

# Moving Pictograms



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**Abstract** Although pictograms and motion are part of our day-to-day life, few are the examples that tie these two topics together. The aim of our study in connection with information design was to examine the significance of adding motion to a reality that is seen as being chiefly analog. Based on theoretical concepts, case studies and the results of field research that included interviews, surveys and focus groups, we developed and tested speculative propositions for adding motion to thirteen AIGA system pictograms. The research findings have led us to conclude that the introduction of motion could be an important contribution to facilitate the interpretation of pictograms and to enable them to develop in others ways, for example, to encourage civic behaviour, enhance the content of a message and to create emotional ties. We witnessed with this research that moving pictographs are better to decode, when compared with static pictographs. We achieved this result by comparing the original AIGA pictograms with a modification that we applied to the same pictograms in order to add movement. The results are extremely relevant, because satisfaction rates are quite high, as care was taken to conduct interviews and focus groups with designers and non-designers.

**Keywords** Pictogram · Information design · Movement · Communication · The AIGA system

## 1 Introduction

Pictograms are concise, condensed and schematic forms that were first used in pre-historic times to identify, graphically, and unequivocally, different actions, processes and activities. They should not require any text to be decoded, because if they do

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then their function is no longer relevant [9]. The word ‘pictogram’ derives from the joining of the words *picto* and *gram*, meaning “the painted image” and “message”, respectively. This term competes with the word’s ideogram and icon [2].

Information design is divided into three areas: complexity, interdisciplinary and experimentation [10]. Several authors before and after Schuller also addressed the role of information design and contributed to distinguishing this area from all others.

Considering complexity, information design can thus be seen as the transfer of complex data to a two-dimensional representation, with the aim of communicating, documenting or preserving knowledge. It deals with the relationship between facts, in order to make their interrelationships understandable, offering information in a transparent way, eliminating uncertainty. The creation of “meanings of complex information” is a task that requires information designers to take a systematic approach to the project, combining analytical, editorial and graphic elements [10]. Regarding interdisciplinarity, information design involves an interdisciplinary attitude, since the contribution of external people or marginal scientific areas to this field ended up influencing this territory, even ending up inventing new methods of visual representation, such as animation for example, which is explored in this research. This concept of interdisciplinarity is reinforced when it is observed that information design combines the benefits of graphic design, 3D, digital media, cognitive sciences, information theory, cultural sciences, and, as we can observe in this paper, animation. Interdisciplinarity is the synthesis of different partial aspects and not their juxtaposition. The information design discipline has its roots, among others, in information theory and the psychology of perception and is therefore a combination of research and design. Information design encompasses a third competence (alongside complexity and interdisciplinarity), experimentation. Therefore, technical and graphic archetypes are an important part of the design repertoire; added to the need for clear objectivity, they are often indispensable in defining information design solutions. However, it is often the case that in some cases the representation of solutions is quite subjective, and the aforementioned archetypes do not achieve their purpose. And we believe that movement can help, because it improves the relation between form and meaning.

So, with the analysis of formal elements that generate meaning in images, animation combined with graphic discourse improves decoding the messages.

While today information design cannot be defined as an independent discipline and is far from being admitted as such, in visual communication it already stands apart from other disciplines [9].

The interest in incorporating motion into pictograms is owed to the fact that twenty-first century is characterized by technologies and motion, although pictogram representation is still predominantly fixed. We know that technology plays a determining role in people’s lives, increasing the presence of the digital and the disappearance of the analog.

According to Barnés [1, p. 41], a static or fixed image conveys its contents and meaning in a static way, that is, without any movement. This image can be seen for as long as one wants or needs to interpret it. A static image, however, can be dynamic, in other words, even if it has no movement and consists only of a ‘frame’, it can convey movement or dynamism.

The function of some pictograms, however, even if they lack movement, is precisely to give the idea of motion, that something is moving.

As regards to the motion image, Barnés [1] defines it as images that move one after the other at a specific pace.

Two key concepts should not be mixed up: “motion image” and “movement-image”, both of which are mentioned by Deleuze [3]. When we refer to “motion images”, they are obtained through people or things that move, whereas “movement-images” are created when the movement is obtained by moving the camera and through the movements that are created during editing, that is, whatever shows in the picture can be static.

Rancière [8] gave his summarized and objective definition of Deleuze’s “movement-image” [3], arguing that the “movement-image” is an element that forms part of the natural chain created between various images.

Zunino [12] refers that Bergson explains the relation between action and movement by assuming that the origin of awareness is the movement itself, and that its function is not to represent things or objects, but rather to group all the moments while it lasts and to make important and significant progress. Each separate image, that is, static image, shows a framework that is specifically created and defined as an art, since all the parts that form a group have to be chosen in order to create the desired framework.

To create movement in pictograms, we used Deleuze’s [3] editing technique, since pictograms are static fixed planes, and we edited several sequential planes to create movement.

The aim was to start from two or three complementary forms of a pictogram and create “movement-image” to effectively convey the “thing”/image/message of that pictogram.

So as to increase the knowledge of the nature of pictograms, the main aim of this empirical study was to explore the adding of motion to pictograms and to assess the possible gains resulting therefrom to real life situations. We have posed the following question: “How does the adding of motion improve the decoding of pictographic information?”.

More specifically, the purpose of this empirical study is to:

Assess whether there is a need to graphically update all/some of the pictograms chosen for the project;

Analyse the need to simplify all/some of the chosen pictograms;

Check that all chosen pictograms can improve the understanding thereof with the adding of motion.

Since this is a first approach to the topic, we chose to base our work on a specific case study, namely the AIGA pictographic system, which is not only a worldwide reference that offers a broad variety of pictograms, but is also associated to transports, a relevant sector in pictographic communication.

Of the 34 pictograms that form the AIGA system we only chose those that depicted the human form, because besides being a sufficient sample size, 13 different pictograms, the sample included the most relevant pictograms for the intended objectives (Fig. 1).














DEFINITION OF PICTOGRAMS			
	Ladies WC		Escalators
	Men WC		Hotel Information
	WC		Passport Control
	Diaper		Arrivals
	Waiting Room		Ticket Office
	Drinking Fountain		Customs
			Rubbish Bin

Fig. 1 Definition of the pictograms of the AIGA system

Our theoretical search allowed us to identify the best approach for producing a system of pictograms with movement.

Based on the results achieved in the three first phases of the empirical investigation—interviews, surveys and focus group, and on the study of real cases that could be a source of inspiration, we carried out thirteen movement introduction tests, one for each of the thirteen pictograms under study. We then tested the propositions developed in a fourth phase, through interviews.

Taking account of the above, the aim of this study is to contribute to a reflection and possible development of current pictographic systems, exploring new conceptual forms through the introduction of movement.

## 2 Methodology

To achieve the objectives outlined, the research plan developed along four main phases, following an applied research method—action, to generate knowledge that can be applied in practice. This is a quasi-experimental and exploratory study, considering that it is a first approach to the topic and our intention is to know the facts and phenomena related to the problem under study and that the research variables were not manipulated or changed [5].

In the first study, data was collected from participants not in the design area, as we hoped to find out how the chosen pictograms are interpreted by people who are not conscious of design issues, even though they use most of those pictograms on a daily basis or frequently.

The second consisted of collecting data from participants involved in design. Unlike the first phase, our aim was to examine the most sensitive side of graphic issues and image of the pictograms, and to compare their interpretation with that of the first phase group.

A focus group was organized in the third phase, in which we sought to analyse the issues identified as being the most relevant in the previous phases and to discuss possible solutions to those issues. The focus group consisted of representatives of the groups involved in the two first phases.

In the fourth phase, we again collected data from participants not in the design area, the aim being to assess the proposed pictograms with movement done in the project compared to the original pictograms.

## ***2.1 Measurement Instruments***

Different methods were chosen for data collection according to the target audience and the study phase.

During the first and fourth research phases, we interviewed people not in the design area and a second phase took place concurrently with the first phase, which consisted of a survey to people exclusively in the design area. Once the results for the first and second phase were obtained, a focus group was arranged for the third phase involving people in the design area and outside this area.

The interviews were semi-structured, taking into account that not all questions were closed-ended questions, allowing the interviewee to give his/her opinion and thoughts.

Data from the interviewees were analysed through content analysis, which, according to Bardin (2009), consists of a number of communication analysis techniques and uses systematic and objective procedures to describe the contents of messages [4].

The same script was used for all interviews, which examined the thirteen pictograms of the AIGA pictographic system chosen for the project.

The questionnaire was the measurement instrument used in the project's second phase to collect information from people in the design area, including design students, teachers or designers.

We chose to conduct a direct survey through an online questionnaire, so as to enable an efficient and effective data collection.

In the third phase, the focus group participants gathered for a round-table discussion of the topic and the most relevant results obtained in the two previous phases (phase one and two). The study was conducted in Lisbon, between Nov. 2017 and May 2018.

## ***2.2 Samples and Data Collection Procedures***

A non-probability sampling method was used in the research, typical of exploratory studies, for a cross-sectional time span.

**Table 1** Characterization of participants in phase 1 of the empirical study

GENDER		AGE					PROFESSION		
MEN	WOMEN	ATÉ 10 ANOS	]10,18]	]18,25]	]25,55]	>=56	STUDENT	WORKER	OTHER
41%	59%	5%	0%	36%	41%	18%	32%	64%	4%

**Table 2** Responses by participants in questionnaires

GENDER		AGE			CATEGORY			
MEN	WOMEN	]18,30]	]30,45]	>=46	LICENSEE STUDENT	MASTER STUDENT	DESIGNER	DESIGN TEACHER
31%	69%	85%	15%	0%	38%	30%	27%	5%

**Table 3** Responses by participants in the focus group

GENDER		AGE		AREA		DESIGN AREA		OTHER AREA	
MEN	WOMEN	]18,30]	>=30	DESIGN	OTHER	MEN	WOMEN	MEN	WOMEN
50%	50%	87,5%	12,5%	50%	50%	50%	50%	50%	50%

**Table 4** Characterization of participants in phase 4 of the empirical study

GENDER		AGE			PROFESSION		
MEN	WOMEN	]18,25]	]25,55]	>=56	STUDENT	WORKER	OTHER
57%	43%	40%	43%	17%	26%	67%	7%

Both the larger samples, used in phases one, two and four, and the sample used for the focus group were intentional samples, since the participants were chosen based on the probability and existing conditions for them to accept being part of the research (Tables 1, 2, 3 and 4).

### 2.3 Suggestions for Motion Pictograms

After analysing the results obtained in the three first research phases, we went on to apply movement to the pictograms based on Deleuze’s concept of “movement-image” [3], a process that can be done through editing, that is, linking the various planes that work as static planes on their own, but when joined together create movement.

Initial sketches were required to see which solution was more appropriate and effective for each pictogram, based, as much as possible, on the current version of AIGA’s pictogram. Where we found that it was more difficult to interpret the pictogram’s message in the three first phases of the research, changes had to be made to the original pictogram.

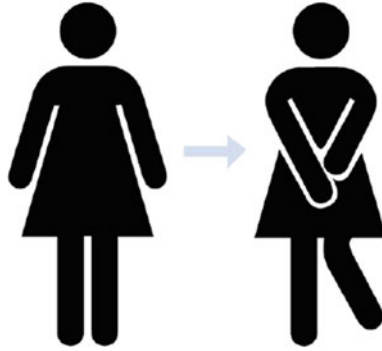


Fig. 2 Suggestion of frames for the ladies WC pictogram

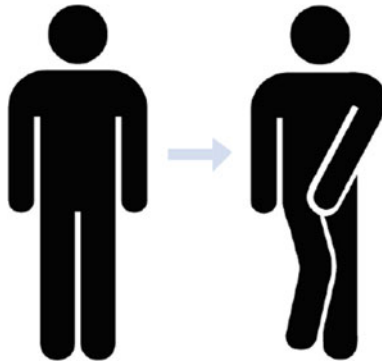


Fig. 3 Suggestion of frames for the men WC pictogram

Where the use of colour is concerned, taking into consideration the preliminary and non-exhaustive nature of the study in question, we chose to do all sketches in black and white. However, colour can be applied to any of the hypotheses.

In pictograms “WC Ladies” (Fig. 2), “WC Men” (Fig. 3) and “WC” (Fig. 4), we added only one more frame characterized by a movement that can help convey the idea of “when you have to go to the toilet/need to use a toilet”.<sup>1</sup> In these examples, the introduction of movement was explored to enhance the message of the context to which the situation refers, humanizing and creating an emotional link.

In the pictogram for “Baby changing facility” (Fig. 5) we also added just one frame to enhance the message of the action it aims to convey.

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<sup>1</sup> The movement introduced in the second frame of this pictogram was inspired on the pictogram representing the ladies’ toilet (WC) at the Alegro Alfragide Shopping Centre, which shows that same movement.

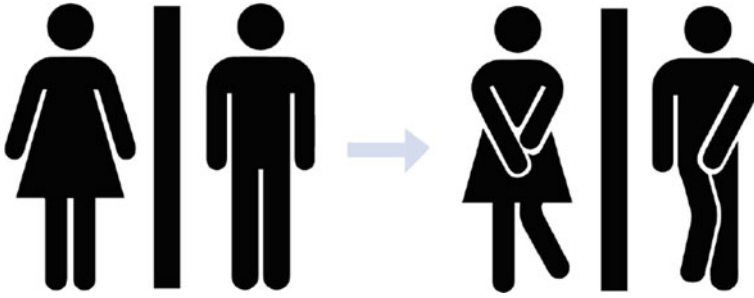


Fig. 4 Suggestion of frames for the WC pictogram

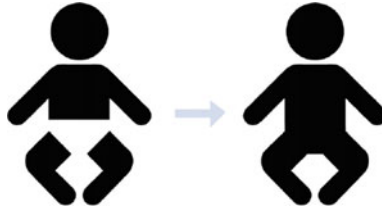


Fig. 5 Suggestion of frames for the diaper pictogram

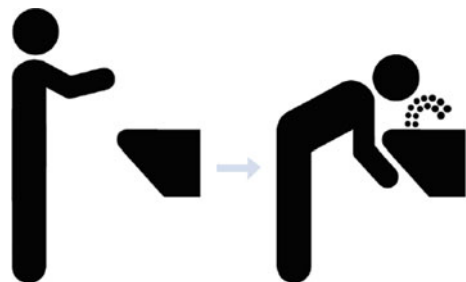
As regards the “Waiting Room” pictogram (Fig. 6), we chose to increase the size of one of the elements (clock) and to create a sequence of five frames.

As for the “Drinking Fountain” (Fig. 7) and “Rubbish Bin” (Fig. 8) pictograms, the aim of introducing movement was to explore the association of a correspondent



Fig. 6 Suggestion of frames for the waiting room pictogram

Fig. 7 Suggestion of frames for the drinking fountain pictogram





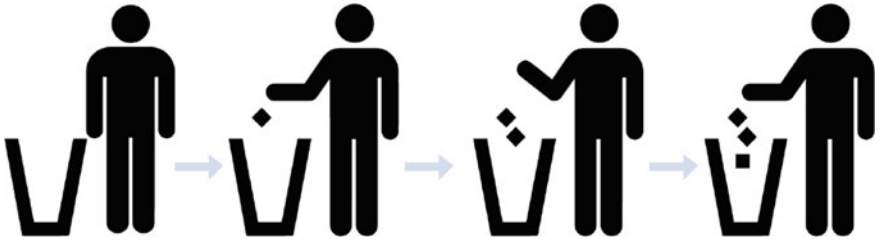


Fig. 8 Suggestion of frames for the rubbish bin pictogram

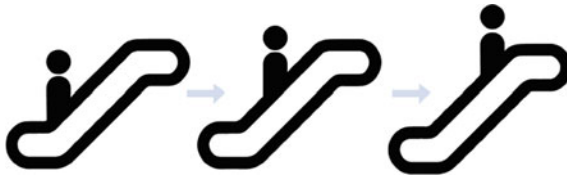


Fig. 9 Suggestion of frames for the escalators pictogram



Fig. 10 Suggestion of frames for the hotel Information pictogram

Fig. 11 Suggestion of frames for a pictogram representing passport control



civic engagement message: “use only when needed” and “throw the rubbish in the bin”. The suggestions presented contained two and four frames, respectively.

For the “Escalators” pictogram” (Fig. 9), we joined three complementary frames.

The “Hotel Information” pictogram (Fig. 10), we found it appropriate to introduce movement to complement the pictogram’s message with non-pictographic elements.



Fig. 12 Suggestion of frames for the customs pictogram



Fig. 13 Suggestion of frames for the arrivals pictogram



Fig. 14 Suggestion of frames for the ticket office pictogram

With regard to the “Passport Control” (Fig. 11) and “Customs” (Fig. 12) pictograms, in addition to updating the clothing of the human figure, the introduction of movement enhanced the action it intends to convey.

Our approach to the “Arrivals” pictogram (Fig. 13) was to give a perspective of space, that is, the feeling of space covered by the human figure through its different size from the first to the fourth frame.

Finally, by adding movement to the last pictogram—“Ticket Office”—(Fig. 14) we were able to replace the human figure representing the action and to update the action we intend to convey.

### 3 Results

In phases one and two, the percentage of answers that accurately decoded the message of the base pictograms (the interviewees understood the message) varied widely between the thirteen pictograms, with some of the situations getting all answers right and in one case no right answer.

In six pictograms (46% of all the chosen pictograms), the majority of interviewees were unable to give a right answer and, therefore, to decode the message. The results obtained were similar in phase one and two.

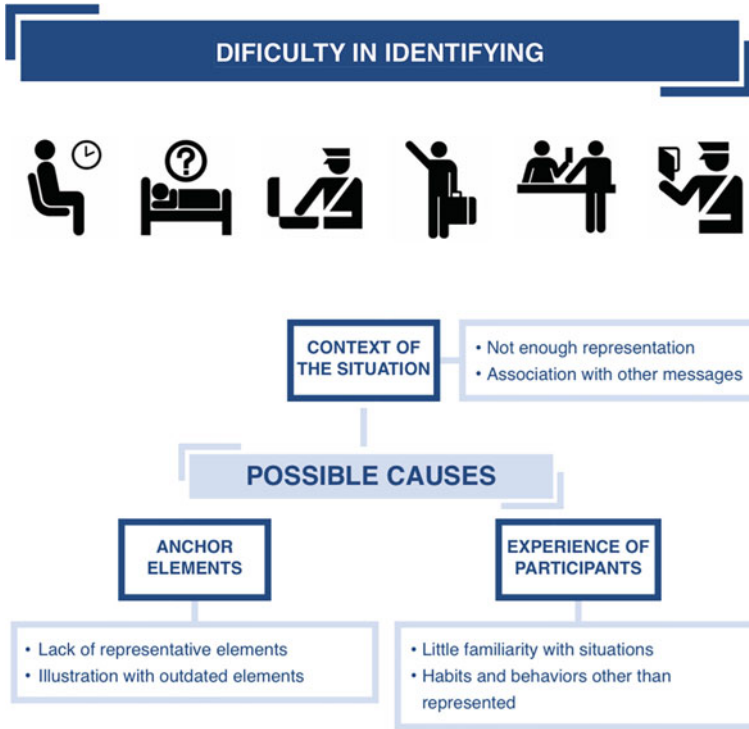


Fig. 15 Difficulty in identifying—group of reasons on three main points

The following three main problems were identified in phase three (focus group) as possible causes for not understanding the pictograms that raised more doubts, as shown in Fig. 15: (i) The context of the situation; (ii) Anchor elements, and (iii) The experience of participants.

With regard to the possible benefits in adding motion to the pictograms, all participants felt that there were significant opportunities for improvement compared to the current reality, in particular in three aspects: (i) Understanding; (ii) Visibility, and (iii) Behaviour.

Figure 16 compares the results obtained before (phase one) and after introducing motion (phase four) in the pictograms difficult to identify in phases one and two. The percentage of right answers (message decoded) increased on all situations where motion was introduced.

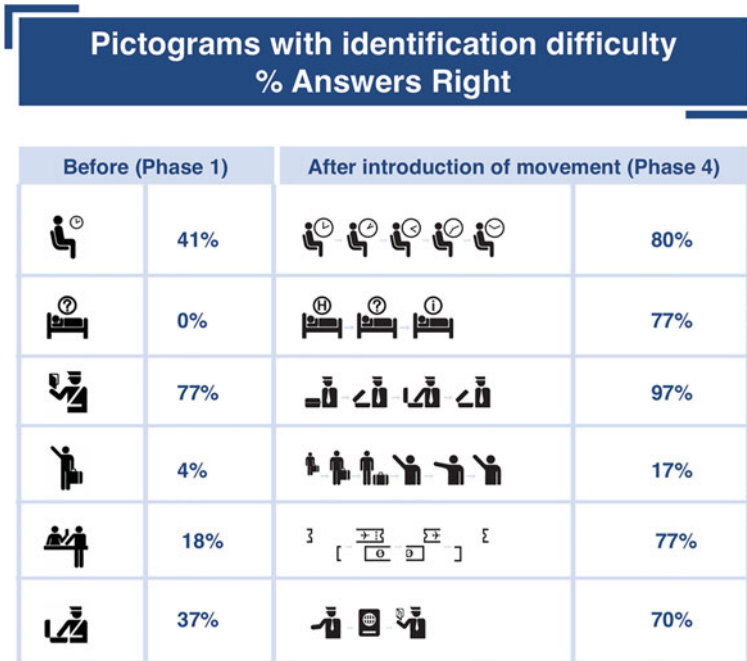


Fig. 16 Results of introducing motion and increasing the effectiveness of the message

## 4 Discussion

The review of literature has shown that pictography and motion are vast fields in the area of design, but studies that relate these two topics are nevertheless few.

The shortcomings found in connection with the introduction of motion in pictograms increase the interest in conducting this study.

The results obtained with regard to the objective/hypothesis—the need to redesign some of the analysed pictograms—seem to indicate that some of the AIGA system pictograms are difficult to decode and are out of date. In fact, in some cases there is a problem at syntactic level concerning its interpretation, that is., people can identify the anchor elements on their own (human figure, bag, chair, etc.), but fail to understand the message supposed to be conveyed.

As regards the second objective/hypothesis—the relevance of adding motion to pictograms—the results indicate that there is strong evidence that adding motion can be an appropriate step to increase the effectiveness of the message, although perhaps not to all pictograms.

As regard the benefits that motion can bring to the pictograms, the results point to opportunities for improvement in three aspects: (i) understanding the pictogram; (ii) visibility of the pictogram, and (iii) influence in the behaviour of the person seeing the pictogram.

**Table 5** Introducing motion in pictograms—explored scenarios

SCENARIOS EXPLORED WITH THE INTRODUCTION OF MOVEMENT	
MAIN FORMS OF CONTRIBUTION	MAIN FORMS OF APPROACH
<ul style="list-style-type: none"> <li>● Facilitate interpretation / increase effectiveness of the message</li> <li>● Reinforce message context</li> <li>● Create emotional links</li> <li>● Encourage civic behavior</li> <li>● Update processes</li> </ul>	<ul style="list-style-type: none"> <li>● Humanization</li> <li>● Sequential chromatic change</li> <li>● Changing the size of some elements</li> <li>● Changing the Space Perspective</li> <li>● Rotation with non-pragmatic elements</li> <li>● Highlight of elements</li> </ul>

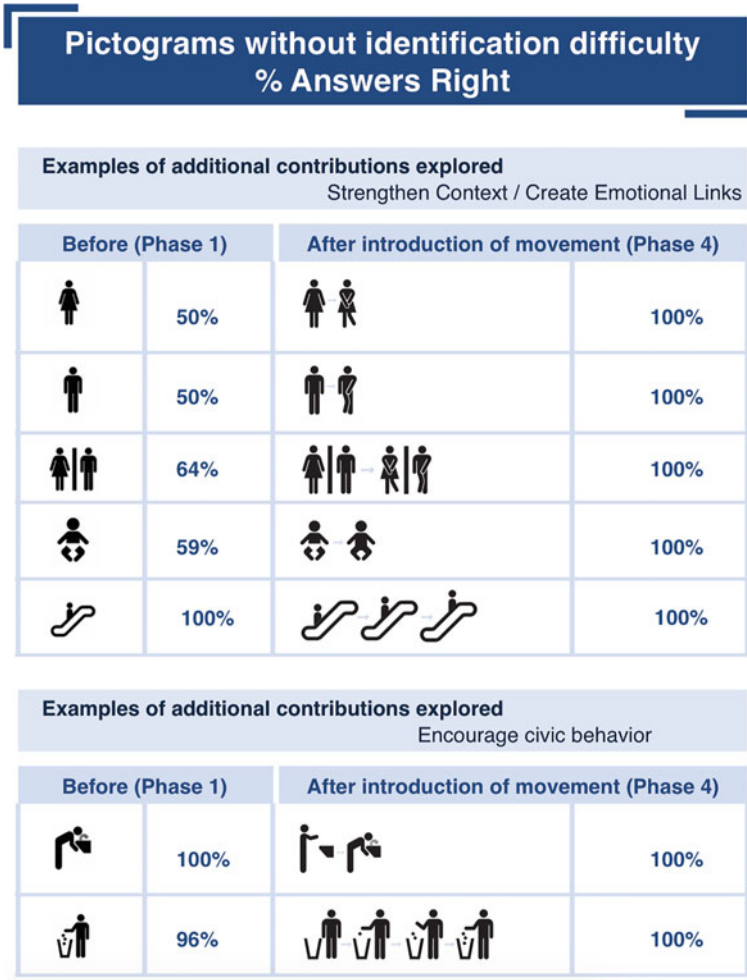
With regard to understanding, the possibility of increasing the effectiveness of the message is, without any doubt, very relevant, considering what is expected of a pictogram. As far as visibility is concerned, the benefit is also quite relevant since a pictogram will not fulfil its role if it cannot be easily seen. As for the influence on the behaviour of the person who sees the pictogram, for example, encouraging to always putting the rubbish in the designated bins, this can be a quite interesting development, through the exploration of new functional aspects in pictograms.

Table 5 presents a summary of the main contributions identified, as well as the different approaches tested. In this regard, it should be pointed out that when we ran the tests we sought to diversify as much as possible, both in terms of contributions and of forms, so that they could be an inspiring starting point for future work to optimize the message of pictograms.

In relation to the effects of “facilitating the interpretation/ increasing the effectiveness of the message”, these are very positive. In fact, as shown in Fig. 16, when motion was added to the pictograms the number of right answers increased substantially in the pictograms identified in the previous phases as being difficult to interpret. With the exception of the “Arrivals” pictogram, for which results were much lower than expected (showing that the test was not enough to significantly improve the message), all pictograms tested with the addition of motion were easy to interpret for most of the interviewees.

As regards the elements added to the pictograms identified in previous phases as having no difficulty in interpretation, in particular to “strengthen the context of the message”, “create emotional ties” and “encourage civic behaviour”, the results obtained were also very satisfactory. As shown in Fig. 17, by exploring elements added to the base form, the effectiveness of the message not only did not decrease but in fact increased, with 100% right answers obtained in all pictograms.

We were unable to compare and complement the results obtained with other results from similar studies, as no other studies in this field have ever been carried out, according to our extensive research. We did, however, identify some aspects in the study that reflect theories and considerations of other authors that have already dealt with pictograms.



**Fig. 17** Results of introducing motion in additional elements to the base form

In this context, it is considered that the three areas of improvement identified (understanding the pictogram, visibility of the pictogram, and influence in the behaviour of the person who sees the pictogram) reflect two of the three dimensions of the signage process by Morris [7].

We should also highlight the relation between the changes suggested for each pictogram and the two rules required to create this “writing style”, as per Lupton [6], since throughout the project we always took the basic nature of the pictograms into

consideration, giving primacy to their development to the rather than to aesthetically create new writing styles.<sup>2</sup>

We believe that the results obtained can strongly encourage further studies on this topic and that they reflect the need to rethink some of the AIGA system's pictograms, because although this international system is widely spread, it is quite clear that it was quite difficult to decode some of these signs.

Considering that motion is not a sufficiently explored topic in the field of pictograms, and that studies linking these two elements—motion and pictograms—are not available, we hope that this study contributes to opening up a new world of approaches and interpretations, and to the evolution of pictograms.

## **4.1 Limitations**

In addition to the issues that seem especially relevant to design, we think it is important to mention some of the limitations we came across in our research.

First of all, we wish to comment on the method for sample selection. The fact that it is a convenience sample limits the mainstreaming of results obtained, as the factors associated with self-selection may have influenced the participants' decision to participate in the study.

Another difficulty encountered has to do with the group of instruments used, which were specifically built for the purpose (interview, questionnaire), but since they are of the self-report type, they are subject to errors of interpretation and to social desirability factors.

Limiting the study to Portugal and to the city of Lisbon is, in itself, a limitation to the mainstreaming of results to other locations, therefore its social and cultural characteristics should be taken into consideration.

## **5 Disclosure Statement**

No potential conflict of interest was reported by the authors.

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<sup>2</sup> According to Lupton (1989), pictograms must follow two rules: (i) reduction—determining the style of individual signs, (ii) consistency – giving a group of signs the appearance of a coherent system.

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