



7th International Symposium of Interactive Media Design

DYNAMIC TYPOGRAPHY IN SCREEN DESIGN

HATİCE ÖZ, Assistant. Prof.Dr.
Maltepe University, TURKEY
haticeoz@maltepe.edu.tr

Hatice ÖZ was born in 6 March 1977 in Antalya, Elmalı. She was graduated from the Burdur Anatolian Teacher High School in 1995. She studied her BA in the Graphics Department of Hacettepe University Faculty of Fine Arts (1995-1999); and received her MA in Graphics from Hacettepe University Institute of Social Sciences (1999-2002) with the thesis entitled "The Use of Digital Portfolio for Individual Presentation and Digital Portfolio Applications". In 2006, she received the proficiency in arts degree from the same department with the thesis entitled "Analysis of Movie Credits In Terms of Graphic Design". Between the years of 1999-2006, she worked as research assistant in the Graphics Department of Hacettepe University Faculty of Fine Arts. In 2006, she began work as assistant professor in the Department of Visual Communication Design at Maltepe University Faculty of Communications. She has been working as the Chair of the same department since 2007.

Keywords: type in motion, kinetic typography, screen design

ABSTRACT

Typography is used in screen design by primarily considering legibility. The technical factors that the screen requires need to be taken into consideration. The screen affects the character selection, size of type and color in typography.

Typography stays on the screen as image for a couple of seconds, and therefore, it should attract attention within this time. Thus, the duration and the appearance of the color used on the screen should also be considered. Moreover, the size of type is an important element in terms of the script-image correlation.

In typography selection, the target group, genre and subject are also considered. The position of the typography on the screen is determined according to its relationship with the image used with it.

Typography should also be suitable to the time and space in the design. There exist numerous dynamic design works that do not reflect its day or typographies that are not suitable to the atmosphere of the design are used. Typography should be used consciously, like many other elements in the visual structure of the screen design. Since many outdated fonts are accessible today electronically, it is possible to attain the right typography.

In the study entitled "Dynamic Typography in Screen Design"; the importance of typography in design, its features of usage and the principles that need to be considered when using typography in dynamic graphic design were examined.



7th International Symposium of Interactive Media Design



7th International Symposium of Interactive Media Design

TYPOGRAPHY

Writing enables the transmission of ideas and information through signs. "Typography in graphic design is considered to be an element which enables the transmission of information and message through an understandable form language, and an element which represents a style, an identity, a visual language and a different image" (Uçar, 2004, s.106). The term typography started to be used after Gutenberg's metal printing types. Typography is now used to express a broader meaning. Typography now is defined as "the visual, functional and aesthetic arrangement of letters and other elements related to the written-visual communication, and a design language and understanding composed of these elements" (Sarıkavak, 2004, p.10). According to Tevfik Fikret Uçar, "Typography is the existence reflection of the language and humankind reflected on forms and shapes" (Uçar, 2004, p.24).

Typography is one of the most important elements in screen design. The classical typography is based on readability and aesthetic values. The important feature of screen typography is its readability. The design should attract the viewer before the act of reading starts. In screen design, "the designer combines the content of the text with a new shape. He solves the conceptual problem with a visual language and then a graphic design work appears. An ordinary text turns into a design element and becomes a part of the visual culture" (Uçar, 2004, p.94)

In order to use typography in screen design expediently, it is necessary to know well its structure, components and historical development. A motion graphic designer should be able to base his work on communication, which is the main function, by using the shapes of letters; as well as targeting to create an aesthetic, conceptual and original work.

There exist several typographic elements that need to be considered in the use of typography in screen design: the letter's form and size, the selection of typeface, the adjustment of spaces, the arrangement of the text, the use of upper and lower case letters, special effects, text-content relationship, text-color relationship, text-animation relationship and text-sound relationship. Although the effects of these elements to the design differ according to the design environment, they are valid for means of communication such as movies, television, video and computer. It can be thought that some principles blind creativity in design, however, experimental works should be carried out by knowing these principles.

The Anatomy of the Letter

"Letter is the most essential component of typographic arrangement." (Sarıkavak, 2004, p.15) Several terms are used while talking about the structure of the letter in studies on the issue of writing. The vertical distance between the upper and lower lines is called "the height of the letter", the horizontal distance between the upper and lower lines covered by the letter is called "the width of the letter", and the flesh part that constitutes the body is called "the thickness of the letter" (Istek, 2004, p.9). The extensions of the main lines of letters located in the lower and upper edges in the form of a nail are called "serif".

"Today's typographic characters have emerged after a long evolution that started with handwritings. The main component of a letter is linear touches and strokes. Writing instruments such as brush, reed pen and gouge have directly influenced letter shapes" (Becer, 1997, p.176).

"Font" is the series of a typographic character composed of letters, numbers, punctuations and other symbols. The essential components of a font are upper-case letters, lower-case letters, numbers, punctuations, mathematical symbols, accents and logogram. Typographic characters are designed by considering optical criteria. Pierre Simon Fournier de Jeune, French type designer, initiated the standardization of typographic sizes by developing a measurement system based on the point system. Point is a unit of measurement that is valid internationally today. 1 point is equal to 0.37583 mm (Becer, 1997, p.180).

Letter shapes and other typographic characters are displayed as pixels on the computer screen. Screen fonts are dependent on resolution. (Woolman, 2004, p.28).

The distance between the viewer and the screen should be considered when selecting letter size in screen design. Another criterion to be considered in the determination of letter size is the characteristics of viewers. "Big-point letters should be preferred for children who just learned to read and for adults who have visual difficulty" (Becer, 1997, p.186).

Typeface Selection

The selection of the typeface to be used in screen design is also important. "In order to make a good selection, it is necessary to have a typographic culture and to be able to read the language of shapes" (Uçar, 2004, p.125). bear the traces of the main concept, time, and trends and visual language of the era in which they are designed. Each typography has a distinctive character, style and a formal language. This identity may be serious, confidential and noble as well as being joyous, intimate, enthusiastic and entertaining. A motion graphic designer should know this language and its combinations and be able to comprehend the formal language while using typography.

"What the typeface to be used represents and what kind of sensations it stimulates in the viewer should be taken into consideration. In addition, the selection of typeface, which is a method that can be used in the reflection of the content, enters into direct connection with the message" (Kılıç, 2005, p.128).

There exist different approaches and methods in the classification of such as classifications according to their places of use, their shapes and historical processes. Typographic characters can be classified under the categories of; engraved typefaces, traditional typefaces, transition period typefaces, humanistic typefaces, modern typefaces, typefaces with square-serif, sans serif typefaces, gothic typefaces, handwritings, graphic typefaces, digital typefaces and foreign typefaces (Becer, 1997, p.177-179) (Sarıkavak, 2004, p.67).

- Engraved Typefaces: "that look to have been shaped or engraved by gouge and hammer rather than being typographical" (Sarıkavak, 2004, p.67).

- Traditional Typefaces: Serifs of these, which have the circular and organic shape of hand-



7th International Symposium of Interactive Media Design



7th International Symposium of Interactive Media Design

writings, are curved and elbow-shaped. The axis of thinning in circular shapes is diagonal. There exists a very slight contrast between thin and thick lines. Main examples: Garamond, Caslon, Goudy, Palatino,... (Becer, 1997, p.177-178). "A research carried out in the US has revealed that texts with serif are more readable in long texts. Serifs support the horizontal movement of typography and accentuate letters' distinctive features" (Becer, 1997, p.186).

- Transitional Typefaces: There exists a more explicit contrast between the thin and thick lines of these typefaces compared to traditional typefaces. Serifs have a more horizontal inclination. The axis of thinning in circular shapes is nearly vertical. Letters have been broadened further with the influence of the Baroque era. Main examples: Baskerville, Perpetua, Caledonia,... (Becer, 1997, p.178).

- Humanistic Typefaces: Axes of bows are inclined to the left; and there is not an intense contrast between thin and thick accents" (Sarıkavak, 2004, p.67). Main examples: Verona, Contour, Kennerly,...

- Modern (Contemporary) Typefaces: The contrast between thin and thick lines in modern typefaces is at the maximum level. Thin lines are transformed into straight lines. The axis of thinning in circular shapes is vertical. Serifs with the same thickness as thin lines and look like horizontal lines are tied to the body with a right angle. Geometric rules are essential in letters' anatomy. Main examples: Bodoni, Didot, Walbaum, Torino,... (Becer, 1997, p.178).

- Typefaces with Square Serif: The common characteristic of typefaces in this category is that serifs are square or rectangular-shaped. Serifs, as is the case in modern typefaces, are tied to the body of the letter with a right angle. The contrast between thin and thick lines has decreased. All lines have the same thickness in some characters. Main examples: Beton, Rockwell, Clarendon, Playbill,... (Becer, 1997, pp.178- 179).

- Sans Serif (Linear) Typefaces: All lines are at the same thickness in sans serif typefaces. The axis of thinning in circular shapes is always vertical. They are designed with a geometrical understanding. Main examples: Futura, Helvetica, Avant-Garde, Gill, Universe,... (Becer, 1997, p.179).

- Gothic Typefaces: The first example of the Gothic writing tradition is the "Textur" typefaces commonly used in the 15th Century Germany. Circular elements are annihilated in these narrow and long typefaces that bear the typical characteristics of the Gothic art. The influence of clipped pencils is observable in its anatomy. Main examples: Gothic, Fraktur, Schwabacher, Old English,... (Becer, 1997, p.179).

- Handwritings: Among the main examples of these writings that are designed based on the free and fluent formal features of handwritings are; Brush Script, Vivaldi, Mistral, Brody, Palace Script,... (Becer, 1997, p.179).

- Graphic Typefaces: "Unlike more free script styles, It is the font design in which all characters are specified and designed by drawing in a special format." Main examples: Libra, Cartoon, Dom Casual,... (Sarıkavak, 2004, p.67).

- Digital Typefaces: "They are the font designs that not only are the digitalization of formerly

created fonts but also include the influences of the computer technology" (Sarıkavak, 2004, p.67).

- Foreign Typefaces: "Font types that belong to non-Latin languages such as Arabic, Greek, Cyrillic, Devanagari, Chinese, Japanese and Hebrew etc." (Sarıkavak, 2004, p.67).

The group that consists of a typographic character's different types such as narrowed, lateral and outline is called a "font family". There is not a standard terminology to name different typographic types in a font family. Many terms used with different fonts actually mean the same thing: Semi-black (Regular=Normal=Roman=Book), white (Light=Ligh tline=Slim=Hairline), black (Bold=Black=Massive= Elephant=Heavy=Thick=Fatface), narrowed (Condensed=Narrow= Contracted=Elongated=Compressed, extended (Expanded= Extended=Wide=Streched) (Becer, 1997, p.182).

The stroke is not explicit in some cases. Stroke widths are not constant and shapes seem close in heavy fonts. Non-traditional , which are problematic in terms of readability due to their irregular forms and over detailed shapes, are less readable than sans-serif . Therefore, they should not be used for the purpose of displaying writings (Woolman, 2004, p.28-29).

Adjustment of Spaces

A motion graphic designer designs not only positive areas but also negative ones on the screen. Therefore, spaces are the elements that should be used in design. There exist various typographic principles to do this.

The main elements in letter-spacing adjustments can be grouped under the following categories: Letter-spacing, word-spacing, line-spacing. Each letter is a graphical element used in graphic design. "The togetherness of letters necessitates the adjustment of spaces between them. Spaces between words are called "word-spaces" and vertical spaces between lines are called "line-spaces"" (Uçar, 2004, pp.132-133). Word-spaces are not constant and sometimes two letters are perceived to be a single letter since the space between them is not adequate (Woolman, 2004, p.28).

"Optical criteria, which provide harmonic unity, should be used in the determination of spaces. There exist three factors influencing typographic harmony: Letter size, line length and line-spaces. A right and logical structure should be established between them" (Becer, 1997, p.186).

Text Arrangements

The way the text is arranged affects the attractiveness and legibility of the screen design. Text arrangement types can be juxtaposed as; aligned-left, aligned-right, centered and justified.

The most common solution among text arrangement types is left alignment. While we, those using the reading system from left to right, use left alignment, the eye reaches to the same starting point and follows between lines. This system makes it easy for the eye to find the next line. Center alignment and right alignment are the arrangement types that we use for headings and sub-headings. They ensure differentiation from other texts and play a



7th International Symposium of Interactive Media Design



7th International Symposium of Interactive Media Design

significant role in emphasizing different data groups. Since each line starts from a different point in the center alignment, it is not generally appropriate for text arrangements. Center alignment can be used for short texts such as screen generics but it makes reading very difficult in long texts. It is suitable to use this alignment style in headings and sub-headings due to its first-glance attractiveness. An important problem that emerges if the text is justified is the visual and typographic mistakes that we call river. (Uçar, 2004, p.129).

The use of uppercase and lowercase letters is also influential in text arrangement in screen design. The history of writing demonstrates that lowercase letters are a very recent invention compared to uppercase letters. There exists a functional difference between uppercase and lowercase letters. While lowercase letters are easily legible, uppercase letters can be defined more easily and they are stronger visually. Uppercase letters are, traditionally, used to begin sentences and to demonstrate the importance of a word.

Lowercase letters constitute word types that are more eye-ful and clear-cut; the diversity of letter types creates a contrast that affects legibility (Woolman, 2004, p.36). For example, a visual effect is created by using uppercase letters in texts that can be read shortly such as headings and sub-headings, lowercase letters are used in texts that need to be read for long periods of time (Uçar, 2004, p.130). A group of juxtaposed letters is perceived as a word. The variable nature of the words created by using lowercase letters facilitates reading. When the word is formed by using uppercase letters, the legibility decreases and the time for perception increases since letters with equal height constitute a static line (Becer, 1997, p.186).

Special Effects

Special arrangements may also be made in the typography used in the screen, depending on the content of the design and the effect wished to be created. Most common of them are; using uppercase initials, texts placed inside or outside of figures, handwriting characters, special letter designs (figurations) and border decorations.

Special letters used in the beginning are called initials. The initial is sometimes integrated to the text and sometimes used outside of the text. It can be ornamented or it can be used as it is. Initials can be used in screen design in order to attract attention, remove prosiness and create black area (positive area) (Istek, 2004, p.39)

In screen design, composition can also be made from the outside of a figure or an excessively large letter. Texts could be placed in and outside of figures.

Handwriting characters may also create special effects in the screen typography depending on the content of the visual on the screen. "Handwriting characters have fluency. Letters connect to each other perfectly" (Istek, 2004, p.43).

The most common method used in screen design to create special effect is special letter designs. The designer sometimes believes that a font designed by him will better reflect the structure and content of the work and creates a special font for that design. Special effects can also be created through the lines and symbols used together with the script. The use

of straight lines adds dynamic and highly active relations to the typography. Lines might be horizontal, vertical and skewed. Addition of symbols may provide the text with dynamic effects. While a big bracket enables introduction to an expression, an exclamation or a star mark may create a visual effect (Woolman, 2004, p.38). Symbols may be digital or pictorial. Border decorations and frames may add special effects to the typography as secondary elements. However, borders are mostly used for decorative purposes. They can be used not only at the beginning and end of the text but also as frames. Border decorations are in the forms of a simple border, frame and angle (Istek, 2004, p.50).

In screen writings, special effects may also be created by filters in computer softwares. Deformations can be made in the texture and form of the text through these filters. However, the designer must be careful while using these filters so as not to render the text illegible.

Text - Content Relationship

"Matching typography with the content of the message is the most frequent situation graphic designers are obliged to solve" (Uçar, 2004, p.105). The term of content is explained with its relationship with the form. "In the dual body that is composed of form and content, the form is thought to be the perceived external reality of the production, and the content is considered to be the message that the form tries to deliver" (Sözen, Tanyeli, 2003, p.110). "While content is the thing to be expressed (message); form is the way it is expressed. The form is the external appearance of the internal, that is, the content" (Kılıç, 2005, p.120).

Kane's statement "Content dictates form" (Kane, 2002, s.ix) confirms that the content of the screen design is the main factor that shapes typography.

The typographic message is verbal, visual and audible: Typographic elements are watched, visually perceived, heard and audially interpreted as they are being read and verbally interpreted. Typography is a dynamic mean of communication with this multi-faceted composition. In the early 20th Century, expressionist features started to be added to written words; approaches such as Futurism, De Stijl, Dadaism and Constructivism transformed typography into a branch of art based on meaning-form relationships (Becer, 1997, p.184).

"Typographic analyses, which are deliberately used in the reflection of the content, are based on the selection and placement of , and the connection of such formal characteristics with the experimental method" (Kılıç, 2005, p.126).

"It is possible to find typographic equivalents of words. The concept, object or the movement expressed by the word can be supported by simple choices to be made in , their sizes, their weights and their positions on the page" (Kane, 2002, p.64).

Another way of use of typography, which is extraordinary and supporting the content, is the visualization of the text content by the figure that emerges through typography.

Text - Surface Relationship

"The alphabet, after a long evolution, has become an elastic system of symbols where different elements form a visual harmony when put together" (Becer, 1997, p.186). Each letter has independent and different formal features. There are explicit contrasts between letters:



7th International Symposium of Interactive Media Design



7th International Symposium of Interactive Media Design

Contrast increases and the perception becomes easier when horizontal, vertical, curly and oblique elements are dispersed throughout a word.

Typographic message delivery on the screen is carried out by combining the features that render writings legible. The viewer should be able to comprehend the information on the screen with minimum effort and difficulty. "The legibility of typographic characters depends on three features: contrast, simplicity and balance" (Becer, 1997, p.185). In addition, the way letters are arranged, the communication method and spaces affect legibility. Each typographic element on the screen is perceived in the form-counterform relationship. Counterform (space/background) affects the legibility of the letter no less than it affects its own form.

Visual unity and coherence is important in screen design. "Words should not be randomly placed on the screen; this makes it difficult for the eye to bring the text together, and this decreases legibility and loses lines" (Woolman, 2004, p.55). In typography too, groupings can be made with the coherence of texture, color and size, and spaces can be created on the surface. The coherence in typography will not only prevent disorder but also add a rhythm to the surface.

White space (negative area) and letters are the most important elements to create coherence. Letters on a white space create contrasts with each other. A coherent design appears if the contrast is well-adjusted (Istek, 2004, p.90).

Another issue that needs to be considered in the text-surface relationship is the hierarchy. If we sort the typographic elements in the design according to the message to be highlighted -which can be done through colors, closeness-distance or white space-, then the requirement that is called hierarchy is met.

Grids are used in screen design in order to establish an order on the surface. A grid consists of horizontal and vertical lines. Grid helps to connect elements to each other in design. As texts and images get together, it is necessary to connect them to each other. The image is where the text ends and space (negative area) is where the image ends. A surface having grid structure has coherence and this regularly passes from one element to another and removes prosiness. (Istek, 2004, p.99).

Another important issue within the context of the text-surface relationship is the background on which the text lies. In screen design, the text can be used as a three-dimensional element apart from the background and as typographic elements already present on objects.

Text – Color Relationship

Another factor that influences the text's legibility in screen design is the color of the text and the surface. Unlike the legibility rule in the printed environment, the viewer reads a white or light text on a black or dark surface easier. In addition, the text itself forms tones between white and black depending on the space between letters and lines. The letter's x height, thickness, serifs or sans serifs also affect the color of typography. Types with thin

serifs have more volatile and grey influence. Types with thick serifs, on the other hand, create dark colors since they are attached to each other (Istek, 2004, p.45).

Color vibration occurs due to the excessive contrast between the foreground and background on the computer or video screen. This is an important factor affecting legibility. While strong color contrasts create vibrations, slight contrasts make seeing difficult (Woolman, 2004, p.43). Black backgrounds create minimum vibration on TV and cinema, and therefore, typography is constructed as white on a black background.

Text – Sound Relationship

We can deal with the text-sound relationship in two ways; the sound that emerges from the reading of the text, and typography that emerges from the visualization of the sound through the text. Certain characteristics of letters can be altered in order to attract attention to the meaning of a word, expression or a sentence, or to create visual hierarchy. In cases the dialogue is read, uttered or both, transitions between the characteristics of letters and words can be used in order to accentuate the voice of the narrator (Woolman, 2004, p.36). "The design created by Robert Massin in 1964 for Ionescu's *The Bold Singer* is a turning point in the visualization of sound with writing" (Uçar, 2004, p.95). Massin, by acting like a "theatre director", transformed the "atmosphere, motion, dialogues and songs in the play" into his own design language. By using the interaction between the image and the text, he attempted to convey the idea of time and space on the stage. "Massin, in this design, benefited from the techniques that are used in the expression of time and sequence in cinema and graphic novels" (Meggs, Philip B., "Kel Şarkıcı", *Print Dergisi*, 1980/5 quoted by Grafist 7). "This piece of Massin claimed its place in the history of graphic design as the most dignified exhibition of sound, scene, personality clashes, agreements and disagreements on paper" (Uçar, 2004, p.95).

Page layouts in the Massin design are depicted from the viewpoint of a theatre audience: characters are not closed up and perspective is used in order to add a hierarchical front-back depth within the framework of the speaking order. Characters' words are expressed in the book with different . While a seriffed typeface is used for a male character, a sans serif typeface with bigger points is used for another. Similarly, beautiful and elegant personalities of female characters are expressed by using seriffed and italic . A sans serif typeface is used to represent the talking of the female housemaid since she had masculine behaviors. Massin conveys the characteristics and personalities of the characters in the play to the audience through these decisions (Kılıç, 2005, p.85-86).

"Writing, which has a direct connection to sound, is the mark of the expression on paper and it has a tone and an attitude" (Uçar, 2004, p.105). Perhaps this is why we call alphabet designs having different forms and styles "". All of them, like notes, have different sounds, tones and connotations. "Expression of the meaning is carried out through intonations and transitions of a person's voice. Words are animated in order to imitate the intonation that an actor might use or to support the meaning of the word" (Woolman, 2004, p.41).



7th International Symposium of Interactive Media Design



7th International Symposium of Interactive Media Design

“Similar to the fact that different people reciting the same poem or singing the same song are able to provide different interpretations to the piece, the graphic designer shapes his word through typography. It is now his job to say the same thing whispering or shouting, interpreting it with a language suitable or not suitable to the content” (Uçar, 2004, p.106).

An understanding, style or concept that is tried to be expressed with a long text with many pages can be expressed through a simple typographic solution. In fact, the intonation that we use in daily language has similar levels. We express different messages in different intonations. Similarly, the graphic designer decides in what intonation a heading, slogan or a sub-heading should be expressed.

Script and sound are not the same. Pronouncing the letter “a” does not mean anything alone, however, the typographic and graphic appearance of the letter “a” always precedes its phonetic features. When you see the letter “a”, its faint appearance urges you to sound from inside to outside. The question of why letters are as they are emerges during the deconstruction of the words and structures that we construct with those letters (http://poetikhars.com/belgeler/zinhar_gorsel_ve_somut_siir_kilavuz).

Letters or words that we take as a unit can be aligned on the design surface according to their levels of creating or not creating a movement for the eye rather than to an order of meaning. Each new typeface is a technology tool that bears connections for the eye, not for the word. Although seem to be maintaining the same sequence, curves create new stains. Use of a letter, word, punctuation, curve, line or an object, no matter it constitutes a typographic image as an iconic sign or it constitutes a symbolic sign, makes itself read both by including and excluding the eye’s given ways of seeing. It creates a movement in all conditions and requires the reader to participate in this movement (http://poetikhars.com/belgeler/zinhar_gorsel_ve_somut_siir_kilavuzu).

The expression language is an elastic system. Letters are functional symbols that are used to signify a language and are not meaningful without words. A word is a series of symbols that creates meaning. In most cases, the word may not be seen as the idea it expresses. The word should have a sound (when uttered) and a physical existence (when written). The word creates a mental image when it is uttered. Letters signify primarily themselves, and they become symbols for concepts after they form words and sentences (Woolman, 2004, p.41).

BIBLIOGRAPHY

- BECER, Emre. (1997). İletişim ve Grafik Tasarım, Ankara: Dost Kitabevi Yayınları.
İSTEK, Ragıp. (2004). Görsel İletişimde Sayfa Düzeni ve Tipografi. Ankara: Pusula Yayıncılık.
KANE, John. (2002). A Type Primer. London: Laurence King Publishing Ltd.
KILIÇ, Levent. (2003). Görüntü Estetiği, İstanbul: İnkılap Kitabevi.
KILIÇ, Ekin. (2005). Deneysel Tipografide Biçim ve İçerik İlişkisi, Yüksek Lisans Sanat Eseri

- Çalışması Raporu, Ankara: Hacettepe Üniversitesi Sosyal Bilimler Enstitüsü.
MEGGS, Philip. (2005). History of Graphic Design. Alston W. Purvis.
SARIKAVAK, Namık Kemal. (2004). Görsel İletişim ve Grafik Tasarımda Çağdaş Tipografinin Temelleri. Ankara: Seçkin Yayıncılık.
SÖZEN, Metin ve TANYELİ, Uğur. (2003). Sanat Kavram ve Terimleri Sözlüğü, İstanbul: Remzi Kitabevi.
UÇAR, Tevfik Fikret. (2004). Görsel İletişim ve Grafik Tasarım, İstanbul: İnkılap Kitabevi.
WOOLMAN, Matt. (2004). Motion Design: Moving Graphics for Television, Music, Video, Cinema, and Digital Interfaces, Switzerland: Rotovision SA.



7th International Symposium of
Interactive Media Design



7th International Symposium of
Interactive Media Design



7th International Symposium of
Interactive Media Design



7th International Symposium of
Interactive Media Design