

Creation of an Instrument to Measure Creativity in Graphic Design

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ABSTRACT

This research develops a conceptual framework that integrates creativity and graphic design. It introduces a three-dimensional model of creativity in graphic design that splits creativity in the following three dimensions: *innovation*, *communication* and *aesthetics*. Based on the Three-Dimensional Model of the Creativity in Graphic Design an instrument that allows measuring the creativity in graphic design was created. This instrument was given to 115 graphic designers of the Graphic Designers Association of Catalonia to be validated. Finally, a coefficient was created in order to simplify the results found when using the instrument.

INTRODUCTION

One of the most difficult tasks, for both junior designers and for those designers with more experience, is the evaluation of the product designed and its efficiency for the user. In the research field of graphic design there is no definitive tool that serves to evaluate its products. Most evaluations made to the pieces of design are justified by subjective scales, which are difficult to verify and untrustworthy. The consequences of this evaluations relapses in the fact that they cannot be validated efficiently and the quality of the pieces would be reduce to the judgment. Since it is based on a subjective variable, it would be a preference.

The utilization of instruments that would help the evaluation of the pieces is essential for the graphic design as a discipline. Thus, the designer could have retro alimentation of his work. This will contributes to new knowledge and criteria that will form part of his professional background. Different researchers, such as Frascara, Costa, Tena, Heller and Chavez, share this position. [...] *Existing knowledge is the only method that is to succeed, is to obtain certain practical results.* (Tena, 2006: 187); *the assessment is an essential element of professional practice of communication design* (Frascara, 2006: 111) *Understanding who, what, how, when, where and of course why this design cannot be underestimated.* (Heller, 2006: 13)

THEORETICAL BACKGROUND

For the fundamental methodology we have consulted diverse precedent studies that have measure creativity in the area of advertising, which has been related to graphic design (Caroff & Besançon 2008 y White, Shen & Smith 2001). These studies are sustained in the product analysis of creative products through the given judgment made by experts. This exposes the possibility that in the area of advertising, as in most artistic sectors, the creativity might be measured with more emphasis on its originality and other dimensions. In 2003 Koslow, Sasser, and Riordan, led an investigation to compare the perception of creativity by different groups. His research included a qualitative and a quantitative stage with the administration of a questionnaire. In the realm of graphic design we've based our research on the studies made by Tena (1998) *The influence of the graphic composition in the election of a text block* and Martin (2005) *The connotative meaning of the plastic sign in the visual communication*. These studies analyze the aesthetic aspects.

Searching an orientation toward looking for an instrument that would help us measure creativity in graphic design, we looked up studies about creativity and found some instruments created to measure creativity. These were the *CREA (Creative Intelligence. A Cognitive measure of the Creativity)* Corbalán (2003), *PIC (Test of Creative Imagination)* González, Mairal, and others (2004) and *Creative Product Semantic Scale* Besemer and Treffinger (1981).

The graphic designer is responsible for constructing a piece of graphic design to communicate a message. This message comes from the need of a person (which is not the designer) to communicate to other people. The designer acts like a filter, he would take that message and reconstruct it using his resources (knowledge and techniques) for the receptor of the message. First the receptor is attracted by the message displayed (aesthetics) and then he understands what is intended to be communicated to him.

Since the graphic designer creates messages that nourish of the creativity, as stated by Frascara (2006), Tena (2005), Costa (1994), Chávez y Ledesma (1997) ; it is necessary to profoundly study, what is creativity and how it serves the graphic designer? In this aspect we have to subscribe the following word of Ricarte (1998). *[...] this spark that we all have inside and from the one we have to learn serve as a tool of work. (Ricarte, 1998: 20)*

Based on the authors and the selected works by Huidobro (2002) we classify creativity into 4 components, which were defined primarily by Mooney (1963) and MacKinnon (1970) in Huidobro (2002), that are: person, process, product and context (environment or situation). *"It could be affirm that the modern notion of the creativity already has a sediment of the empiric investigation based on the different experimental lines and theories: focusing on the study of the creativity like a product, like an specific process and like personal characteristics"* (Ricarte, 1998: 43)

Our work focuses on creativity in the function of graphic design, which is why we will use the concept of "graphic creativity. *"We must understand graphic creativity as the intelligent capability to find the correct solutions to problems that establish the communication through graphic. That is, those where vision plays an important role"* (Tena, 2005: 4). We must conclude that the products created by graphic designers are the result of the action of that graphic creativity and that the mention products are solutions to a problem; solutions in different degrees.

Graphic design uses creativity as a working tool in the creation of its products (Frascara; 2006, Tena; 2005, Costa; 1994, Chávez y Ledesma; 1997). These products, created by graphic design, in instance this creativity is compose of a series which we can call dimensions. These allow its catalogue as a creative phenomena and affects creativity contained in these products. These dimensions will be *Novelty, Communication and Aesthetics*. It should be understood that novelty is the capacity to give solutions as a determinate problem that, apart from being valid, will be original or even unpublished and will not only form variants of preceding solution. In context it should be infrequent solutions. We will see the communication as responsible for materializing a message. Also it has to find the best way to contextualize the basic content of the message in order to transmit in a way that is understandable or intelligible. We will value the esthetic dimension of the investigation, like the formal treatment that is given to diverse elements that composes the message. So these elements are perceived and valued by our public as a whole and not in an isolation way.

As we have seen, three dimensions, *novelty, communication and aesthetics* compose creativity in graphic design. The combination of these dimensions creates the construct of creativity in graphic design. Each of them directly intervenes in the creativity contained by a product of graphic design; the lack of some of them disturbs the creativity of the product, thus creating a variation between products to another. For a better understanding it is necessary to

study and identify the mechanisms by which these dimensions interact in the valuation of creativity.

After doing the literature review, the following research question arises: An efficient instrument can be created to determine the degree of creativity for a determinant creative product? Our main objective for this research is the elaboration of a trustworthy instrument to measure creativity in the graphic design.

METHOD

We've used a material composed by the Stapel scale (Crespi, 1961) that was administrated to graphic design professionals which made possible the compilation of data, followed by statistics proceedings where it was calculated the alpha coefficient of Cronbach and descriptive statistical about the relation between them.

The sample was made in base of the Csikszentmihalyi (1996) Systems Theory where it was attributed to a group the power to decide what is creative and what is not, in the action field known as experts. Based on the *Consensual Assessment Technique* of Amabile we'll construct our methodology of the experimentation by supplying the instrument to the experts.

This study had two phases, the pilot phase and the experimental phase. The purpose of the pilot phase is to detect the errors in the development of the instrument, and to improve it before conducting the experimental phase.

Phase 1 (Pilot Phase)

Phase 1 Materials

For visual stimulation we choose three logos to validate the instrument, both of them by reference of creative by the magazine *Communication Arts* (see Figure 1) in their web page and another is exposed in the web page *logopond.com* like a low punctuation in the user's options. As an instrument of measurement we used the *Creative Product Semantic Scale* (Bessemer 1981) with some modifications in its semantic scale to be adjusted to the needs of this investigation according to Osgood (1976). Our scale would be constitute by three dimensions, *Novelty*, *Communication* and *aesthetics*, and in turn consist of five items each, which will have five items each, which will be punctually in every evaluation for the global valuation of the creativity in graphic design, using a Stapel scale of six points.

It was elaborated as a web platform for the administration of the instrument via the Internet.

Subjects

A snowball sample was made with graphic designers, which had the availability to participate as subjects in the pilot phase, to take the instrument and made comments via e-mail about its experience about using the instrument. A total of 30 subjects completed the instrument.

Procedure

Send an e-mail to the sample population with a link to access the instrument.

They were requested to enter the link, observed the logos and evaluate them according to the instrument, once the evaluation was completed they were ask to send an e-mail in response.

Results of the Test Phase

The items that comprised each of the dimensions of the first stimulation (see Figure 2) contain a high positive correlation between them; except from the *unpublished – original* that has a correlation of .354. The coefficient of Spearman-Brown obtained to calculate the reliability of the evaluations of the design 1 was .935. The grade of graphic creativity obtained for design 1 was .79; this grade was determined using the formula of Soler (1990) (see table 1).

In the second stimulation keeps the high positive correlations between the items that comprise each of the dimensions; although it was observed that it does not exist a significant correlation between the unusual items and the originals. The coefficient of reliability of Spearman-Brown was .920 and the result of the grade of graphic creativity was from – 0.406.

It obtained a high positive correlation between the items that comprise the dimensions of stimulation 3 in the exception of the item of originality that keeps a high negative correlation to a level .01. Equally, we highlight that the correlations between the *original* items with the rest that compose the dimensions of novelty, is significant negative. The reliability coefficient of Spearman-Brown was .933 and the result of the degree of graphic creativity was 1.53.

Conclusions of the Pilot Phase

From the results obtained during the pre-test we can conclude that the items comprising each of the dimensions, novelty, communication and aesthetics, have a significant positive correlation between them. About 84% of these significant correlations obtained a level .001 of significance, implying that this correlation is 99% confidence and 1% error. The significance level .005 was obtained by the 11% of the correlations, which indicates that these have a 5% error and 95% confidence; 5% of the correlations were not significant. If we sum up both levels the correlations level .001 with a 84% and level .005 level with 11%, we will have 95% of the correlations are significant. The subjects reported that items of the dimensions caused confusion when evaluating the designs, by the similarity of their definitions. These results lead to the conclusion that the instrument should be simplified and only use one item for the evaluation of dimension to be evaluated, which led us to undertake a 15 items to 3 items.

The reliability coefficient obtained in the evaluation for the design 1 was .935, design 2 was .920 and for design 3 was .934, so the reliability has been confirmed, that was sustain in theory of CAT of Amabile that this coefficient must be greater than .700.

Phase 2 (Experimental)

Phase 2 Materials

As visual stimulus three logos were selected to validate the instrument, one of them was referenced as creative by *Communication Arts* magazine (see Figure 2) on its website and the remaining exposed on page *logoodtheday.com*. It was decided that these were directed to the same industry, so that the three had to somehow solve the same problem of communication, specifically meant to represent the image of a "coffee shop".

Subjects participating

A sample of convenience was used. This decision is based on the statements of different authors like Soler (1996), Fernández, Hernández, and Batista (2006), Igartua (2006) and Sierra Bravo (2001). We select as our universe of graphic designers belonging to the Professional Association of Graphic Designers of Catalonia in order to validate our instrument, a total of 431. It considered as a sample all who answered the questionnaire, a total of 115. With the confidence coefficient of 95.5% and a rate of 50% for the margin of error is 7.83.

The constitution of the sample was dominated by males (77%) over females (23%). The age range was from 23 to 63 years old, with a mean of 44 years, 87% of our sample has an academic background in graphic design; in that 87% a training diploma was predominant with 57%.

Procedure

An email was sent from the administration of the Professional College of Graphic Designers of Catalonia, asking its members to complete the instrument. The instrument was online for

55 days. The information obtained was processed in Excel and then worked in a statistical program SPSS.

Design of the Test

The instrument was produced in two languages, Catalan and Spanish. This was because of the composition of our sample.

Improvements were made in the instrument created based on the results of the pilot phase. It is therefore decreased by the number of items from 15 to 3, *Novelty*, *Communication and Aesthetics*; These were measured directly by each of the dimensions, the scale was modified to use a 10 point scale (-5 to 5). (see Figure 3)

Result of the Test

The Cronbach coefficient for the stimulus 1 was .83, the stimulus 2 has one of .88 and 3 contains the coefficient of .78. Therefore there is evidenced of a high coefficient of internal reliability (see Table 2).

We developed a mathematical equation in order to create an index of creativity which simplify the presentation of the results of the instrument. The equation for determining the degree of creativity in the design would be as follows, $C = \frac{fc(nv \times nj) + (\sum v)}{fc(nv \times nj) \times 2}$. Where, **fc** = Creative Force is the maximum possible value that can reach the variable. This depends on the scale used, axis, using a Stapel scale from -5 to 5, the **fc** is 10. Since the codification of the values of the Stapel scale is -5 = 1, -4 = 2, -3 = 3, -2 = 4, -1 = 5, 1 = 6, 2 = 7, 3 = 8, 4 = 9 and 5 = 10, you can not use negative numbers, **nv** = number of variables that has been used to measure creativity, **nj** = number of judges who have rated the creativity **$\sum v$** = is the sum of the values of the variables. To indicate the variables it must be accompanied by the assigned number, axis. On a scale with variables *Novelty*, *Communication and Aesthetics*, V1 = Novelty, V2 = Communication and V3 = Communication = Aesthetics. The equation would be as follows; (V1 + V2 + V3). We must state that the maximum degree of creativity that can reach a product is 1 and therefore its opposite is 0, meaning the total lack of creativity. The minimum accepted level of creativity for a product to be considered as positive creatively is .80. If all the dimensions of the stimulus were evaluated at -1 or less the index is below .80. Consequently, those stimuli where all of its dimensions were evaluated as positive (+1 or more), which gets as the index of .80 or greater.

Using the coefficient to determine the creativity in graphic design created in this investigation stimulation 1 obtained a coefficient of .69, while the stimulation 2 and 3 were .89 in both cases

CONCLUSION

First we must consider that we have realized the appropriate statistical tests to verify the reliability of the instrument constructed in this investigation. This corresponds with the main objective of the same: To validate an instrument to measure the creativity of a graphic design. Secondly, and as a result of this research it has created a three-dimensional model of the creativity of graphic design products. (*novelty*, *communication and aesthetics*) In which it provides the theoretical and practical framework that allows further investigation the role of creativity in graphic design. The three-dimensional model of creativity in graphic design experimented and validated in this investigation should be thoroughly studied and validated further.

Finally, the created instrument in this investigation takes us a step closer to obtaining a more thorough model that would be deeper and more valid and would have great academic potential, both in the field of investigation and education. It could be used as an educational

tool. In the professional area it allows to construct a guide instrument to evaluate a product before it is terminated in order to study their potential effectiveness. It can also be used as an instrument to evaluate the effectiveness of a product after its development.

In the academic area the investigation allows to obtaining predictions, with acceptable reliability, the behavior of targets against the positive valuation of the graphic creativity.

Table 1

Equiation

$$C_g = \frac{\sum a - \sum r}{\sum i} \cdot \frac{1}{n}$$

Result

0.79

C_g = Creativity graphics; $\sum a$ = Sum of points acceptability factors; $\sum r$ = Sum of points of rejection factors; $\sum i$ = number of reactions of indifference, n = number of characteristics tested

Table 2

										
		Stimuli 1			Stimuli 2			Stimuli 3		
N	Valid	nd1	cd1	ed1	nd2	cd2	ed2	nd3	cd3	ed3
	Missing	115	115	115	115	115	115	115	115	115
		0	0	0	0	0	0	0	0	0
Mean		4.15	3.26	3.90	5.50	7.06	6.66	5.27	7.03	7.20
Std. Error of Mean		.229	.200	.243	.230	.212	.223	.205	.173	.160
Median		4.00	3.00	3.00	6.00	8.00	7.00	5.00	7.00	7.00
Mode		1	1	1	7	8	8	5	7	6
Std. Deviation		2.458	2.140	2.602	2.465	2.276	2.387	2.194	1.852	1.718
Cronbach's alpha		.83			.88			.78		

nd1 = Novelty dimension for stimuli 1; cd1 = Communication dimension for stimuli 1; ed1 = Aesthetic dimension for stimuli 1; nd2 = Novelty dimension for stimuli 2; cd2 = Communication dimension for stimuli 2; ed2 = Aesthetic dimension for stimuli 2; nd3 = Novelty dimension for stimuli 3; cd3 = Communication dimension for stimuli 3; ed3 = Aesthetic dimension for stimuli 3.

		
Design 1: Logo extracted from the website of the Communication Arts (commarts.com)	Design 2: Logo extracted from the website Logopond.com	Design 3: Logo extracted from the website of the Communication Arts (commarts.com)

Logos used as stimuli for the pretest of the research, they were extracted from the Communication Arts (www.commarts.com) and the website Logo Pond (www.logopond.com)

Figure 1

		
Logo Logo of the day. (156 votes, average: 2.62 out of 5)	Logo as noted by Creative Arts Computer	Logo taken from the page, Logo of the day (98 votes, average: 3.37 out of 5)

Logos selected for use as stimuli in our instrument.

Figure 2

	Descripción: Logo para un café										
	-5	-4	-3	-2	-1	Novedad	1	2	3	4	5
	0	0	0	0	0	[?]	0	0	0	0	0
	-5	-4	-3	-2	-1	Comunicación	1	2	3	4	5
	0	0	0	0	0	[?]	0	0	0	0	0
	-5	-4	-3	-2	-1	Estética	1	2	3	4	5
	0	0	0	0	0	[?]	0	0	0	0	0

Partial view of the instrument. The stimulus is presented on the left side while on the right side are the items and scale. If the subject needed to review the definition of the term presented, I will press the symbol "?" and then they displayed a window showing the definition.

Figure 3

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