; **TUSED:** Journal of Turkish Science Education; **BU:** Balıkesir University Journal of Necatibey Education Faculty; **NE:** Journal of National Education; **OMU:** Ondokuz Mayıs University Journal of Education; **KEJ:** Kastamonu University Kastamonu Education Journal; **CDE:** Child Development and Education;

**ÇU:** Çukurova University Faculty of Education Journal; **JTES:** Journal of Turkish Educational Sciences; **ES:** Education and Science; **EJER:** Eurasian Journal of Educational Research; **TN:** Total Number

The number of articles according to years is presented in Table 1. Frequency of the studies in 2009 is 27, in 2008 it is 23, in 2006 it is 14, and in 2005 it is 13. Researches consist of visual elements have increased by the years.

Frequency of articles according to years of publication and study area is presented in Table 2. 29 of the studies are in science education, 21 of the studies are in biology, 19 of the studies are in chemistry education. On the other hand, there are 6 studies in language education and 8 studies in social science.

There are 157 data in Table 1 and 158 data in Table 2. Although it seems to be as an inconsistency between tables it can be explained as the involvement of a study in two different study areas.

Table 2. Frequencies of articles in regard to education field (EF)  
 (Tablo 2. Eğitim alanlarına göre yayımlanmış makalelerin frekansı)

EF	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	TN
CIT			1	2	2	3	3	1	2	3	17
CDE			1	2	2				1	2	8
SE		2	1	2	2	2	3	6	2	9	29
CT						1		1		1	3
TE							1	1	4		6
SSE					1	1	1	2	3		8
BE			1	2	4	3	3	3	3	2	21
ME		1				2	2			1	6
PE		1	3	1				1	5	1	12
LE						1	2	3	1	1	8
CE		1	1	3	2	2	5	1	3	1	19
GE						1	2	2			5
LSE						1			2		3
GEE						1					1
TSE								1			1
EPT							1	2	2		5
HE				1							1
SNT					1			1	2		4
TLLE								1			1
TN		5	8	13	14	18	23	26	30	21	158

Key Note: **CIT:** Computerized Instructional Technology; **CDE:** Child Development and Education; **SE:** Science Education; **TE:** Turkish Education; **SSE:** Social Science Education; **BE:** Biology Education; **ME:** Mathematics Education; **PE:** Physics Education; **LE:** Language Education; **CE:** Chemistry Education; **GE:** Geometry Education; **LSE:** Life Science Education; **GEE:** Geography Education; **TSE:** Traffic Safety Education; **EPT:** Education Programs and Teaching; **HE:** History Education; **TLLE:** Turkish Language and Literature Education; **TN:** Total Number

Table 3. Frequencies of articles in regard to kind of the used visual material

(Tablo 3. Kullanılan materyal çeşidine göre yayımlanmış makalelerin frekansı)

Material Kind	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	TN
PU				1				1			2
ES						3	1	3	1	2	10
VD				1	1	1	3	2			8
VL								1	1		2
OP							1				1
TVU									1	1	2
MU		1	2			1	1		2	1	8
BDR		1	2	2	1	1		1	3	1	12
US		1		1	1		1		1	1	6
UA					1		1	2	1		5
PP							1			1	2
LG						1		1			2
CAM		1	2	4	4	7	5	5	1	5	34
WBM			1		1	1	2	1	3	4	13
UVM		1		1	1		1	4	3	2	13
VP					1	1		1		1	4
UC				1			1	3	4	2	11
UM			1	2	3	1	6	2	7	2	24
SGE						1			2		3
CG								1			1
TN		5	8	13	14	18	24	28	30	23	163

Key Note: **PU**: Photo Usage; **ES**: Educational Software; **VD**: V-Diagram; **VL**: Visual Literacy; **OP**: Use of Overhead Projector; **TVU**: TV Using; **MU**: Model Use; **BDR**: Book Design Review; **US**: Use of Simulation; **UA**: Use of Animation; **PP**: Powerpoint; **LA**: Logo Aided; **CAM**: Computer-Aided Material; **WBM**: Web-Based Materials; **UVM**: Use of Visual Materials (pictures etc.); **VP**: Visual Perception; **UC**: Using Cartoon; **UM**: Use of Maps (Concept Maps-Mind Maps-Information Maps-Story Maps); **SGE**: Schematic and graphic editors; **CG**: Configured Grid; **TN**: Total Number

Frequency of articles according to years of publication and study area is presented in Table 3. Computer aided materials are the most frequently used materials as visual. Maps (information maps, mind maps, concept maps) are second most frequently used visual materials. Analyzing Table 1 and Table 3 numbers of data are not equal because six articles have more than one visual element. These six studies were conducted in 2008, 2009, 2010, and 2011.

Table 4 shows that 87 of the studies are experimental, 7 of the studies are case study, 8 of the studies consist of both qualitative and quantitative methods, and 2 of them are document analysis.

Table 4. Frequencies of articles in regard to research methodology  
 (Tablo 4.Araştırma yöntemine göre yayımlanmış makalelerin frekansı)

Methodology	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	TN
CoS											0
DA									1	1	2
MA							1	1			2
CaS				1	1	1	1	2		1	7
DS		1	1	1	1	2		2	3	1	12
AR											0
S		1	2	4	2	2	2	8	5	2	28
ACOQM						1	1	1	5		8
Nitel		1			1		3	1	5	2	13
ES		2	5	8	9	12	14	13	10	14	87
TN		5	8	14	14	18	22	28	29	21	159

Key Note: **CoS**: Comparative Study; **DA**: Document Analysis; **CaS**: Case Study; **DS**: Descriptive Study **AR**: Action Research; **S**: Survey; **ACOQM**: A combination of qualitative and quantitative methods; **ES**: Experimental Study; **TN**: Total Number

Table 5. Frequencies of articles in regard to grade (the study's sample)

(Tablo 5.Örnekleme göre yayımlanmış makalelerin frekansı)

Sample	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	TN
5Y					1					2	3
6Y					1					1	2
P1							1			1	2
P2											0
P3					1	1					2
P4		1		1			1	3	2	1	9
P5				1	1	1	2	2	2		9
P6				2		1		3	4	2	12
P7		1		2	1	3	2	1	1	4	15
P8		2		3		1	3	1	1	1	12
S9			2	2	1	3	2		1		11
S10		2	3	3	1		3	1	1	1	15
S11		1	1	1			2			1	6
S12			1	1			2				4
U			1	3	6	5	5	9	10	7	46
DS								3	1		4
T			1			1	4	4	3	2	15
MPAS					1	1	1		1		4
TB		1	1	2	1	1			2	1	9
FTB											0
GS									1		1
VSS									1		1
FM			1					1			2
TN		8	11	21	15	18	28	28	31	24	184

Key Note: **5Y**: 5 Year-Old Children; **6Y**: 6 Year-Old Children; **P1**: Primary Students of 1st grade; **P2**: Primary Students of 2nd grade; **P3**: Primary Students of 3rd grade; **P4**: Primary Students of 4th grade; **P5**: Primary Students of 5th grade; **P6**: Primary Students of 6th grade; **P7**: Primary Students of 7th grade; **P8**: Primary students of 8th grade; **S9**: Secondary students of 9th grade; **S10**: Secondary students of 10th grade; **S11**: Secondary students of 11th grade; **S12**: Secondary students of 12th grade **U**: Undergraduate students; **DS**: Disabled students; **T**: Teachers; **MPAS**: Materials Preparation Academic Studies (Literature search 'visual' of the concept described in the examples presented and applied studies on the sample, and theses, and articles); **TB**: Textbooks; **FTB**: Foreign Textbooks; **GS**: Graduate Students; **FM**: Faculty Member; **TN**: Total Number

Table 5 shows that 46 of the studies' samples have undergraduate students and 15 of the studies' sample have 7<sup>th</sup> and 9<sup>th</sup> grades students. At the same time teachers are in the sample of 15 studies and 4<sup>th</sup> grade students are in the sample of 9 studies.

When Table 1 is analyzed; while in journals there are 157 data about visual elements, in Table 5, this number increases to 184. This means that, in 157 studies done, the samples are more than one.

Table 6. Frequencies of graduate theses in regard to years  
 (Tablo 6. Yıllara göre yayımlanmış tezlerin frekansı)

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	TN
RD	5	3	3	11	42	43	36	33	42	29	247
MD	15	30	19	31	4	1	2	7	16	22	147
TN	20	33	22	42	46	4	38	40	58	51	394

Key Note: **RD**: Reached Data; **MD**: Missing Data; **TN**: Total Number

Table 7. Frequencies of the graduate theses in terms of year, university name and type of the graduate thesis submitted  
 (Tablo 7. Yıllara, Üniversiteye ve türüne göre tezlerin frekansı)

Year	University Name	MSc	PhD
2002	Anadolu University	1	-
	Ankara University	-	1
	Marmara University	2	-
2003	Anadolu University	1	-
	Dokuz Eylül University	-	1
	Marmara University	1	-
2004	Anadolu University	1	-
	Balıkesir University	1	-
	Dokuz Eylül University	-	1
2005	Abant İzzet Baysal University	2	-
	Anadolu University	1	-
	Balıkesir University	2	-
	Çukurova University	1	-
	Hacettepe University	2	-
	Marmara University	1	-
	Pamukkale University	1	-
Selçuk University	1	-	
2006	Abant İzzet Baysal University	3	-
	Ankara University	-	1
	Atatürk University	2	-
	Balıkesir University	1	-
	Celal Bayar University	3	-
	Çukurova University	2	-
	Dokuz Eylül University	2	-
	Fırat University	1	-
	Gazi University	10	1
	University Name	MSc	PhD
	Hacettepe University	1	-
	Karadeniz Technical University	1	-
	Marmara University	5	1
	Middle East Technical University	1	-
	Osmangazi University	1	-
	Selçuk University	4	-
Yeditepe University	1	-	
Yüzüncü Yıl University	1	-	
2007	Anadolu University	1	-
	Ankara University	1	1
	Bilkent University	1	-
	Celal Bayar University	1	-
	Çanakkale Onsekiz Mart University	2	-
	Çukurova University	3	-
	Dokuz Eylül University	3	1
	Gazi University	10	-
	Karadeniz Technical University	1	1
Hacettepe University	1	-	

	Marmara University	2	1
	Muğla University	2	-
	Niğde University	1	-
	Ondokuz Mayıs University	2	-
	Osmangazi University	3	-
	Sakarya University	1	-
	Selçuk University	3	1
2008	Abant İzzet Baysal University	2	-
	Afyon Kocatepe University	1	-
	Anadolu University	1	-
	University Name	MSc	PhD
	Atatürk University	1	-
	Çanakkale Onsekiz Mart University	2	-
	Çukurova University	1	-
	Dokuz Eylül University	1	2
	Fırat University	1	-
	Gazi University	6	4
	Karadeniz Technical University	1	-
	Marmara University	2	1
	Middle East Technical University	1	-
	Muğla University	1	-
	Mustafa Kemal University	1	-
	Niğde University	1	-
	Ondokuz Mayıs University	1	-
	Osmangazi University	1	-
	Selçuk University	4	-
2009	Abant İzzet Baysal University	1	-
	Ankara University	1	-
	Atatürk University	1	1
	Bahçeşehir University	1	-
	Boğaziçi University	1	-
	Celal Bayar University	1	-
	Çukurova University	1	-
	Ege University	2	-
	Gazi University	6	1
	Gaziosmanpaşa University	1	-
	Hacettepe University	1	-
	İstanbul University	1	-
	Kafkas University	1	-
	Karadeniz Technical University	2	-
	University Name	MSc	PhD
	Marmara University	5	-
	Mersin University	-	1
	Middle East Technical University	-	1
	Osmangazi University	1	-
	Sakarya University	1	-
	Süleyman Demirel University	1	-
	Uludağ University	1	-
2010	Abant İzzet Baysal University	1	-
	Anadolu University	1	-
	Afyon Kocatepe University	1	-
	Bülent Ecevit University	1	-
	Çanakkale Onsekiz Mart University	1	-
	Çukurova University	1	-
	Dicle University	-	1
	Dokuz Eylül University	2	-
	Ege University	2	-
	Fırat University	1	-
	Gazi University	8	2
	Gaziosmanpaşa University	1	-
	Hacettepe University	1	-
	Karadeniz Technical University	2	-

	Koç University	1	-
	Marmara University	4	-
	Middle East Technical University	-	1
	Muğla University	2	-
	Niğde University	1	-
	Ondokuz Mayıs University	1	-
	Osmangazi University	1	-
	Recep Tayyip Erdoğan University	1	-
	University Name	MSc	PhD
	Sakarya University	1	-
	Selçuk University	2	-
2011	Anadolu University	1	-
	Balıkesir University	1	-
	Dokuz Eylül University	1	1
	Erzincan University	1	-
	Gazi University	6	3
	Karadeniz Technical University	4	-
	Marmara University	3	-
	Recep Tayyip Erdoğan University	1	-
	Selçuk University	3	1
	Süleyman Demirel University	1	-
	Yıldız Technical University	1	-
	Yüzüncü Yıl University	1	-
Total Number		215	32

According to Table 6 and Table 7, 247 theses collected for this study include visual elements. Frequency of theses according to years is: 42 in 2005, 46 in 2006, 38 in 2008, 40 in 2009, 58 in 2010 and 51 in 2011. As a result, number of theses on visuals has increased dramatically in recent years.

Table 8. Frequencies of graduate theses in regard to education field  
 (Tablo 8. Eğitim alanlarına göre tezlerin frekansı)

EF	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	TN
I					1	1	1		1		4
CIT			1	1	2	5	1	7	1	3	21
CDE	2	1		1	1	1		1	1		8
SE	1		1	2	11	6	5	8	12	4	50
CT				1					1	1	3
TE				1	7	2	4	4	3	2	23
SSE					5	5	6		4	3	23
BE	1			1	2	1	2		2		9
ME		1	1	1		5	6	3	2	5	24
PE				1	1	3	2	2	3	1	13
LE	1				1	4	3	2	2	1	14
CE				1		2	2	2	2	2	11
RCME					2	1	1		1		5
TSE					1		1				2
RHKE					1	1	1		2		5
TLLT						2		1			3
GE					1			2	3	1	7
HE					1	1				1	3
GEE		1			2	1	2	1	2	2	11
EPT				1	1	2	2	1			7
LSE									1	1	2
MUE									1		1
SNE					1				2	3	6
PES					1						1
MD	15	30	19	31	4	1	2	7	16	22	147
TN	20	33	22	42	46	44	41	41	62	52	403

Key Note: **I**: Image Education; **CIT**: Computerized Instructional Technology; **CDE**: Child Development and Education; **SE**: Science Education; **CT**: Classroom Teaching; **TE**: Turkish

Education; **SSE**: Social Studies Education; **BE**: Biology Education; **ME**: Mathematics Education; **PE**: Physics Education; **LE**: Language Education; **CE**: Chemistry Education; **RCME**: Religious Culture and Moral Education; **TSE**: Traffic Safety Education; **RHKE**: Revolution History and Kemalism Education; **TLLT**: Turkish Language and Literature Teaching; **GE**: Geometry Education; **HE**: History Education; **GEE**: Geography Education; **EPT**: Education Programs and Teaching; **LSE**: Life Science Education; **MUE**: Music Education; **SNE**: Special Needs Education; **PES**: Physical Education and Sports; **MD**: Missing Data; **TN**: Total Number

Theses are analyzed according to study area. Results show that the most frequently studied area is science education (50) and mathematics education (24).

For this research, 247 theses about visuals in Turkey were collected. Besides unreached data, there are much more data than collected as some of the theses involve more than one study area.

Table 9. Frequencies of graduate thesis in regard to used visual material kinds

(Tablo 9. Görsel materyal çeşidine göre tezlerin frekansı)

Material Kind	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	TN
PU						1			1	1	3
ES		2		2	2	2	1	2	2	3	16
VD			1	1	1				1		4
VL					2		3				5
OP											
TVU					1	1		1	3	4	10
MU					2		1		1	2	6
BDR				1		5	5	2	3	1	17
US								1	1	1	3
UA					1	2	1	2	5	2	13
PP					1						1
CAM					1		2	2	3		8
WBM	1		1		1	7	2	8	6	6	32
UVM	1	4		1	4	5	8	2	4	2	31
VP	1			2	1	1		2	3	1	11
UC					2	6	6	6	6	3	29
UM	2		1	6	22	10	9	10	13	9	82
CG						1	1	1	1	2	6
MD	15	30	19	31	4	1	2	7	16	22	147
TN	20	36	22	44	45	42	41	46	69	59	424

Key Note: **PU**: Photo Usage; **ES**: Educational Software; **VD**: V-Diagram; **VL**: Visual Literacy; **OP**: Use of Overhead Projector; **TVU**: TV and Video Using; **MU**: Model Use; **BDR**: Book Design Review; **US**: Use of Simulation; **UA**: Use of Animation; **PP**: Powerpoint; **CAM**: Computer-Aided Material; **WBM**: Web-Based Materials; **UVM**: Use of Visual Materials; **VP**: Visual Perception; **UC**: Using Cartoon; **UM**: Use of Maps (Concept Maps-Mind Maps-Information Maps); **CG**: Configured Grid; **TN**: Total Number

Table 9 shows that there are 247 theses about visual elements and frequency of them according to types of visual materials are: 82 maps, 32 web based materials, 31 visual materials, 11 visual perception, 10 TV and video. There are 16 studies which have software. V-diagram, photograph, overhead projector, PowerPoint and configured grid are used in one study.

According to Table 10, 160 of the theses about visual are experimental study, 69 of them are survey, 10 of them are case study, 4 of them descriptive, and one of them is action research. For this research 247 thesis were collected and analyzed. The theses which could not be reached are described as missing data. 4 of the theses have more than one method. So, there are 247 theses in Table 6 and 251 theses in Table 10.

Table 10. Frequencies of graduate theses in regard to research methodology

(Tablo 10. Araştırma metoduna göre tezlerin frekansı)

Methodology	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	TN
AR						1					1
CaS				1	1	1	2	1	3	4	10
DS					1	1	2				4
S	1	2	2	3	9	16	11	7	11	7	69
ES	4	1	1	7	32	24	23	24	26	18	160
ACOQM						1					1
OI								1	1		2
DA						2	1				3
MA								1			1
MD	15	30	19	31	4	1	2	7	16	22	147
TN	20	33	22	42	46	47	39	41	57	51	398

Key Note: **AR**: Action Research; **CaS**: Case Study; **DS**: Descriptive Study; **S**: Survey; **ES**: Experimental Study; **ACOQM**: A combination of qualitative and quantitative methods; **OI**: Observation and Interview; **DA**: Document Analysis; **MA**: Meta Analysis; **MD**: Missing Data; **TN**: Total Number

Table 11. Frequencies of graduate theses in regard to grade (the study's sample)

(Tablo 11. Örneklemine göre tezlerin frekansı)

Sample	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	TN
5Y	1				1	1					3
6Y	1			1	1	1					4
P1	1	1		1							3
P2	1	1		1							3
P3	1	1		1							3
P4	1	1		2	3			2	2	3	14
P5	1	1	1		2	3	3	3	1	2	17
P6	1	1		1	7	7	8	4	8	5	42
P7	1			1	9	5	4	5	4	5	34
P8				1	2	3	6	2	4	6	24
S9	2	2		1	3	2	4	2	2		18
S10		1			1	6	6	1	2		17
S11		1			3	2	2	2	2		12
U			1	1	2	5	2	4	6	5	26
EWS			1								1
DS				1	1			2	2	1	7
T		2			2	6	5	1	8	4	28
MPAS					3			1			4
FTB				1		6	3	1	2		13
UP				1							1
VSS				1	1	2		1	1		6
GS						1				1	2
FM								1		1	2
I									1		1
F										1	1
MD	15	30	19	31	4	1	2	7	16	22	147
TN	26	42	22	46	45	51	45	39	61	56	433

Key Note: **5Y**: 5 Year-Old Children; **6Y**: 6 Year-Old Children; **P1**: Primary Students of 1st class; **P2**: Primary Students of 2nd grade; **P3**: Primary Students of 3rd grade; **P4**: Primary Students of 4th classgrade; **P5**: Primary Students of 5th grade; **P6**: Primary Students of 6th grade; **P7**: Primary Students of 7th grade; **P8**: Primary students of 8th grade; **S9**: Secondary students of 9th grade; **S10**: Secondary students of 10th grade; **S11**: Secondary students of 11th grade; **U**: Undergraduate students; **EWS**: Educational Web Sites; **DS**: Disabled students; **T**: Teachers; **MPAS**: Materials Preparation Academic Studies (Literature search 'visual' of the concept described in the examples presented and applied studies on the sample); **TB**: Textbooks; **FTB**: Foreign Textbooks; **UP**: Undergraduate Programs; **VSS**: Vocational School Students; **GS**: Graduate Students; **FM**: Faculty Member; **I**: Inspector; **F**: Family members of students; **MD**: Missing Data; **TN**: Total Number

Table 11 shows that 6<sup>th</sup> grade students are the most frequently involved in samples of the thesis. Other important groups involved in samples are textbooks in 12 studies, and undergraduate students in 13 studies.

Comparing Table 8 and Table 11, it can be concluded that some theses have more than one sample.

##### **5. DISCUSSION AND IMPLICATIONS (TARTIŞMA VE SONUÇ)**

"Interest in research on the nature of drawing and evidence of learning by drawing is growing in the Learning Sciences" [10]. Parallel to findings of this research, the number of studies on visuals in education increased between 2002 and 2011 in Turkey. Most of the studies were investigated in 2008. But there is a decrease in the number of studies in 2010 compared to 2009. Some of the studies could not be reached because they were still in publishing process. Parallel to findings, there is a significant increase in the number of theses between 1987 and 2011. The most significant increase has become since 2002. Between the years 2010 and 2011 there was not an increasing. Among educators and psychologists, there is a widespread agreement that advanced skills such as reasoning, composition and experimentation needs interaction with content rather than transformation of knowledge. Using visuals in the content and instructional activities is one of the most important ways of creating learning and interaction in science education.

As a result of this study, it is determined that science education is the most frequently area in which visual is used. Çalık and others [11] stated that science education has been a new research field in Turkey. Moreover, the study on visual elements in science education has increased since 1987. Science can be more comprehensible for students when it is supported with visual elements. Therefore, children should be encouraged to depict their perceptions of natural objects and events in drawings and diagrams [12 and 13].

It is seen that book design review has importance as visual material kind. Books should be supported with visual items for an effective education [14]. Moreover, visuals must be carefully selected in books [15]. Therefore; book design review has found many places in this research. Especially, kids do not read so much except for their school books because television and computer bring easier way of communication [16]. This is important in terms of quality. It is also seen that web based materials and computer based materials have important place as visual material. This shows us the importance of technology integrated education [17].

It is determined that experimental study method is the most common research method in articles and graduate theses. And it shows that comparing the studies that contain visual items to the studies that do not contain visual items might be easy for researchers. It is known that Action Researches and Case Studies have been used in recent years in Turkey [11]. Hence, it is not ordinary to use these methods so much in the studies including visual items. From now on, it can be suggested that it is useful to use qualitative methods in the studies which are based on visual items.

Participants of most of the articles and the theses are primary school students. Hence, one can understand that visual items attract primary school students' attention much more than the others. Most of the samples in the studies are sixth grade students. We can clarify why the sixth grade students are important for samples; the students in primary schools learn from just one teacher from 1st to 5th grade. According to new curriculum, even though it is suggested that branch teachers can teach Maths, Science, and Technology courses in 4th and



5th grades, it seems impossible for the primary schools in Turkey. Therefore, when students become sixth grade, they have to learn classes from different teachers and their different styles in the lesson. Until the age of 11, students in Turkey learn Maths or Science and Technology just for fun. But in sixth grade they are expected to have enough consciousness to learn these lessons for a real aim. This consciousness expected by adults makes the students much more stressful. Thus, choosing the sixth grade students as sample in the studies can be explained as an effort to examine the changes in perception of the students that come from 5th grade to 6th grade. There are only a few studies whose samples are teachers. It was stated that student teachers could not draw their own diagrams [18]. Because of the importance of the visuals in education, we recommend that student teachers and teachers be taught how to use visuals in the classroom. It was mostly applied to undergraduate students due to appropriate classroom environments in which both researchers and students get together. From past to present, it is hoped that this research shows the way to the ones who wants to study on visual items in education.

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