

## PERCEPTION AND CREATIVITY ASSESSMENT IN GRAPHIC DESIGN

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### INTRODUCTION

The study of creativity has a major interest in the current context of our society. It is important for companies to determine how creative their products can be, as innovation can generate 75% of their revenues [1]. As a result, companies and professionals responsible for expressing their creative potential need to use methods and measures to distinguish products that are considered the most creative from those that are less creative.

The general objective of this study is to contribute to the analysis of the different factors responsible for differences in the way creative works are evaluated. The research is focused on the field of graphic design, described by *La Maison de Artistes* as intended to "convey a visual message in all areas of life".

More specifically, our general objective can be subdivided into two parts:

- First, we want to identify the criteria used spontaneously by judges during the evaluation of the creativity of graphic design.
- Second, we want to determine the differences between assessments performed by judges with different profiles. The profiles taken into account are based on two factors: the "professional perspective" of judges – depending on their professional status and can influence their perception of graphic design – and their level of experience in the professional field – and their level of experience in the field of design (measured in number of years spent practicing an activity in this field).

### 1. CREATIVITY

#### 1.1. Definition of creativity

Anyone working on creativity first has to define his or her understanding of this term [2]. However, such is the complexity and multidimensionality of the subject that a clear definition is difficult to achieve.

Plucker, Beghetto, and Dow selected 90 different articles from peer-reviewed journals on

creativity, business, education, and psychology, restricting their choice to those with the word "creativity" in their title. Only 38% of these articles explicitly defined creativity [2].

Some authors opine that creativity escapes definition [3] [4]. For example, Amabile asserts that the current state of science does not provide a sufficiently clear description of creativity for it to be given a definition. She claims that there is a plethora of data, but a dearth of definitive statements: we cannot yet establish the cognitive profile of a creative individual, that is, a person with all the traits and abilities needed to ensure the production of a truly creative outcome. Nor can we list the features that set a truly creative outcome apart from a noncreative one. However, quoting Kosslyn's observation that "it is not necessary to begin with a crisp definition of an entity in order to study it" [5], Amabile suggests that as long as the entity under consideration can be recognized with a reasonably good consensus, it makes sense to proceed with a scientific examination of that entity.

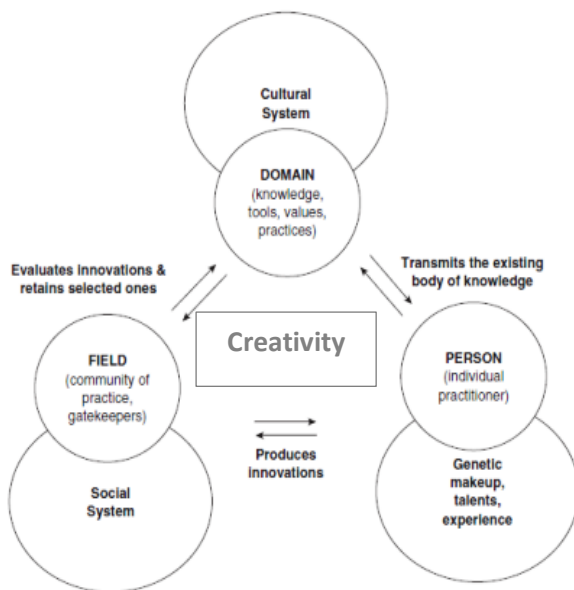
Many authors writing about creativity nonetheless attempt to provide some kind of definition of the term. Sarkar and Chakrabarti analyzed over 160 definitions of creativity and arrived at the following common definition: "Creativity occurs through a process by which an agent uses its ability to generate ideas, solutions or products that are novel and valuable" [6]. This is the definition we adopted for the purposes of the present research.

In a summary of scientific research into creativity, Michael Mumford suggested: "Over the course of the last decade, however, we seem to have reached a general agreement that creativity involves the production of novel, useful products" [7] or, in Robert Sternberg's words, the production of "something original and worthwhile" [8]. Authors have diverged dramatically in their precise definitions beyond these general commonalities: Peter Meusburger reckons that over a hundred different analyses can be found in the literature [9]. As an illustration, one definition given by Dr. E. Paul Torrance described it as "a process of becoming sensitive to problems, deficiencies, gaps in knowledge, missing elements, disharmonies, and

so on; identifying the difficulty; searching for solutions, making guesses, or formulating hypotheses about the deficiencies: testing and retesting these hypotheses and possibly modifying and retesting them; and finally communicating the results” [10].

Creativity, with all its complexity and multidimensional aspects, is difficult to define in a clear and easily generalizable way. For this research, we will refer to the definition proposed by Sarkar and Chakrabarti [6], resulting from their analysis of about 160 definitions resulting from various research in the field of creativity. According to them, the common feature of all definitions of creativity is that it appears through a process implemented by the individual to generate ideas, solutions or products that are new and valid.

Moreover, in order to be recognized as creative, productions must be judged by what Csikszentmihalyi [11] in its systemic model calls “the field”, constituted by a group of people or institutions playing the role of *gatekeepers* (fig. 1).



**Figure 1.** General Systems Model of Creativity [11]

It is the latter who will accept or reject production so that it may or may not be part of the domain (the domain), constituted by a set of cultural knowledge and symbols. It seems, therefore, that in order to obtain a positive judgment or approval for creative production, the author must become familiar with the requirements and values of the judges who will evaluate it in order to satisfy them.

## 1.2. Perceptions of creativity

Creativity is a subject that arouses a great deal of interest and curiosity. People are fascinated

by the way in which famous creative personalities such as Albert Einstein and Pablo Picasso came up with their discoveries or produced their masterpieces [12]. But creativity is not only about the great art, it also concerns the everyday life, since most of the artifacts present in our environment are the consequence of people’s creative invention [13] [14] [15].

Back in the 1950s, psychologists shifted their attention from the works of geniuses to those of ordinary people, and the late 1980s witnessed a growing interest in the social and cultural dynamics of creativity, including in everyday life [16] [17]. Increasing use is now being made of consensual forms of validation [3] [18], and creativity has started to be perceived of as something that takes place in the context of the community, within networks of social relations and social interactions, and using existing cultural artifacts.

The growing interest for the subject became a large public center of interest: self-help books, courses and workshops on how to develop one’s creativity are extremely popular in today’s society. There is an increasing demand for innovation in our society, in the form of new products, but these new products must be tailored to users’ actual needs and cognitive abilities.

From the theoretical point of view, the societal approach described above contrasts personal creativity, or creativity with a small c, with “*historical creativity*” or Creativity with a big C [19] [12]. Personal creativity refers to creations that of lesser importance for humanity as a whole, but which nevertheless have a great deal of value for their authors, as they are the result of an individual process. Historical creativity refers to the discoveries and masterpieces of famous creative personalities.

Beghetto and Kaufman extended this discontinuous view of the creativity concept by introducing the Four C model of creativity, adding to the existing creativities (with a small c and big C), creativity with a mini c, which refers to the “*novel and personally meaningful interpretation of experiences, actions, and events*” [20] and creativity with a pro c, referring to the creativity expressed through people’s creative professions, without any major impact on history.

In lines with these hypotheses, Johnson and Carruthers divided creativity into four categories: (1) Creation-common-place, of which the result is neither surprising nor uncommon, just a consequence of human activity; (2) Creation-creative-domain, where the creative domain can be art, the media, and so on, but where the creative discovery is made on an individual scale; (3)

Creative combination, which involves the improvement of an already existing artifact, by modifying a single feature such as method, context or use; and (4) Creative-new, which is innovative in the context of the history of humanity [21].

This desire to categorize creativity reflects the existence of different expectations associated with creativity, described by Sarkar and Chakrabarti [6]. The novel and valuable character of a product is perceived differently according to whether it has been created by a kindergarten pupil, a nonexpert adult or a creative professional.

In this research, in relation to the typology set out above, we focused on a brand of creativity that lies midway between the small-c and pro-c categories, insofar as the authors of the creative outcomes we analyzed were students enrolled on creative courses.

## 2. RESEARCH FRAMEWORK AND STUDIES

The aim of this study is to collect the criteria that people consider as important when assessing creativity in graphic design. In this study we aim to collect criteria reflecting the theoretical viewpoints, mental representations and declared priorities of our participants. In order to obtain that information, we asked the participants to express their criteria independently of any specific examples of design. Moreover, the participants involved in this study were not provided with lists of suggested criteria, but had to quote spontaneously what is important to them, while assessing the creativity of design.

The first objective of this research is to find out whether there is a set of general criteria adhered to by most people.

Second, is to analyze differences and common points between criteria proposed by participants with different professional viewpoints and with different levels of expertise in design.

### 2.1. Method

For this study we choose to use a survey for collecting the qualitative data, which were then analyzed with the use of an adapted version of the grounded theory method. The findings were then transformed into quantitative variables and statistically compared, in order to determine the differences observed between different groups of participants.

### 2.1.1 A survey with open questions

The most appropriate way to discover what is important for participants to assess creative design is simply to ask them about the criteria they think are the most suitable for this domain. Therefore, for the phase of data collecting we used an online survey with open questions.

### 2.1.2 Data analysis

To analyze the responses given during the survey, we adapted the grounded theory method. More specifically, in this study we proceed as follows:

- First we identify **codes**, by collecting terms used by participants of the survey to describe the criteria of creative design assessment. Thus we obtain a list of terms, which comprises different propositions of criteria expressed in various ways and by different numbers of occurrences.
- Second, we group the terms with similar content, in order to find the common concepts. Therefore, we assembled them in order to create the categories – entities spontaneously proposed by participants as important to evaluate creativity. For each category, we find the most representative label.

Using this methodology, we expected to find relatively detailed information about the representations and approaches to creative design assessment. More precisely, (1) our data show the vocabulary spontaneously used by people to describe criteria for assessing graphic design, (2) we compare the quantity and the nature of criteria mentioned by participants with different professional backgrounds and levels of expertise.

## 2.2. Participants

### 2.2.1. Recruitment

Our participants were recruited via Facebook and email invitation to fill in an online questionnaire. We sent invitations to participate in our study to approximately 150 design professionals and 100 other people. 61 design professionals and 14 other people responded positively to our demand and filled correctly the questionnaire. The participant's age is minimum 19 and maximum 67 years old.

This way of collecting responses seems the most appropriate, as it allows us to reach design professionals in the entire country. We could access a high number of people with the appropriate profiles, even if we knew that the percentage of

responses would be lower than if we contact them in person.

### 2.2.2. Establishing specialization profiles

We asked each participant what was precisely his or her professional activity and to indicate the number of years spent on this activity. They could choose one or more activities between:

- Graphic designer
- Graphic Design Student
- Art director
- Art teacher
- Other

We reserved the other category for participants whose activity was not connected with design, in order to obtain the control group of laypeople. We needed this group to compare the results obtained by the design professionals with those obtained by participants having no professional experience in design. Moreover, this group can be considered as the design audience and their opinion reveals the viewpoint of users' experience and their implicit theories about creativity.

Numerous participants indicated multiple professional activities, thus we decided to describe our sample in a more detailed way. Many professional designers are also art directors. Because of this, we decided that being an art director is a decisive criterion, since it changes the viewpoint on the domain: art directors are supervising the global directions of design and often they give directions to designers. We therefore separated our participants who were only designers from those who were art directors, even if their activities were multiple.

Being an Art teacher is an even more decisive criterion, as being able to explain the design to others, often from a theoretical perspective, also changes the viewpoint on the domain. If participants indicated that they were art teachers, we included them in the group of teachers, regardless of the other activities that they declared. Thus, even if a participant was not only a teacher, but also an art director or a designer, we qualified him or her as a teacher.

Because of this, for the participants professionally connected with design, we obtained the following groups:

- Designers
- Art directors
- Art teacher
- Graphic Design Student

### 2.2.3. Establishing experience profiles

Our aim was also to analyze differences related not only to the design specialization but also to the participants' level of professional experience in design. Within the same sample, we created additional groups.

Moreover, we aim to identify differences between participants, depending on their level of experience in the design field. We created the following groups:

- Participants with more than 10 years of professional experience in the design domain – 11 persons.
- Participants with 5 to 10 years of professional experience in the design domain – 11 persons.
- Participants with 3-5 years of professional experience in the design domain – 6 persons.
- Participants with 1-2 years of professional experience in the design domain – 19 persons.
- Participants with no professional experience in design at all, that we will laypeople – 28 persons.

### 2.2.4. Final sample

Finally we obtained a sample of 75 participants.

In order to obtain the groups with different professional backgrounds, we created the following groups:

- **18 designers** (9 males and 9 females, 7 with 1-2 years, 3 with 5-10 years, 4 with 3-5 years, 1 more than 10 years, 3 with no professional experience)
- **10 art directors** who are not teachers (9 males and 1 female, 5 with more than 10 years, 3 with 5-10 years, 1 with 3-5 years, 1 with 1-2 years)
- **8 art teachers** (4 males and 4 female, 4 art teachers with 5-10 years of professional experience, 1 art teachers with 3-5 years, 2 more than 10 years, 1 with no professional experience).
- **25 Graphic Design Student**
- **14 Others**

We chose 10 years of professional experience as limit differentiating experts from other participants, as suggested by a number of authors [22] [23] [12]. We compared data obtained from these participants with those obtained from less experienced design professionals and from laypeople.

## 2.3. Material

We created one questionnaire using Google documents. Furthermore, all participants were provided with instruction to write down, using their own words, the criteria that allow them to evaluate the creativity in the graphical design task.

## 2.4. Procedure for criteria finding

To analyze the data from all the participant's responses, we proceeded in three steps.

### 2.4.1. First step: identifying codes

We made a list of all the terms proposed by participants as criteria to assess graphic design. Therefore, these terms contains information about the subjective representations of what creativity in design is, and about the vocabulary used by participants to evoke the criteria to assess this creativity. The same term could be proposed by different participants. We collected the terms proposed to evaluate the creativity of graphical design.

### 2.4.2. Second step: categorization of finding criteria

Having a list of terms, we then proceeded to categorize their contents, in order to find those, which could be interpreted as synonyms and label these terms under the same concept.

For example, a label *Originality* was suggested to group the following terms from the graphic design list:

*Innovation, presenting the message in an original way, original processing, new, innovative, surprising, cessation of what is usual, unusual, different, not ordinary, new idea.*

We eliminated the items that appeared just once, without being linked to any category, or that were difficult to interpret.

To understand which criteria are the most commonly mentioned, we analyzed the number of occurrences of each of them in the participant's proposals. If participants used more than one item belonging to the same criteria, we considered that they used synonyms to describe the same criterion.

### 2.4.3. Third step: identification of criteria in creative assessment

We carried out the categorization of our criteria with the goal of obtaining criteria and their number of occurrences. We then analyzed the

number of occurrences of each criterion in the participant's proposals. If participants used more than one criteria belonging to the same criterion, we treated it as a single occurrence of that criterion.

## 2.5. Categorization results and criteria finding

During the categorization process, 21 categories were created to represent criteria for the assessment of graphic design creativity. We present all of them in the table 1, each with a short description and the numbers of times that was mentioned each criterion as being important when assessing creativity in graphic design.

We can observe that *Originality* obviously has the highest number of occurrences. This was the only criteria that had more than 50% of occurrences and of which we can assume that, according to the participants, it has a high importance for creativity. There was also *Design elements*, *Comprehension message*, *Aesthetic*, *Creative person qualities*, *Concept*, criteria mentioned by more than 10 % of the sample.

### 2.5.1. Criteria depending on the participant's professional backgrounds

The data are collected in a table whose lines are the participant's professional backgrounds, the columns of which are the criteria and whose general term  $x_{ij}$  is the number of times the criterion  $j$  is mentioned by the participants  $i$  (Table 1). This table can be seen as a contingency table considering that it has  $n$  criteria descriptions and these descriptions are ventilated by two categorical variables: the participant's professional backgrounds and the used criteria.

Correspondence analysis's based on the analysis of the contingency table through the row and column profiles [24]. Row profiles correspond to the relative frequencies of the different criteria mentioned by each group of participants with different professional backgrounds.

Dimensions are typically plotted to visualize the relationships among the variables. In CA, this graphical representation is called a "map".

Results of the CA were generated using the following code in RStudio [25]:

```
data <-
read.table("C:/Users/user/Desktop/poster.txt",
header=TRUE,sep="\t", na.strings="NA",
dec="," , strip.white=TRUE)
summary(data)
library(FactoMineR)
```

**Table 1.** The criteria related with creativity that were cited by all the participants in the area of Graphic Design

N	Criteria	Definition	Numbers of times that was mentioned the criteria
1	Originality	Reference to innovation, uncommonness	41
2	Design elements	Visual components of design	13
3	Comprehension message	Degree to which it is comprehensive for the user to understand the design functionalities	11
4	Aesthetic	The appearance of design	10
5	Creative person qualities	Describes the characteristics considered as important for person creativity	9
6	Concept	Quality and the elaboration of the idea on which the design is based	8
7	Simplicity	Use of simple means and minimum of elements	7
8	Quality of execution	Precision and finishing of the design work	7
9	Harmony	The way in which the design elements should be adjusted with each other to create an impression of unity	6
10	Style	Underlines the importance of some strong, recognizable traits	5
11	Layout	Organization of the design elements on the given surface	5
12	Functionality	the quality of being suited to serve a purpose well	5
13	Emotions conveyed	Evoking emotional reaction	5
14	Professionalism	the competence or skill expected of a professional	4
15	Relevance to the subject	Importance of the semantic connection between the content and the theme of the graphic design	3
16	User appropriateness	Connected with usability of the design	1
17	Tools	Technology used during the creation process	1
18	Impact	A marked effect or influence	1
19	Creative process characteristics	Divergent thinking and visibility of the creative process within the final production	1
20	Character adapted to the public	The design is adapted to the public needs	1
21	Appeal	Attracting the target attention	1

```
res = textual
(data,num.text=13,contingence.by=3)
res$nb.words
descfreq(res$cont.table,proba=0.2)
res = CA(res$cont.table)
```

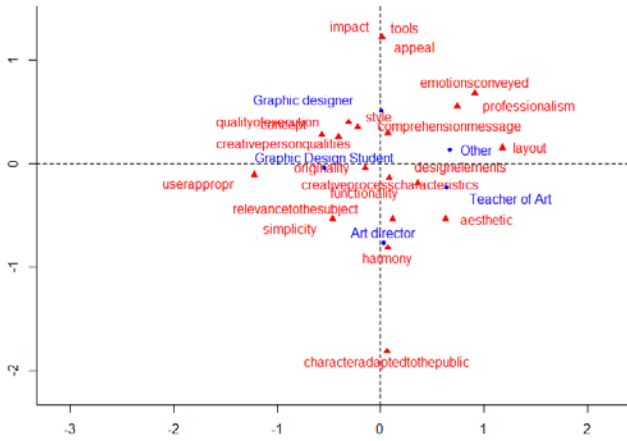
The map is presented in Figure 2. The origin on the map corresponds to the centroid of each variable. The closer a row profile's vector location is to the origin, the closer it is to the average profile.

Dimension 1 is represented by the horizontal axis; Dimension 2, the vertical axis. Along Dimension 1, we see on the map that *Art Teacher* and *Graphic Design Student* are opposed and

furthest away from the origin and therefore have the most importance. Along Dimension 2, we see that *Art Director* and *Graphic Designer* have different vision about assessing criteria declared as important for the graphic design creativity assessment.

When analyzing data obtained within the groups with different backgrounds, we observed that for **Art directors** seem very important *Originality*, *Harmony* and *Aesthetic*.

**Art teacher** considerate more important criteria for assessing creativity in graphic design the *Originality*, *Aesthetic*, *Design elements*. This is the only group that shared moderately their conside-



**Figure 2.** Correspondence analysis map of criteria used during the interview, within groups of persons with different backgrounds.

ration for *Comprehension message*.

**Graphic Designers** shared at least more interest to *Originality*, *Creative person qualities* and *Creative person qualities*.

For **Graphic Design Student** seem very important *Concept*, *Simplicity*, *Comprehension message* and *Originality*. Graphic Design Students shared their consideration to *Originality* as highly important for graphic design creativity, to a higher degree than other groups. We did not want to keep the criteria related to the creative-process or person, nevertheless in this case the number of participants with this specific profile that mentioned this criterion seemed high and we judged it interesting to note it as a specificity of student' group.

For **Other people** seems important *Originality*, *Comprehension of message*, *Concept* are most important criteria.

### 2.5.2. Criteria depending on the participant's level of experience in graphic design

When comparing the results of participants depending on their level of experience, we observe that the distribution of the most cited criteria is not equal.

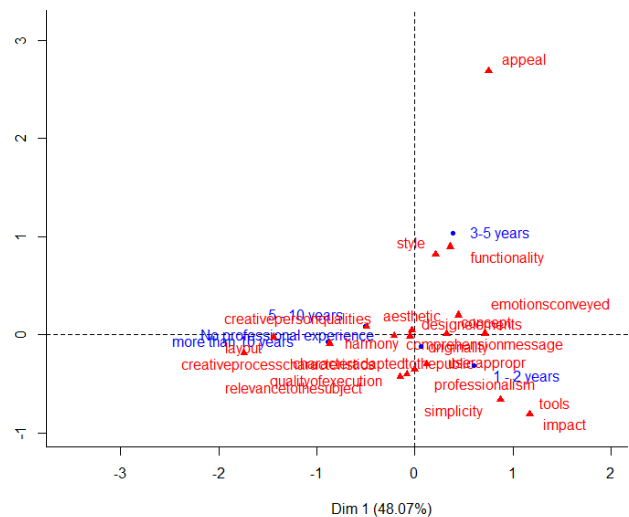
Results of the CA were generated using the following code in RStudio.

```
data <-
read.table("C:/Users/user/Desktop/poster2.txt", header=TRUE, sep="\t", na.strings="NA", dec=".", strip.white=TRUE)
summary(data)
library(FactoMineR)
res =
textual(data, num.text=13, contingence.by=4)
res$nb.words
descfreq(res$cont.table, proba=0.2)
```

res = CA(res\$cont.table)

The map is presented in Figure 3. The origin on the map corresponds to the centroid of each variable. The closer a row profile's vector location is to the origin, the closer it is to the average profile.

Along Dimension 1, we see on the map that the group of participants with *1-2 years of experience in graphic design* and *Impact* are furthest away from the origin and therefore have the most importance. Along Dimension 2, we see that participants with *3-5 years of experience in graphic design* and *Appeal* have the most importance. These results indicate that the most important difference or largest deviation from independence in the sample is between *1-2 years of experience in graphic design/Impact* and the other groups of persons and criteria. The second most important difference is between participants with *3-5 years of experience in graphic design / Appeal* and the other groups of persons and criteria. The other responses being closer to the origin imply that the deviations from the expected proportions are relatively small.



**Figure 3.** Correspondence analysis map of criteria used during the interview, within groups of persons with different level of experience in graphic design.

First axe separate the group which have few experience from the group of more than 5 years of experience. The second axe separates the group of 3-5 years of experience (style, functionality) of the group with 1-2 years of experience (simplicity).

For people with the **1 - 2 years of experience** in graphic design seems very important *Originality*, *Simplicity* and *Comprehension message*.

**3-5 years of experience** in graphic design shared at least more interest to *Originality*, *Style*, *Functionality* and *Appeal*.

The people with **5 – 10 years of experience** in graphic design consider more important criteria



for assessing creativity in graphic design the *Originality, Design Elements, Layout*.

The people with **more than 10 years** most important criteria are *Originality, Aesthetic and Layout*.

Asserted experts (5-10 years and more than 10 years of experience) show a common preference for a quite moderated quantity of criteria, but most of them reach the threshold of high importance. The distribution of their most shared criteria reflects the general preferences.

For **No professional experience** it is important *Originality, Design elements, Comprehension message and Concept*.

## CONCLUSIONS

The results of this study have enabled to identify in greater detail the creativity criteria used in the area of graphic design. Furthermore, it allowed us to understand the influence of judges' characteristics, such as their professional background or level of experience in design, on the use of those criteria.

This study allowed us to understand better the nature of detailed criteria, representing the mental representations of design creativity. We will use criteria cited with the highest frequency by the participants of this study, in order to find out to which degree they influence the overall creativity assessment.

The first goal of this study was to find out whether there is a set of general criteria that people find important for the design creativity. After analyzing our findings, we can propose such a set of the most important criteria. Thus, for graphic design area, on which we focus in this study, it would be *Originality, Design elements, Comprehension message* and *Aesthetics Creative person qualities*. Additionally, we have *Concept* criterion was cited by participants few times, thus, we consider it as a moderately important criterion.

Some criteria issued from the state of art, were not included in our set of the most important criteria, since they were mentioned by a lower number of our participants: *Appeal, Character adapted to the public, Creative process characteristics, Impact, Tools, and User appropriateness*. It seems that in people's mental representations these criteria do not play the major role. Nonetheless, even if these criteria do not seem to be declared as important for creativity, it does not mean that they are not taken into account during the real situations of design assessment.

Our second goal was to verify if mental representations of creativity are different depending on the professional viewpoint and on the level of experience in graphic design.

First, we analyzed criteria declared by **participants with regard to their different professional viewpoints**. The most striking difference between the four profiles is that **designers** seem to have the most developed mental model of creativity, since comparing to other groups, they share the most important number of criteria that they consider important for creative design. While considering only the graphic design criteria, we can see that *Style, Creative person qualities* and *Quality of execution* are especially more considered by designers, than by other groups.

If we look at the quantity of criteria on which agree **art directors**, we see that it is moderate compared to designers. Art directors' considerations for graphic design criteria are very similar to those found in general results, which could be interpreted as a validation of this group as being the appropriate representatives of the domain voice. If it's their role to be opinion leader, to select the memes and transmit them to the relevant audience their choices and preferences should be somehow reflected by the choices and preferences of the domain in general. This is also in lines with Hooker, Nakamura and Csikszentmihalyi: domain gatekeepers should be able to identify the adequate degree of appropriateness and novelty, which means that to identify this adequateness, they should share, or at least have the knowledge about the mental representations of different actors of the field.

**Teachers** seem to have the strictest vision of creativity: they agreed on the lowest number of criteria. Their approach to creativity is similar to that of art directors, but comprises fewer criterions, which confirms that both groups are close to each other and can be put under the common label of domain gate keepers, but with a slightly different focus. In comparison to teachers, art directors' professional role consists more in meeting the audience's values. It seems that teachers developed a system of creativity values that is not only clear, but also restricted to only few shared criteria. The important number of non-shared criteria could be a result of differentiation of the approach to the design developed during the years of teaching experience, during which theory meets the variety of individual pedagogical cases. This could be interpreted in line with Caroff and Besançon [26], who underlined that some experts could diverge in their opinions about creativity, since their subjective understanding of it was developed differently during the acquisition of their own experience.



Nevertheless, we should also remember that the quantity of participants in this group was lower than in other group, which might influence the results.

When **comparing the results of participants with different levels of experience in design**, we can see that the main difference between **other people** and the more experienced participants is in their approach to the appropriateness criteria.

These findings are the most visible within more detailed criteria results concerning graphic design area: we can see that other people cited only *Originality* and *Emotions conveyed* as highly important for creativity. We can even observe that asserted experts agreed strongly on a smaller number of criteria, while intermediary experts agreed moderately on a higher number of criteria.

With increasing experience the professionals of design find more shared criteria and when they achieved the asserted expert's level, these criteria are reduced to a smaller number, but shared by more individuals. It could be due to the fact that more the experience of people increase in the graphic design area, more the criteria are shared. With time needed to acquire the experience, several criteria lose their importance and the agreement is kept only for those criteria that kept their universality towards different situations that can be encountered during the design professional's career.

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