

Metadata of the chapter that will be visualized in SpringerLink

Book Title	Advances in Ergonomics in Design	
Series Title		
Chapter Title	Design, Meaning, and Intention: Communication in Times of a Pandemic	
Copyright Year	2021	
Copyright HolderName	The Author(s), under exclusive license to Springer Nature Switzerland AG	
Corresponding Author	Family Name	Costa
	Particle	
	Given Name	Maria Luísa
	Prefix	
	Suffix	
	Role	
	Division	
	Organization	CIAUD, Faculdade de Arquitetura da Universidade de Lisboa
	Address	Rua Sá Nogueira, Polo Universitário da Ajuda, 1349-063, Lisbon, Portugal
	Division	
	Organization	Instituto Superior Miguel Torga
	Address	Largo da Cruz de Celas nº1, Coimbra, Portugal
	Email	design.luisacosta@gmail.com
Author	Family Name	Saes
	Particle	
	Given Name	Joana
	Prefix	
	Suffix	
	Role	
	Division	
	Organization	CIAUD, Faculdade de Arquitetura da Universidade de Lisboa
	Address	Rua Sá Nogueira, Polo Universitário da Ajuda, 1349-063, Lisbon, Portugal
	Division	
	Organization	Instituto Superior Miguel Torga
	Address	Largo da Cruz de Celas nº1, Coimbra, Portugal
	Email	
Author	Family Name	Rala
	Particle	
	Given Name	Silvia
	Prefix	
	Suffix	
	Role	
	Division	
	Organization	CIAUD, Faculdade de Arquitetura da Universidade de Lisboa
	Address	Rua Sá Nogueira, Polo Universitário da Ajuda, 1349-063, Lisbon, Portugal

Division
Organization Instituto Superior Miguel Torga
Address Largo da Cruz de Celas nº1, Coimbra, Portugal
Email

Abstract In this paper, we assess how communication design has contributed, in the context of the SARS CoV 2 pandemic, to inform and motivate people to take safe individual actions, particularly physical distancing and the use of masks. Throughout the study, and in order to assess the communicative effectiveness of images, we contextualize the concepts of poster and image. Thus, we analyze a set of images produced and presented on posters through a descriptive grid and an open survey to the community.

Keywords (separated by '-') Communication design - Poster - Image - Covid19 - Meaning - Information



Design, Meaning, and Intention: Communication in Times of a Pandemic

Maria Luísa Costa^{1,2}(✉), Joana Saes^{1,2}, and Sílvia Rala^{1,2}

¹ CIAUD, Faculdade de Arquitetura da Universidade de Lisboa, Rua Sá Nogueira, Polo Universitário da Ajuda, 1349-063 Lisbon, Portugal

² Instituto Superior Miguel Torga, Largo da Cruz de Celas n°1, Coimbra, Portugal

Abstract. In this paper, we assess how communication design has contributed, in the context of the SARS CoV 2 pandemic, to inform and motivate people to take safe individual actions, particularly physical distancing and the use of masks. Throughout the study, and in order to assess the communicative effectiveness of images, we contextualize the concepts of poster and image. Thus, we analyze a set of images produced and presented on posters through a descriptive grid and an open survey to the community.

AQ1

AQ2

Keywords: Communication design · Poster · Image · Covid19 · Meaning · Information

1 Introduction

In the context of the pandemic caused by Coronavirus disease 19 (COVID 19), our habits have changed profoundly, and in a short time, people had to adapt to new practices to protect themselves and others from SARS-CoV 2. New social codes of conduct were adopted, and new practices were integrated in a generalized way into the behavior of the populations. This new reality required a great effort of adaptation by the people, and in this sense, efforts were multiplied, and posters were produced to inform citizens about procedures and actions to take. Many of these posters have been posted in public spaces and are available on websites for consultation or download.

We believe that these posters, despite their relevance, have some weaknesses, particularly at the level of images that should be more perceptible. Therefore, as designers, teachers, and researchers in the field, we carried out an in-depth analysis of the posters and the images that compose them; starting from this study, we selected a set of images that we systematized in an analysis table, and then put the evaluation of the public through a survey.

Thus, this paper presents a reflection on the clarity of images and their communicative accuracy, the suitability of the means used, and how information reached the population.

2 Design Poster and Image

In the campaign carried out under Coronavirus disease 19 (COVID 19), we are dealing with informative and didactic posters, with an educational, awareness-raising, and

social prevention function, whose objective is to generate a reactive action in the target audience, persuading through the message, and that according to Moles [1], fulfill the function of informing; educating and creating action.

Munari [2] addresses the need for visual characterization, referring to the need for product differentiation or a style of its own associated with the entire campaign, which will allow immediate recognition, being essential the coherence between product form and color. We consider that this visual and transversal coherence exists, particularly in the posters of the General Direction of Health (DGS) and the University of Oporto.

In the context of the poster, we can point out that as a whole, it can be seen as an image, that it contains differentiated elements such as figures and typography, which are also images with different levels of iconicity and that as a whole they end up transmitting to us, which are nothing more than mental images.

Concerning the image, we must contextualize, stating that according to Costa [3] “images are fragments of visible things, or visual, of the environment and imagination, and its fundamental character is that of representation.”

For Melot [4], “no one can provide today with a definition of the image that makes authority.”

As for the narrative interaction, most of the informative posters referring to the pandemic theme “tell a story” having as the main element the image. In graphic design, images are one of the most mediatic and effective elements of communication. Ambrose and Harris [5], refer to the image as the element that most effectively stimulates the recipient: “Image usage is perhaps the most exciting aspect of design because images can have a profound impact on the outcome and success of a piece of work due to the emotional reaction they can precipitate in the viewer. However, if images are poorly used, they can detract from, or counteract, the message in the text”. This connection between image and text helps to simplify and explain the complex information described in the text [6].

According to Melot [4], the image is in permanent tension between two poles, analogy, and code. The analogy is based on the relationship with what it represents, while the code is all that gives it meaning.

According to Ambrose and Harris [5], the image has the power to communicate differently, according to its connotative meaning and its denotative meaning. For example, the denotation of ‘mask’ outside the pandemic context would be associated with personal protection equipment used for reasons such as illness, fragility, or “prevention and control of respiratory infection in health units” [7]. However, the same ‘mask’ image in a pandemic context may have a connotation of fear, terror, accessory, and obligation.

For González-Miranda and Quindós [8], icons, symbols, and pictograms are powerful tools of visual communication and used to inform without the use of words, since they are assumed as signs that carry meanings, easily recognizable and that indicate actions, concepts, content or services, and may present a greater or lesser degree of iconicity.

The degree of iconicity lies in the degree of similarity with the referent. The referent consists of the object, person, action to which the sign alludes, and respect for the morphological structure and the referent’s respective peculiarities is decisive on its excel-

lent understanding. As for the degree of iconicity, the maximum degree refers to total similarity while the minimum degree refers, for example, to an abstract representation [8].

Because it is more attractive and affective, the image is widely used for motivation, as is the case with these posters that systematically use it for transmitting the information. We know that according to Joly [9], the image transmits a large number of visual information, which can have multiple meanings and interpretations. Thus the image, or an iconic sign, ends up assuming itself as a visual text, which for a correct reading and interpretation, needs to stand out or to highlight the most relevant aspects of what it is intended to communicate, which can be done through color, composition, framing, and proportions.

The creation and manipulation of images are of extreme importance because the meanings and environments can suggest both denotatively and connotatively, having a vast range of possibilities. An incorrect visual representation of the mask's placement on an information poster can trigger an inappropriate use of.

We would say that the image, like a text, needs to have a coherent structure appropriate to communication to be simplified and a hierarchical process to be considered an instrument of expression and communication.

In this context, we propose to analyze the images that are part of a set of posters to verify first and foremost their relationship with the referent and whether they are assumed as elements of communication and information.

3 Method

This study aims to analyze the communicative effectiveness of images with instructions on procedures to adopt in a pandemic context and, as advocated by Costa [10], to verify whether the images meet the needs of communicating the largest number of data with the smallest number of graphic elements in the smallest physical space, and also if the receiver understands the graphic visual information with clarity and accuracy.

Thus, in the first stage, we proceeded to an extensive gathering of images, from which we selected those presented in the analysis tables because we considered them representative of the general context. We intervened in the images by purging them from accessory elements to direct our focus to analyze their communicative effectiveness. To do so, we developed an analysis grid based on Gervereau's [11] proposal, where we descriptively analyzed selected images, concluding with a small synthesis about the aspects we considered positive and negative.

Subsequently, we carried out a survey to confirm our analysis. This survey is composed of an initial part, which allows us to achieve a small sociodemographic framework of respondents.

The questionnaire was developed on the Google Forms platform and disseminated through email lists and Facebook social network. The questionnaire consists of multiple choices, a linear scale, and open questions. None of the questions was mandatory.

This study involved 128 participants, women ($n = 88$) and men ($n = 40$), the ages of respondents ranged from 18 to 71.

Regarding the academic level, 87 respondents have higher education, 34 middle or professional education, and 7 basic education.

4 Results and Discussion

The analysis grids are presented, followed by a table with the survey results and the description of the main answers to the open questions. This information is divided by the themes under study: analysis of social distancing representations and correct use of the mask. We analyze relevant variations by gender, academic level, or age and conclude that these differences are non-existent, and there is no differentiating trend verified.

4.1 Physical Distance

AQ3 See Tables 1 and 2.

Image a): most respondents report that the distance is perceptible or very perceptible 59% ($n = 75$). It is also reported that the number of participants who consider the image nothing or little perceptible doubles (28%) concerning those who consider the image totally perceptible (13%).

Regarding open answers, it should be noted that a large number of respondents report that the distance between the figures does not represent 2 m. One refers to the proportionality between the scale of the human figure and the separation of figures. Some report that perspective and three-dimensionality make it difficult to read, stating that a 2D representation would be easier to interpret. There is also one respondent who says that profile images facilitate understanding.

Image b): most respondents reported that the distance is totally perceptible 57% ($n = 73$). It is also recorded that the number of participants who consider the image nothing or little perceptible is only 12%, which allows us to conclude that this is the image that best represents the physical distancing required.

However, it is verified that in the open answers, several respondents refer to the movement of the female figure (walking), considering it a form of incorrect representation, which confuses the information since there seems to be the possibility of approximation to the other figure and not a distance that should be maintained. There is also the reference to the shadows of the three steps, as a reinforcement of the idea of movement and approximation, generating confusion in the interpretation of the image.

Image c): the majority of respondents reported that the distance is nothing or little perceptible 49% ($n = 62$). It is also recorded that the number of participants who consider the image perceptible or very perceptible is 35% ($n = 45$).

However, it was verified that two respondents answered that the distance indicated in the arrows represents about $\frac{1}{2}$ metro. All other answers indicate that the lack of other people represented makes the image imperceptible.

Image d): most respondents reported that the distance is perceptible or very perceptible 46% ($n = 59$). It is also reported that the number of participants who consider the image nothing or little perceptible is 25% ($n = 32$), which is equivalent to 27% who consider the figure to be totally perceptible.

The open answers verified that the lack of another figure(s) is less reported in this example but is still accounted by two respondents. There is a reference to the scale, where the respondents say that the circle should represent a larger diameter, one respondent even mentions 4 m, which is not in any way represented, and there is also reference that

Table 1. Image analysis on physical distance - year 2020 - pandemic context





Images	Description / Style / Color / Analysis
 <p>Image a)</p>	<p>Issuer: University of Algarve</p> <p>Description: Illustration with three-dimensional representation of two adults talking, with indication of location, with message reinforcement through the arrows drawing between the figures.</p> <p>Colors: White, black and red. Meaning: attention, alert.</p> <p>Synthesis analysis: The message 'keep the distance' is illustrated with the grey circles - stay in place; drawing and distance from the forearms - conveys the idea of the need to ensure a distance of 1 meter to 1.5 meters. The drawing of the red arrows between the figures constitutes the semantic reinforcement of the concept.</p>
 <p>Image b)</p>	<p>Issuer: General Direction of Health (DGS)</p> <p>Description: Illustration with two-dimensional, lateral view. Representation of two young adults indicating how to measure the distance, through the action of moving three steps and arrows to represent the distance.</p> <p>Colors: cream, red, black. Meaning: attention, movement.</p> <p>Synthesis analysis: The action of the three steps movement, reinforced with arrows, illustrates the objective - to maintain approximately the 2 meters of distance recommended by health organisms. The warm colors' application reinforces the contents' expressiveness; the red on the female figure's legs allows direct attention to the three steps' message, and after we visualize the other element highlighted by the orange shirt. However, female figure legs must not represent movement.</p>
 <p>Image c)</p>	<p>Issuer: University of Oporto</p> <p>Description: Illustration with a two-dimensional, frontal view. Representation of how to measure the distance, through lines on the trunk's sides with two arrows in the opposite direction.</p> <p>Colors: Blue and red. Meaning: calm and attention.</p> <p>Synthesis analysis: The reader's attention is focused between the background and red shirt design and, after on the representation of the arrows with approximately half the trunk's width - transmits ensuring a distance of 30 to 50 centimeters.</p>
 <p>Image d)</p>	<p>Issuer: Beja City Hall</p> <p>Description: Three-dimensional illustration with representation of arrows and circle that marks the radius of the social distance, also symbolized by the action of opening the woman arms.</p> <p>Colors: Green and brown. Meaning: Calm; disease - chromatic palette used in hospital areas.</p> <p>Synthesis analysis: The positioning of the figure opening the arms in the center of a circle marks the radius/social distance to be maintained - transmits the need to guarantee a distance of 70 to 90 centimeters. The chromatic palette of cold and homogeneous tones does not guarantee a focus on the graphic elements that characterize the distance message.</p>

Table 2. Physical distance – survey results, by image (total numbers)

Images	Nothing/little perceptible	Perceptible/very perceptible	Totally perceptible	Do not know/do not answer
Image a)	36 (28%)	75 (59%)	17 (13%)	0
Image b)	16 (12%)	36 (29%)	73 (57%)	3 (2%)
Image c)	62 (49%)	45 (35%)	18 (14%)	3 (2%)
Image d)	32 (25%)	59 (46%)	34 (27%)	3 (2%)

the image conveys the idea that, as long as someone is positioned outside the circle the distance is already correct what is misleading.

4.2 Use of Mask

See Tables 3 and 4.

Image a): most respondents report that the mask placement is noticeable or very noticeable 50% ($n = 64$). It is also reported that the number of participants who consider the image nothing or little perceptible (18%) is very close to those who consider the image totally perceptible (23%). Relevant is the number of respondents who do not know or do not answer (9%), which is also manifested in open answers in which individuals report that the lack of eye representation and the small white trace that comes out of the top of the mask confuses and does not let us realize if the mask is well or poorly placed.

Image b): of the entire questionnaire, this is the image that is best understood with 80% ($n = 103$) of respondents to mention that the image is totally perceptible, or very perceptible 50% ($n = 64$) and only one respondent considers that the image is little or nothing perceptible, which also manifests in open answers where only one respondent mentions that the character should have a neck and another mentions that the drawing is strange and the colors incorrect.

Image c): for this image, most respondents report that the mask placement is not perceptible or very little perceptible 45% ($n = 57$). It is also reported that the number of participants who consider the image perceptible or very perceptible is 32% ($n = 40$), and those who consider the image totally perceptible is 20% ($n = 25$), being relevant to the number of individuals who do not know or do not respond (5%). In the open answers, there are numerous references to the fact that the mask does not cover the chin of the figure, and the absence of representation of the eyes continues to be identified as a problem.

Table 3. Image analysis on the correct use of masks - year 2020 - pandemic context

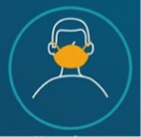
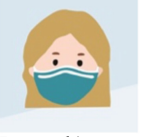

Images	Description / Style / Color / Analysis
 <p>Image a)</p>	<p>Issuer: City Hall of Moita</p> <p>Description: Face illustration with bidimensional linear representation and representation of the mask location with color filling, without indication of the eyes or nose, frontal view.</p> <p>Colors: Blue, green, orange. Meaning: calm and alert</p> <p>Synthesis analysis: Illustration without representation of the eyes or nose can make it difficult to understand the correct location of the mask on the face. The mask color orange over dark blue background highlights and reinforces how to use the mask.</p>
 <p>Image b)</p>	<p>Issuer: General Direction of Health (DGS)</p> <p>Description: Face and mask two-dimensional illustration with filling the shape to color, with the representation of the eyes, ears, but without the neck, frontal view.</p> <p>Colors: Blue, green. Meaning: disease - chromatic palette used in hospital areas.</p> <p>Synthesis analysis: Illustration referring to the mask's position on the face with representation of the eyes, ears but no neck.</p>
 <p>Image c)</p>	<p>Issuer: University of Oporto</p> <p>Description: Face and mask two-dimensional illustration without indication of the eyes or nose and the mask above the chin. Representation with filling the shape to color; frontal view.</p> <p>Colors: Red, blue, green, cream, brown. Meaning: Warning in incorrect location with the application of red on the background.</p> <p>Summary analysis: Illustration referring to the mask's location on the face without indication of the eyes, nose, and positioned above the chin - incorrect representation of the mask's use. The red color application on the image background diverts the receiver's attention from the message's main content.</p>

Table 4. Use of mask – survey results, by image – total numbers

Images	Nothing/little perceptible	Perceptible/very perceptible	Totally perceptible	Do not know/do not answer
Image a)	24 (18%)	64 (50%)	30 (23%)	10 (9%)
Image b)	1 (1%)	22 (17%)	103 (80%)	2 (2%)
Image c)	57 (45%)	40 (32%)	25 (20%)	6 (5%)

4.3 Access and Importance of This Information in Changing Behaviour

To the question “Did you have access to posters, with the information mentioned, at the beginning of the pandemic?” 104 respondents answered affirmatively, 23 answered negatively, and 1 did not know or did not answer.

Concerning the importance that the posters assumed about information on physical distancing and wearing masks, only 18 respondents considered that they had no importance. Regarding physical distancing, 10 respondents answered that they consider the information confusing. With regard to the use and placement of masks, 6 individuals consider the information confusing. It should be noted that 54 and 47 respondents consider that they have obtained more explicit information, either with regard to physical distancing, as in the use of the mask, respectively, by other means such as the media and social networks.

5 Conclusions

This study allowed us to understand that images are read and interpreted by young people, adults, and seniors without distinction and that neither gender nor academic level interferes with this interpretation. It was also possible to understand that the images' errors were better identified in the open questions than in the evaluation of the figures (scale from 1 to 5). We speculate that perhaps because individuals are familiar with these images, it led them to perform a more superficial reading, which was manifested in the evaluation and when asked about their understanding of the image and the errors found, they looked at it more attentively.

We also conclude that the images related to the need for physical distancing of two meters hardly fulfilled their informative function, because there was recourse to perspective and three-dimensionality, which makes the image tend more to the analogy and devalue the code that gives it meaning, and that it was devalued the need for simplification and elimination of superfluous elements in order to keep the image clear and simple interpretation.

Regarding the analysis of the correct use of masks, we can observe that the lack of details such as the representation of the figures' physiognomic elements (eyes, nose, and chin) made it difficult to read the images and their communicative efficacy.

We verified in all the answers that the respondents identify the need to link the image to the referent, and the referent consists of the object, person, or action to which the image alludes and that must respect the morphological structure, the scales and their particularities.

Despite the outcome of the survey, we consider that access to this information at the beginning of the pandemic was diminished because people were isolated at home, which was aggravated by the development of images that were not always intelligible.

References

1. Moles, A.: *O cartaz*. Perpectiva, São Paulo (2005)
2. Munari, B.: *A Arte como Ofício*. Editorial Presença, Lisboa (1978)
3. Costa, J.: *Design para os Olhos: Marca, cor, identidade, sinalética*, p.115. Dinalivro, Lisboa (2011)
4. Melot, M.: *Uma Breve História... da Imagem*, p.15. Edições Humus, Lda, V. N. Famalicão (2015)
5. Ambrose, G., Harris, P.: *Imagem*, p. 6. Bookman, São Paulo (2005)

6. Samara, T.: *Design Elements, a Graphic Style Manual*. Rockport, USA (2007)
7. Gonçalves, S.: *Prevenção e Controlo de Infecção na Prática dos Enfermeiros: Contributos da Formação (Mestrado)*, p. 36. Escola Superior de Enfermagem de Coimbra, Coimbra (2012)
8. González-Miranda, E., Quindós, T.: *Diseño de Iconos y Pictogramas*. Campgráfico Editors, Valência (2015)
9. Joly, M.A.: *Imagem e os Signos*. Edições 70, Lisboa (2005)
10. Costa, J.: *La esquemática: visualizar la información*. Paidòs, Barcelona (1998)
11. Gervereau, L.: *Ver, Compreender, Analisar as Imagens*. Edições 70, Lisboa (2007)

Author Queries

Chapter 9

Query Refs.	Details Required	Author's response
AQ1	This is to inform you that corresponding author has been identified as per the information available in the Copyright form.	
AQ2	Please note that as per Springer guideline private email address of the author will not be displayed.	
AQ3	Please check and confirm if the inserted citation of "Tables 1–4" are correct. If not, please suggest an alternate citations.	

MARKED PROOF

Please correct and return this set

Please use the proof correction marks shown below for all alterations and corrections. If you wish to return your proof by fax you should ensure that all amendments are written clearly in dark ink and are made well within the page margins.

<i>Instruction to printer</i>	<i>Textual mark</i>	<i>Marginal mark</i>
Leave unchanged	... under matter to remain	Ⓟ
Insert in text the matter indicated in the margin	⋈	New matter followed by ⋈ or ⋈ [Ⓢ]
Delete	/ through single character, rule or underline or ┌───┐ through all characters to be deleted	Ⓞ or Ⓞ [Ⓢ]
Substitute character or substitute part of one or more word(s)	/ through letter or ┌───┐ through characters	new character / or new characters /
Change to italics	— under matter to be changed	↙
Change to capitals	≡ under matter to be changed	≡
Change to small capitals	≡ under matter to be changed	≡
Change to bold type	~ under matter to be changed	~
Change to bold italic	≈ under matter to be changed	≈
Change to lower case	Encircle matter to be changed	≡
Change italic to upright type	(As above)	⊕
Change bold to non-bold type	(As above)	⊖
Insert 'superior' character	/ through character or ⋈ where required	Υ or Υ under character e.g. Υ or Υ
Insert 'inferior' character	(As above)	⋈ over character e.g. ⋈
Insert full stop	(As above)	⊙
Insert comma	(As above)	,
Insert single quotation marks	(As above)	ʹ or ʸ and/or ʹ or ʸ
Insert double quotation marks	(As above)	“ or ” and/or ” or ”
Insert hyphen	(As above)	⊞
Start new paragraph	┌	┌
No new paragraph	┐	┐
Transpose	└┐	└┐
Close up	linking ○ characters	Ⓞ
Insert or substitute space between characters or words	/ through character or ⋈ where required	Υ
Reduce space between characters or words		↑