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The effect of message type on primary perceptual field in visuals

Özgen Korkmaz *

Abstract

This study aims to determine the relationship between message type and the field(s) that students perceive first in an instructional material. It employs the scanning model and its study group consists of 150 sophomore students attending the Faculty of Education at Ahi Evran University. The data has been obtained by identifying the student responses to a visual material designed by the researchers. The results have been interpreted through the frequency, percentage and the Kendall's tau_b test applied on the collected data ($p<.05$). As a result, message type is of importance in placing the message in an instructional material. The field including the primarily perceived message in a visual principally focuses around the center of the visual or in the first point of interest according to the rule of thirds. Furthermore, encoding messages in the form of letters or numbers leads to a change in the primary perceptual field. Therefore, it would be useful to encode verbal information in various techniques such as numerical expression, symbolization, etc.

Keywords: Material development, Message design, The rule of thirds, Balance, Integrity

* Assist. Prof. Dr., Ahi Evran University, Education Faculty, ozgenkorkmaz@gmail.com

INTRODUCTION

The systems approach proposed in the planning of learning-teaching processes comprises the analysis, design, application and evaluation stages. Design is described as the process of specifying conditions for learning (Seels & Richey, 1994). Specifically in this context, instructional material design could be defined as the process of visualizing and specifying the conditions for learning. It is a point of particular emphasis that the use of visuals is of utmost importance for an easy and efficient recall of any piece of information (Alessi & Trollip, 2001; Chi, Bassok, Lewsi, Reimann & Glaser, 1989; Dale, 1969; Morrison, Ross & Kemp, 2001). Furthermore, the process of information visualization naturally requires several considerations. The general aim in designing a visual is described as creating a communication environment enabling the audience to easily grasp the information for easy recall of information and capturing the audience's attention (Szabo & Kanuka, 1998).

There are various studies discussing how to use and place the texts, colors and graphs in a visual design (Aspillaga, 1991; Livingston, 1991; Szabo & Poohkay, 1994; Szabo & Kanuka, 1998). These studies include various design elements such as text density, font size, lines, margins, columns, placement of the message, color selection, graph and the use of visuals. To put it another way, certain basic principles of design such as integrity, focal point, balance, message type and color are considered while designing a particular visual. The question of where to place the main theme in a visual is still without a clear answer. Furthermore, the way one encodes the main theme or the message type could also affect the position the message within the material. Winn (1993) suggests that perception varies according to the message type (image, diagram, table, graph, text, sound etc.) in an instructional material; thus, rendering the message type a critical factor in the designing process. In his study investigating the effect of numerical or verbal presentation of the message on the use of information, Bell (1984) argues that verbal and numerical messages characteristically differ in various ways, and the latter is easier to comprehend when compared to the former. Similarly, investigating the most effective way to present the performance information to corporate partners, the study by York and Ruthand (2004) hold that the source of the message, type of information (verbal or numerical) and the main

theme variables constitute the basic characteristics of information and emphasize a difference of attitude towards verbal and numerical information.

Design rules are in general intended to ensure that the design guides the audience and makes them perceive and notice at first hand the important subjects of priority. In this context, the most important point that design rules need to consider is to demonstrate how the eye naturally moves or tend to move while looking at a certain image (George, 1992). The eye movement recording system is commonly used to determine the eye-catching points and analyze the movements of the eye in a visual design. In addition to the cognitive responses of the audience, advertising studies also provide substantial evidence on the points mostly capturing attention in drawings located in different places (Dorfman, 1984). However, revealing that sensory components differentiate eye movements during the thinking process, multiple measurements suggest that such research could, in a sense, be quite indirect in various professional media applications. Therefore, recent research on the movements of the eye has shifted the focus rather on the direct perceptual and cognitive processes in the brain.

With the aim to determine the natural movements of the eye while looking at a visual, several researches have been conducted since the early 1960s (Land, Mennie & Rusted, 1999; Nesbit, 1981; Newman 1971). These studies experimented various instruments and methods. For instance, through the device he designed and named “Direct Reading Eye Movement Monitor System”, which could record the eye movements of the viewers while looking at a visual, Newman (1971) attempted to record the natural movements of the eye. Another study by Land et al. (1999) attempted to identify the eye movements of viewers while they were performing the very familiar tasks of daily life.

Preparing an attractive visual requires choosing an interesting subject and making an appropriate design. In order to arouse the curiosity of the audience and to stimulate their motivation to learn, visuals in instructional materials could be prepared using various photography techniques (Oman, 2002). Art theories provide substantial information regarding the fact that the main theme should be located close to the center in a particular design. However, the available research shows that the main theme should be driven out from the center towards the corners. Especially visuals placed parallel to horizontal or vertical lines in top-down or left-to-right direction provide a much more dynamic perception of the design (Gooch, Reinhard & Shirley, 2001). In this context, the rule of thirds is one of the crucial rules suggested to create an eye-catching design (Heinich,

Molenda, Russell & Smaldino, 2002) and is a rule commonly used for visual design in photography in particular (Barlow, 2006; Greenzweig, 2001; Golub, 2007; Lister, 2005).

The basic idea underlying the rule of thirds is that if a visual is placed on the points of interest or along the lines created by the points of interest, this will result in a much more balanced design, which provides a much more natural perception by the very nature of eye movements (Barlow, 2006). The rule also offers suggestions on how to identify and organize the points of interest in a visual. Points of interest could be defined as the areas where the viewers perceive visual stimuli best, where they perceive the visuals located in areas of focus earlier than the other visual objects, and where they like viewing the visual as a whole (Greenzweig, 2001). In this respect, using two pairs of horizontal and vertical lines, the rule of thirds divides a visual into three equal horizontal and vertical parts, and consequently defines the intersection points of these lines as four separate points of interest (Banerjee, 2004; Barlow, 2006; Greenzweig, 2001; Gooch, et al., 2001; Lister, 2005). The rule holds that these points are described as the best areas of focus. Figure 1 presents the points of interest that the rule of thirds suggests.

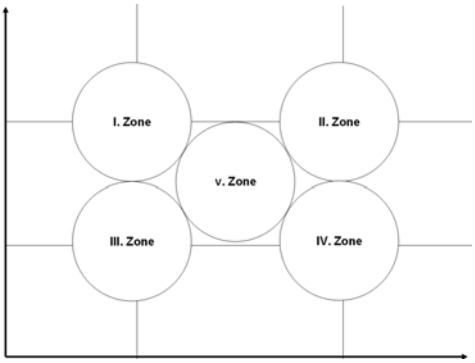

Figure 1. Points of interest according to the rule of thirds

The relevant research indicates that, while looking at a particular visual, the eyes of a viewer tend to move towards one of the points of interest rather than the exact center of the visual. Within this framework, it is suggested that, for the visual and perceptual nature of the viewers, it would be more appropriate to make a design according to the rule of thirds, or in other words, to locate in one of the points of interest the visual pertaining to the main theme of emphasis (Barlow, 2006; Dragicevic & Colin, 1998).

As seen in Figure 1, the first four areas (areas I-IV) are critical points of interest in a visual design. However, although there are no definite consensus on which area

outweighs others as the potential focal point in a visual, which point of interest is perceived earlier than others, or the visual located in which point is more important than the ones located at other points in a design (Greenzweig, 2001), the message that is expected to be perceived first in the visual should be placed around point I.

Heinich et al. (1993) states that the levels of attention for the points of interest differ according to the rule of thirds, meaning that the level of attention is highest at the I. point of interest. To put it another way, the main theme in a visual should be placed near the I. point of interest. However, the literature does not present any information on how these results were obtained. Thus, it could be suggested that these were achieved not through experimental studies, but through the research on the natural eye movements and the way people scan a visual with their eyes. In the light of the information presented above, it could be suggested that the number of studies are not sufficient on how to place the message in a visual material and the effect of message type on the placement of the message. The main problem of this study is to identify the basic principles on where to place the main theme in a design in accordance with its content.

Research questions

1. According to students' perceptions; where is the primary perceptual field of students in a visual consisting of numbers, symbols and letters?
2. According to students' perceptions; is there any relationship between the primary perceptual field and a visual that consists of numbers, letters or symbols?

METHOD

Research design

This study employs the descriptive scanning model. The present study attempts to describe students' primary perceptual fields in instructional materials.

Sample

The study group of the research consists of a total of 150 sophomore students (male: 70 students (46.7%); female: 80 students (53.3%)) attending the Faculty of Education at Ahi Evran University, 53 of which attend the Department of Elementary

Teaching, 73 the Department of Turkish Language Teaching, and 24 the Department of Science Education.

Procedures

In the application, the students were shown 9 different visuals in Powerpoint environment and attempts were made to identify what was the first thing that the students saw in each visual. In first three visuals, a total of 54 two-digit numbers were placed in different spots with 9 numbers in each line and 6 numbers in each column. In the first two visuals, the messages were symmetrically placed to make a formal balance, while the third visual was organized to constitute an informal balance. Of the nine different visuals, the numbers in the first three visuals, the symbols in the next three, and upper and lower-case letters in the last three visuals were organized in a similar configuration. Figure 2 presents sample images from the materials used.

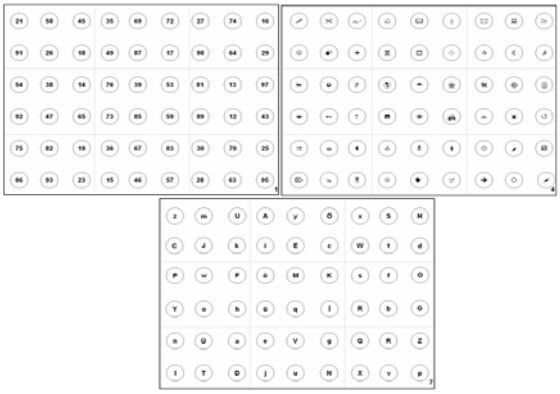

Figure 2. Sample images from the presentation

Prior to the application, a pilot study was carried out to determine the maximum duration that the students could see a single number, letter or a symbol in each visual. Thus, it was aimed to minimize the effect of perceptual selectivity that might stem from the students' individual differences. Before the pilot application, 20 students outside the sample group of the study selected exclusively on the basis of volunteerism were asked to write in the previously-prepared forms "how many of the messages presented in the visuals they could see" and "what they are".

In the pilot application, different visuals were shown initially for 10 seconds, while the subsequent visuals were shown by decreasing the duration by one second and continued until the students stated that "they could not see anything". To prevent students

from focusing on a certain point in any visual, pauses were made between two visuals, during which various sceneries were shown.

Subsequently, by examining the forms in which the students wrote down the messages they could perceive in each visual, the minimum duration of perception was determined during which the students could perceive only one message. Thus, it was aimed to minimize the effect of individual differences in perception and cognitive processes that affect perception.

Accordingly, the minimum duration of perception was determined to be 2 seconds in the visuals consisting of letters and numbers, and 2.5 seconds in images containing symbols. In other words, students can perceive a piece of information about numbers or letters contained in a visual within duration of 2 seconds, while they can perceive a symbol in 2.5 seconds. The fact that they are not as familiar with symbols as they are with numbers and letters might have caused that it took longer to perceive symbols.

Before the application, during the preliminary work with the study group, the concept of "Instructional Message Design" was briefly explained and the effect of emphasis, alignment etc. on the perception of hierarchy between the messages in a visual was discussed. Then, the discussion followed with how to place the most important message in a visual and whether this facilitates perception. In this context, emphasis was made on the fact that effectiveness of an instructional material depends on the ease with which the material is understood and retained and that one design instrument to be used for this purpose is the primary perceptual field.

Furthermore, to avoid manipulating and affecting the students' perceptions, no information was provided about where is the primary perceptual field in a visual, as described in the literature.

In the beginning of the application, the students were first given handouts in which they were asked what they first see in each visual to be shown during the application and in which they could mention their perception, and the researcher tried to avoid any kind of guidance so as not to affect the students' perception.

During the presentation, the students were first informed about the type of knowledge (number, letter or symbol) to be presented in the visual. Thus, for a pre-determined duration, the related visual was displayed for 2 seconds for images containing letters and numbers, and for 2.5 seconds for images containing symbols. After each visual, the students were shown different sceneries so as to prevent the point they focused in a

visual from affecting their perception in the subsequent visual and at the same time, the students were asked to write down on the handouts the first number, letter or symbol they could see..

This study differs from the previous studies by Newman 1971; Nesbit, 1981; and Land, et al., 1999 in terms of the method followed. For instance, to identify the primary perceptual field, the mentioned studies used methods such as making use of devices that record eye movement while the audience is watching a visual, attempting to determine eye movements during the performance of very familiar daily activities or to estimate what individuals saw on the basis of what they remember in a visual. On the other hand, this study concentrated on the minimum duration for perceiving a message in a visual. Moreover, this process was based on the students' own perceptions. Accordingly, attempts were made to identify the field in a visual that contains the message perceived by the students and to interpret the primary perceptual fields.

Furthermore, the data were collected by the help of a PowerPoint presentation in this study; however, the scope of the study is not limited to PowerPoint as an instructional material. The important point here is that the material has a visual aspect. The results of this study can be generalized to non-PowerPoint visuals. Moreover, the main reason to prefer using PowerPoint as the environment in this study was that durations of perception were accepted to be significant variables in the study process and that PowerPoint makes it easier for the researcher to control this variable.

Data collection

The study data was collected through a literature review and a form prepared by the researcher from the source groups by observing the student responses to the visuals prepared by the researcher. This form consists of nine different questions asking "What did you see in this visual?" for each of the nine visuals. The structure and content of the data collection instrument were examined by a group of field experts and through discussions, it was concluded that this instrument would be sufficient to collect the target data.

The students were handed out these forms before the application and were asked to write down in them their perceptions about what they saw in the visuals within the minimum duration of perception, as was determined by the pilot study.

Data analysis

While encoding the data, the images were divided into three rows and three columns equal to each other. The upper left piece was named as field 1 and the subsequent parts were named as field 2, 3… successively with a total of 9 fields; to put it another way, the visual was divided into a 3x3 matrix. The data was encoded by determining the field containing the letter, number or symbol that the students first perceived in the visual. Moreover, considering the points of interest of the rule of thirds, these images were subjected to a different encoding, as the upper-left (field I), upper-right (field II), lower-left (field III), lower-right (field IV) and center (field V). Although the sample group contained 150 students, analysis focused on the students' reactions to each of the three visuals and these were coded separately since three visuals were used for each message type. The results were interpreted through the frequency, percentage and the Kendall's tau_b test applied on the collected data. For the differences and relationships, a significance level of $p<.05$ was deemed as sufficient.

RESULTS

The primary perceptual field in an instructional material full of numbers, symbols and letters

Table 1 summarizes the findings on the fields in which the first perceived message concentrated in a total of three separate visuals organized into a 3x3 matrix and presented to students as an instructional material full of numbers.

Table 1. The Primary Perceptual Field in a Screen full of Numbers and Organized as a 3x3 Matrix

	Fields									
	1	**2**	**3**	**4**	***5***	**6**	**7**	**8**	**9**	**Total**
f	54	31	11	53	*247*	20	10	18	6	450
%	12	6,9	2,4	11,9	*54,9*	4,4	2,2	4,0	1,3	100

In Table 1, an examination of the fields in which the first perceived number concentrated in a total of three separate visuals full of numbers reveals that field V located in the center of the visual is the most primarily perceived field (54.9%). Field I (12%) and field IV (11.9%) are the most primarily perceived fields following field V, which is the center of the visual. On the other hand, the least primary perceived field is field IX, which is located in the lower-right-hand of the screen (1.3%). Table 2 summarizes the findings on

the primary perceptual fields in an instructional material with a screen full of numbers and organized according to the rule of thirds.

Table 2. The Primary Perceptual Field in a Screen full of Numbers and Organized according to the Rule of Thirds

	Fields						
	1	**2**	**3**	**4**	**5**	**Others**	**Total**
f	124	27	28	13	136	122	450
%	27,6	6,0	6,2	2,9	30,2	27,1	100

Considering the reference fields according the rule of thirds in Table 2, it could be observed that the field including the most primarily perceived number is again the reference field V (30.2%), located in the center of the visual, and the reference field I (27.6%), which is found in the upper-left corner of the center. On the other hand, the least primarily perceived reference field is field IV (2.9%) located in the upper-right corner of the center. Moreover, it is also seen that 27.1% of the students perceived primarily the numbers which were located in the fields falling outside these five reference fields of the rule of thirds. Figure 3 presents the scatter diagram for the fields including the most primarily perceived number in three images full of numbers both according to fields organized into a 3x3 matrix and the rule of thirds.

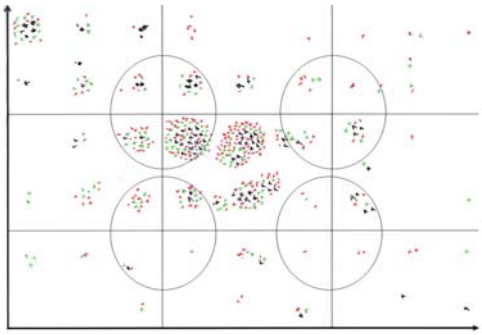

Figure 3. The scatter diagram on the primary perceptual field in an image full of numbers

An examination of the scatter diagram in Figure 3 reveals that, according to the rule of thirds, the students who were distracted by the other parts of the visual and did not concentrate on any particular reference field are not strikingly concentrated around any specific point. As a result, it could be suggested that, in a visual containing more than one message, the message to be primarily perceived should be placed in the center of the visual or around the first point of interest according to the rule of thirds.

Table 3 summarizes the findings on the fields in which the first perceived symbol concentrated in a total of three separate visuals full of symbols in a teaching material.

Table 3. The Primary Perceptual Field in a Screen full of Symbols and Organized into a 3x3 Matrix

	Fields									
	1	**2**	**3**	**4**	***5***	**6**	**7**	**8**	**9**	**Total**
f	29	44	13	58	*224*	15	25	24	18	450
%	6,4	9,8	2,9	12,9	*49,8*	3,3	5,6	5,3	4,0	100

In Table 3, an examination of the fields in which the first perceived symbol concentrated in a total of three separate visuals full of symbols reveals that field V located in the center of the visual is the most primarily perceived field (49.8%). Field IV (12.9%) is the most primarily perceived one following field V, which is the center of the visual. On the other hand, the least primary perceived field is field IX, which is located in the lower-right-hand of the screen (4.0%). Table 4 summarizes the findings on the primary perceptual fields in an instructional material with a screen full of symbols and organized according to the rule of thirds.

Table 4. The Primary Perceptual Field in a Screen full of Symbols and Organized according to the Rule of Thirds

	Fields						
	1	**2**	**3**	**4**	**5**	**Others**	**Total**
f	57	34	41	31	145	142	450
%	12,7	7,6	9,1	6,8	32,2	31,6	100

Considering the reference fields according the rule of thirds in Table 2, it could be observed that the field including the most primarily perceived symbol is again the reference field V (32.2%), located in the center of the visual, and the reference field I (12.6%), which is found in the upper-left corner of the center. On the other hand, the least primarily perceived reference field is field IV (6.8%) located in the upper-right corner of the center. Moreover, it is also seen that 31.6% of the students perceived primarily the numbers which were located in the fields falling outside these five reference fields of the rule of thirds. Figure 4 presents the scatter diagram for the fields including the most primarily perceived symbol in three images full of symbols both according to fields organized into a 3x3 matrix and the rule of thirds.

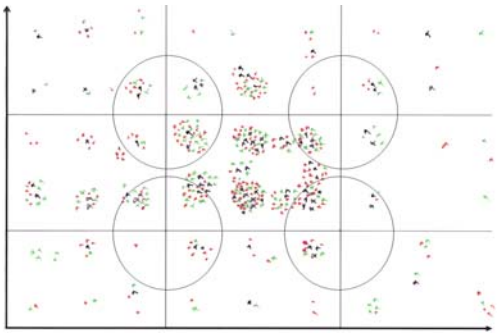

Figure 4. The scatter diagram on the primary perceptual field in an image full of symbols

An examination of the scatter diagram in Figure 4 reveals that similar to Figure 3, the students, who were distracted by the other parts of the visual and did not concentrate on any particular reference field according to the rule of thirds, are not strikingly concentrated around any specific point. Furthermore, this finding could be interpreted as follows: In a visual containing more than one visual symbol, one should place the message to be primarily perceived exactly in the center, or the first reference field according to the rule of thirds.

Table 5 summarizes the findings on the fields in which the first perceived letter was concentrated in a total of three separate images full of letters presented as an instructional material.

Table 5. The Primary Perceptual Field in a Screen full of Letters and Organized into a 3x3 Matrix

	Fields									
	1	**2**	**3**	**4**	***5***	**6**	**7**	**8**	**9**	**Total**
f	22	39	16	89	*203*	27	20	27	7	450
%	5,0	8,7	3,6	19,7	*45,1*	6,0	4,4	6,0	1,5	100

In Table 5, an examination of the fields containing the first perceived letters in three separate visuals full of letters reveals that the most primarily perceived field is field V, which is located in the center of the visual as was the case with the one full of numbers. An examination of these fields reveals that the field V located in the center of the visual is the most primarily perceived field (45.1%). Field IV (19.7%) is the most primarily perceived one following field V. However, taking into consideration the scatter diagram in Figure 3, the distribution density in field IV is basically at the points neighboring to field V. The least primarily perceived field, on the other hand, is field IX located in the lower-right-hand of the screen (1.5%). Table 6 summarizes the findings on the primary

perceptual fields in an instructional material with a screen full of letters and organized according to the rule of thirds.

Table 6. The Primary Perceptual Field in a Screen full of Numbers and Organized according to the Rule of Thirds

	Fields						
	1	**2**	**3**	**4**	**5**	**Others**	**Total**
f	75	35	82	24	125	109	450
%	16,7	7,8	18,2	5,3	27,8	24,2	100

Looking into the reference fields in Table 6 according to the rule of thirds, it is seen that the fields containing the most primarily perceived letter are reference field V (27.8%) located again in the center of the screen, reference field III (18.2%) in the lower-left-hand of the center, and reference field I (16.7%) in the upper-left corner of the center. Different from the image full of numbers, the image full of letters has a strikingly dense distribution in reference field III. On the other hand, the least primarily perceived field was reference field IV (5.3%) located in the lower-right-hand of the center. Furthermore, it is also seen that 24.2% of the students perceived primarily the numbers which were located in the fields falling outside these five reference fields of the rule of thirds. Figure 5 presents the scatter diagram for the fields including the most primarily perceived number in three images full of letters both according to fields organized into a 3x3 matrix and the rule of thirds.

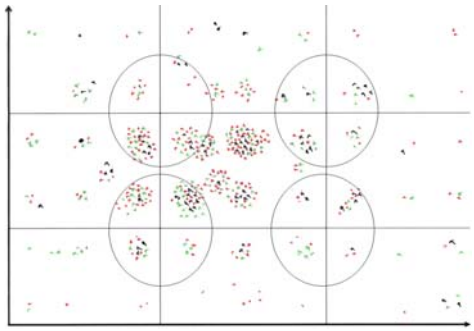

Figure 5. The scatter diagram on the primary perceptual field in an image full of letters

An examination of the scatter diagram in Figure 5 reveals that, similar to the case in Figure 3 and 4, the students who were distracted by other parts of the visual and did not concentrate on any particular reference field are not strikingly concentrated around any specific point. Thus, this finding could be interpreted as suggesting that in a visual containing more than one verbal message, one should place the message to be primarily perceived exactly in the center, and the third of first reference field according to the rule of

thirds. Figure 6 presents together the Primary Perceptual Fields in images full of symbols, numbers and letters.

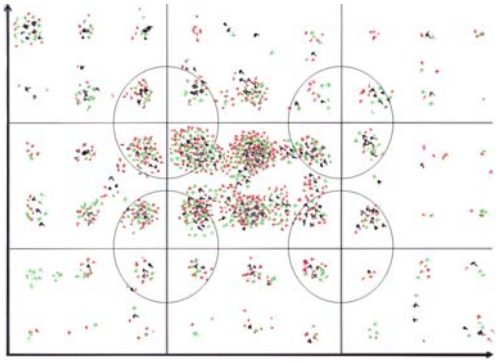

Figure 6. The scatter diagram on the primary perceptual field in images full of numbers, letters and symbols

As seen in Figure 6, the field containing the most primarily perceived message in images with numbers, letters and symbols is the center of the visual, i.e. the region around the first reference field according to the rule of thirds. Hence, it follows that in a visual containing more than one message, arguably, placing the message to be primarily perceived in the center or around the first reference field of the visual increases the likelihood of primary perception for the message.

The relationship between primary perceptual field numbers, symbols and letters

Table 7 summarizes the findings on the relationship between the primary perceptual field and encoding messages in an instructional material in the form of numbers, letters or symbols.

Table 7. The Relationship between Message Type and Primary Perceptual Field

			Numbers	Symbols	Letters
Kendall's tau_b	Numbers	r	1,000	0,086(*)	0,027
		p	.	0,028	0,489
		N	450	450	450
	Symbols	R	0,086(*)	1,000	0,120(**)
		P	0,028	.	0,002
		N	450	450	450

An examination of Table 7 suggests that there is a positively significant relationship between encoding messages as numbers and symbols ($r=0.086$, $p<0.05$) as well as between encoding messages as letters and symbols ($r=0.12$, $p<0.01$) in an instructional material, while this is not the case between those encoded as letters and

numbers (r=0.27, p>0.05). This finding could be interpreted as indicating that encoding the message as numbers or symbols and as letters or numbers does not bring a change in the primary perceptual field, while encoding the message as letters or numbers does so. Examining Table 2 and 6, it could be observed that, when compared to a visual with letters, a visual full of numbers has higher perception percentages for the numbers in reference fields I and V. Furthermore, the primary perceptual fields are much more dispersed in visuals containing letters when compared to those containing numbers. Consequently, it follows that, according to the rule of thirds, the presence of numerical messages increases the likelihood of message perception in reference fields I and V. Finally, message type is of importance in placing the message in an instructional material.

CONCLUSION

According to students' perceptions, in visuals with more than one number, letter or symbol, the field containing the most primarily perceived message is principally the center of the visual, i.e. the region around the first point of interest according to the rule of thirds. Thus, in a visual with different message types, placing the message to be primarily perceived in the center of the visual or near the first point of interest increases the possibility that the message is primarily perceived.

A study by Oman (2002) demonstrated that placing visuals in the center attracts greater attention, and placing the visual in places other than the center will make it more difficult for viewers to comprehend the subject of emphasis. On the other hand, Lister (2005) argues that the images placed in one of these four points of interest are perceived as the main theme of the visual. Heinich et al. (1993) claim that the perception levels of the point of interest are different according to the rule of thirds; that is, perception levels of the message is 42% in reference field I, 20% in reference field II, 5% in reference field III, and 14% in reference field IV, indicating that the perception level in reference field I is much higher than the others.

The relevant research reveals that, while looking at a particular visual, the eyes of the viewers tend to move towards one of the points of interest rather than the exact center of the visual. Thus, it could be suggested that it would be more appropriate to locate in one of the points of interest the visual pertaining to the main emphasized theme (Barlow, 2006; Dragicevic & Colin, 1998). Moreover, in his study Greenzweig (2001) found that visuals placed in reference fields were perceived earlier than other visual objects.

On the other hand, if a visual is placed on the points of interest or along the lines formed by the points of interest, this will result in a much more balanced design, and by the very nature of eye movements, the design would provide a much more natural perception (Barlow, 2006).

As stated above, arguing that the message to be primarily perceived should be placed near reference field I, several studies do not recommend placing the message to be primarily perceived in the center of the visual. Nevertheless, the present study found that the locating a message in the center of a visual will result in a higher likelihood of primary perception. Therefore, it could be recommended to place the main message to be delivered by a visual in its center.

According to students' perceptions, in a teaching material, encoding the message as numbers or symbols, and as letters or numbers does not bring a change in the primary perceptual field, while encoding the message as letters or numbers does so. When compared to a visual with letters, a visual full of numbers has higher perception percentages for the numbers found in reference fields I and V. Furthermore, the primary perceptual fields are much more dispersed in visuals containing letters when compared to those containing numbers. As a result, the presence of numerical messages increases the likelihood of message perception in reference fields I and V according to the rule of thirds; and message type is of importance in placing the message in a visual.

Thus, to provide for a quicker and more effective perception of messages in instructional materials, it would be useful to encode verbal information in various techniques such as numerical expression, symbolization, bulleted lists or schematization. Such encoding techniques could allow a more organized presentation of any piece of information. As a matter of fact, Lee (1999) argues that a more organized presentation of a message could contribute to creating a more attractive visual as well as a smooth and effective comprehension of the message. What is more, various studies underline that a well-organized instructional material will facilitate the comprehension of critical messages (Cook & Kazlauskas, 1993; Faiola & DeBloois, 1988) and bring a significant progress in reading pace, clarity and effectiveness (Hathaway, 1984). On the other hand, highlighting the differences in perception according to message type (image, diagram, table, graph, text, sound, etc.), Winn (1993) states that message type constitutes a critical factor in the designing process. In his study investigating the effect of numerical or verbal presentation of the message on the use of information, Bell (1984) argues that verbal and numerical

messages characteristically differ in various ways, and particularly the latter is easier to comprehend when compared to the former. Similarly, investigating the most effective way to present the performance information to corporate partners, the study by York and Ruthand (2004) hold that the source of the message, type of information (verbal or numerical) and the main theme variables constitute the basic characteristics of information and underline a difference of attitude towards verbal and numerical information.

References

Alessi, S. M. & Trollip, S. R. (2001). *Multimedia for learning: Methods and development (3rd Ed.).* Needham Heights, Massachusetts: Allyn & Bacon.

Aspillaga, M. (1991). Screen design: location of information and its effects on learning. *Journal of Computer-Based Instruction*, 18(3), 89-92

Banerjee, S. (2004). *Composition-guided image acquisition*. The University of Texas: Presented to the Faculty of the Graduate School of The University of Texas at Austin in partial fulfillment of the requirements for the degree of doctor of philosophy.

Barlow, G. (2006). *The 'Rule of Thirds'*. *Retrieved* May 3 2008 from: http://www.inet-gs.com/pdfs/Tutorial%20-%20Rule%20of%20Thirds.pdf.

Bell, J. (1984). The effect of presentation form on the use of information in annual reports. *Management Science*, Vol. 30, No. 2, 169-185.

Chi, M. T. H., Bassok, M., Lewsi, M. W., Reimann, P. & Glaser, R. (1989). Self-explanations: How students study and use examples in learning to solve problems. *Cognitive Science* 13, 145-182.

Cook, E. K. & Kazlauskas, E. J. (1993). The cognitive and behavioral basis of an instructional design: Using CBT to teach technical information and learning strategies. *Journal of Educational Technology Systems.* 21(4).

Dale, E. (1969). *Audiovisual methods in teaching (3rd Ed.)*. New York: The Dryden Press.

Dorfman, A. (1984). Using science to design ads. *Science Diges*. Vol. 92.

Dragicevic, P. & Colin, C. (1998). *Using guiding lines for increasing the effectiveness of images*. International Conference Graphicon, Moscow, Russia,

Faiola, T. & DeBloois M. L. (1988). Designing a visual factors-based screen display interface: The new role of the graphic technologist. *Educational Technology*, 28(8).

George, G. (1992). Monkeycam see - monkeycam do: Considering reflexive aesthetics in the teaching of film and video. *Meeting of The Canadian Communications*

Association, Canada: Charlottetow, Prince Edwar Islan. Jule 4-5. ERIC No: ED355575.

Golub, E. (2007). *Photocropr a first step towards computer-supported automatic generation of photographically interesting cropping suggestions*. HCIL Technical Report. Retrieved May 09 2008 from http://www.cs.umd.edu/~egolub/ PhotoApps/PhotoCropr/PhotoCropr TR-Draft1_16.pdf.

Gooch, B. Reinhard, E. & Shirley, P. (2001). *Artistic composition for image creation. Retrieved* May 6 2008 from http://www.cs.utah.edu/~shirley/papers/ Composition.pdf.

Greenzweig, T. (2001). Aesthetic experience and the importance of visual composition in information design. *Orange Journal*. *Retrieved* May 1 2008 From http://eserver.org /courses/w01/tc510/orange/composition.pdf.

Hathaway, M. D. (1984). Variables or computer screen display and how they affect learning. *Educational Technology*. 24(7).

Heinich, R., Molenda, M., Russell, J. D. & Smaldino, S. E. (1993). *Instructional Media and the New Technologies of Instruction*. Macmillan Publishing Company.

Heinich, R., Molenda, M., Russell, J. D. & Smaldino, S. E. (2002). *Instructional media and technologies for learning* (7_{th} Ed.). New Jersey: Merrill Prentice Hall.

Land, M., Mennie, N. & Rusted, J. (1999). The roles of vision and eye movements in the control of activities of daily living. *Perception*, volume 28, pages 1311 – 1328.

Lister, S. (2005). *Analyzing students' usage of the rule of thirds in photography software.* (An Action Research Project). Michigan State University: Part Of The Capstone Requirement For The Masters Of Arts In Educational Technology (July, 2003 Update April 24, 2005).

Livingston, L. A. (1991). The effect of color on performance in an instructional gaming environment. *Journal of Research of Computing in Education*. 24(2), 246-253.

Morrison, G. R., Ross, S. M. & Kemp, J. E. (2001). *Designing effective instruction (3rd Ed.)*. New York: John Wiley & Sons, Inc.

Nesbit, L. L. (1981). Relationship between eye movement, learning, and picture complexity. *Educational Technology Research, and Development*, 29(2), 109-116.

Newman, J. J. (1971). *Direct reading eye movement monitor system*. United State Patent 3583794

Oman, J. M. (2002). *Student perceptions of set inductions in technology education*. The Graduate College University of Wisconsin-Stout: A Research Paper Submitted in Partial Fulfillment of the Requirements for the Master of Science Degree.

Seels, B. & Richey, R. (1994). *Instructional technology: The definition and domains of the field.* Washington, DC: Association for Educational Communications and Technology.

Szabo, M.& Poohkay, B. (1994). So what if it's in color and moves' A critique of multimedia. Paper presented at *ED-MEDIA'94 World Conference on Educational Media Hypermedia*, Vancouver, BC.

Szabo. M. & Kanuka, H. (1998). Effects of violating screen design principles of balance, unity, and focus on recall learning, study time, and completion rate. *Journal of Educational Multimedia and Hypermedia*, 8(1), 23-42.

Winn, W. (1993). *Perception principles*. In M. Fleming (Ed.), *Instructional message design: Principles from the behavioral and cognitive sciences.* Educational Technology publications Englewood Cliffs, New Jersey

York, A. & Ruthand, J. A. (2004). Framing information to enhance corporate reputation The impact of message source, information type, and reference point. *Journal of Business Research*, 57(1), 14-20.