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# Promoting Climate Awareness through the Design of Interactive Moving Posters

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**Abstract:** Nowadays, the ubiquity of digital media has promoted the establishment of novel Graphic Design practices that seek to better catch the audience's attention. In the Poster Design scenario, we observed the appearance of moving posters, digital-based artefacts that include animated elements; nevertheless, as moving posters get increasingly common, the search for more effective communication approaches should be conducted. This paper studies the impact of interactivity on poster design. Computational and Artificial Intelligence approaches have been employed to design a set of interactive moving posters which can adapt according to the viewer's actions and the surrounding environment. The current environmental issues of the planet Earth have been the theme explored in these experimental posters. To assess whether interactivity was favouring the posters, these were tested against printing and moving versions. The preliminary results encouraged the adoption of interactivity to create more attractive and engaging posters.

**Keywords**: Data-driven Graphic Design; Generative Design; Interactive Animation; Poster Design; Moving Posters.

## 1. Introduction

Posters are one of the most well-established communication media and have played a key role in visual communication over time (Guffey, 2014; Sontag, 1999). In this sense, posters have been constantly changing their production methods alongside the technologies of their time but keeping the same goal of passing messages to the parsers-by (Blauvelt, 2011; Meggs & Purvis, 2014).

Nowadays, the ubiquity of digital media has established a more user-oriented, customised, and straightforward communication turned to digital media and spaces (Armstrong & Stojmirovic, 2011; Richardson, 2016). Therefore, we are observing the emergence of an innovative and digital-based Graphic Design (GD) practice that seeks communication solutions that better catch the audience's attention and communicate more engagingly and effectively (Blauvelt, 2008; Shaughnessy, 2012; Vinh, 2011). In this scenario, it is noticeable the emergence of digital moving artefacts such as moving posters. Although these are not

posters in their traditional sense, moving posters are designed according to the legacy, standards and formats associated with traditional poster designs (Benyon, 2016).

This paper presents a work in progress regarding the employment of generative and interactive methods in the context of poster design and aims to study how such approaches can promote the development of designs that communicate in more effective, customised and engaging ways (*i.e.* posters that better capture the audience interest and communicate the message in a more customised manner). A set of interactive moving posters was developed exploring the use of computational and Artificial Intelligence (AI) approaches such as Machine Learning (ML), Computer Vision (CV), physics engines and data visualisation methods.

The design of the presented posters addresses the current "metamorphosis" of the planet Earth due to the current climatic changes, *i.e.* the posters inform about the causes and consequences of some of the current environmental problems, especially focusing on human impact. The explored subjects are (I) Air Pollution, (II) Biodiversity loss, (III) Global Warming, (IV) Noise Pollution, and (V) Waste production. An online gallery presenting the developed posters is accessible at https://cdv.dei.uc.pt/2021/metamorphosis.

In the first stage, the posters were projected as physical artefacts, to be assembled and displayed in a dedicated gallery or outdoor interactive displays. However, due to COVID-19 restrictions, the posters have been re-defined to be showcased in an online exhibition as well. Each poster includes variable visual elements that react and/or change according to environmental data. The data are gathered directly, through readings of the behaviours of posters' viewers and/or the state of the surrounding environment, and indirectly through the use of geo-referenced or context-aware data. Testing sessions were conducted to assess whether the developed interactive moving posters would be more engaging and efficient compared to print and animated posters.

The remainder of this paper is organised as follows. Section 2 summarises related work. Section 3 describes our approach to the conceptualisation, design, and development of each poster. Section 4 reports the tests and results conducted. Finally, Section 5 draws conclusions and directions for future work.

## 2. Related Work

The use of algorithmic and interactive approaches to generate visuals has existed since the advent of computing. However, the democratisation of the personal computer and Desktop Publishing tools during the 1980s approximated graphic designers to these processes. From then on, a growing number of artists, designers and computer scientists began to use computer programming as a tool to create visuals. Cooper (1989) and Maeda (2000, 2005) were pioneers in the generation of GD layouts, using tailor-made software.

Subsequently, several designers explored such approaches to generate poster designs and layouts. Most explored the use of parametric and/or co-creative systems, especially focused

on the generation of static visuals. Gatarski (1999, 2002) developed a system to evolve banner designs using the user's click-through as a fitness metric. Müller (2002, 2009) employed computational tools to translate text into an image for developing the visual identity of the literature festival *Poetry on Road.* Groß and Laub (2007) developed *Diploma*, a system that generates poster designs using Adobe InDesign scripting. LUST (2008) presented the installation *Poster Wall for the 21st century* in the Graphic Design Museum, in Breda, Netherlands. In this installation, one generative system created posters using content gathered online from multiple internet sources. Stephan and Haag (2011) generated parametric posters optimised for cheap reproduction, using bash scripts. Cleveland (2010) proposed a method and prototype for generating style-based design layouts, exploring the inter-relationship between texts and graphics. Gysin and Vanetti (2010) developed a parametric system to design posters for the music festival *The Puddle.* Damera-Venkata *et al.* (2011) presented a template-based probabilistic framework for creating layouts. Önduygy (2010) and Kitamura and Kanoh (2011) developed interactive evolution systems to generate document layouts. Bleser (2016) built a parametric system that creates posters based on a specific style. Rebelo *et al.* (2021) have been using evolutionary computation to generate typographic poster designs.

Lately, many designers began to employ animation techniques for crafting digital artefacts that resemble poster designs, *i.e.* moving posters. Schaub (n.d.) presents a good overview of this kind of work. However, these artefacts are often designed without the influence of any external input. As far as we know, few related regards the use of data and external inputs can be identified, especially using CV. The installation *Camera Postura* (LUST, 2014; OPENRNDR, 2018) presented interactive posters using movie frames where actors' gestures try to mimic the viewers. Åkestam Holst agency (2014, 2016) developed interactive billboards using data from the surrounding environments to animate the behaviour of a central character. Isobar design agency (2016) created an interactive poster for the Budapest Festival Orchestra where passers-by could control the orchestra on the poster using their smartphones. Rebelo *et al.* (2017) presented an experiment on the design of interactive moving posters using CV and context-aware data. Subsequently, the authors developed an environmental adaptive poster composer, capable of designing posters for a specific site and improving the designs based on the audience interaction (Rebelo *et al.,* 2019). Lopes *et al.* (2018) developed an interactive poster design for the music festival *Olhos Music Fest,* where the viewers' eyes are placed on the poster and move along with the sound. Tim Rodenbröker (n.d.) lectured the workshop *Programming Posters,* where the participants created a set of animated and interactive posters through the use of computational techniques. More recently, Roça and Amaral (2021) designed interactive posters for a dance festival that reacts to the user's pose. Dias (2021) designed digital posters that react to an audio input.

It is possible to notice that most of the interactive works are only focused on the use of direct inputs (especially those gathered using CV) to define the design and its message. In this work, we also explored the use of indirect environmental data (especially context-aware

data) to influence the poster designs. Furthermore, we study and/or evaluate an approach to craft a whole collection of posters. A strategy that, as far as we know, is not explored by any related work.

## 3. Approach

The present work in progress is focused on the conceptualisation and development of a set of GD artefacts that, although developed to be presented digitally, resemble, and comply with the aesthetic and communicative tradition of posters. Also, AI and other computational techniques were employed to develop a set of interactive moving poster designs.

The posters include variable visual elements. The visual features of these elements are defined based on the behaviour of the viewers and/or the state of the surrounding environment where the given poster is being seen. The data is gathered directly and indirectly. Direct data comes from tracking the viewer's behaviour and environment state. On the other hand, indirect data concerns geo-referenced or context-aware data. In some posters, generative approaches are employed to create design variations. The design of each poster represents, therefore, a unique moment based on the time, the space, and its viewers.

The design of the present posters informs about the causes and consequences of some of the environmental issues, especially focusing on the human impact on the environment, exploring the subjects (I) Air Pollution, (II) Biodiversity Loss, (III) Global Warming, (IV) Noise Pollution, and (V) Waste Production.

Each poster has been designed as a self-contained communication artefact, reflecting a different subject. However, these also share a set of common visual features to keep the visual cohesion between them and, therefore, be recognised as a collection. These features are (I) the use of *GT Flexa* typeface (Huber *et al.,* 2020), (II) the typeset of an awareness message centred on the poster, and (III) the presence of a running footer with a set of information about the posters' collection.

The posters were designed to be displayed both physically (*e.g.* in an outdoor interactive display) and virtually (*e.g*. on a dedicated online gallery). This way, we could disseminate and evaluate the results despite the pandemic restrictions going through at the time. The only setup required is access to the captures of a webcam and microphone. HTML, CSS, and JavaScript were used for code development, allowing the easy display of the posters in the different supports. The P5.js library (McCarthy *et al.,* 2020) was used for manipulating and rendering the posters, the ML5.js library (NYU ITP/IMA, n.d.) to facilitate access to ML models and the Matter.js (Brummitt, 2021) library as a physics engine. The diverse features of posters (*e.g.* format, size, elements placement position, *etc.*) were defined in a parametric manner. Figures 1 and 2 display the posters being exhibited physically and virtually, respectively. The following subsections compressively describe each poster and its

development process. More information, supplementary materials and the address to the code repository are accessible at https://cdv.dei.uc.pt/metamorphosis.


*Figure 1 Prototype of the physical interactive installation presenting the Waste Production poster running.*

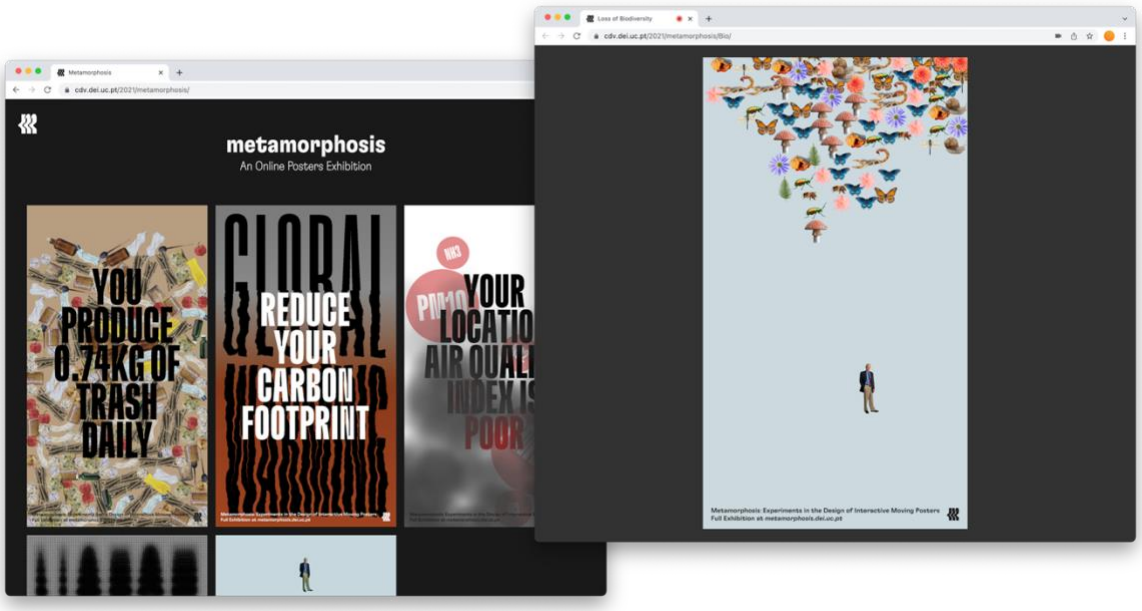


*Figure 2 Screenshots of the developed online gallery presenting all the posters (left) and the interaction with the Loss of Diversity poster in an online environment (right).*

### *3.1 Air Pollution Poster*

Regarding the current air pollution environmental issue (see (Vallero, 2014)), we have designed a poster displaying real-time data concerning the Air Quality Index (AQI) and the number of pollutants near the place where the poster is being observed. This poster is composed of three main variable elements: (I) a message regarding the current air index; (II) a visualisation regarding the quantity of each pollutant nearby; and (III) a system of smog particles. Figure 3 presents three different states of this poster. The online service *Open Weather* and its air pollution API (OpenWeather, 2021a) have been used to retrieve the current AQI and the related pollutants for a given location.

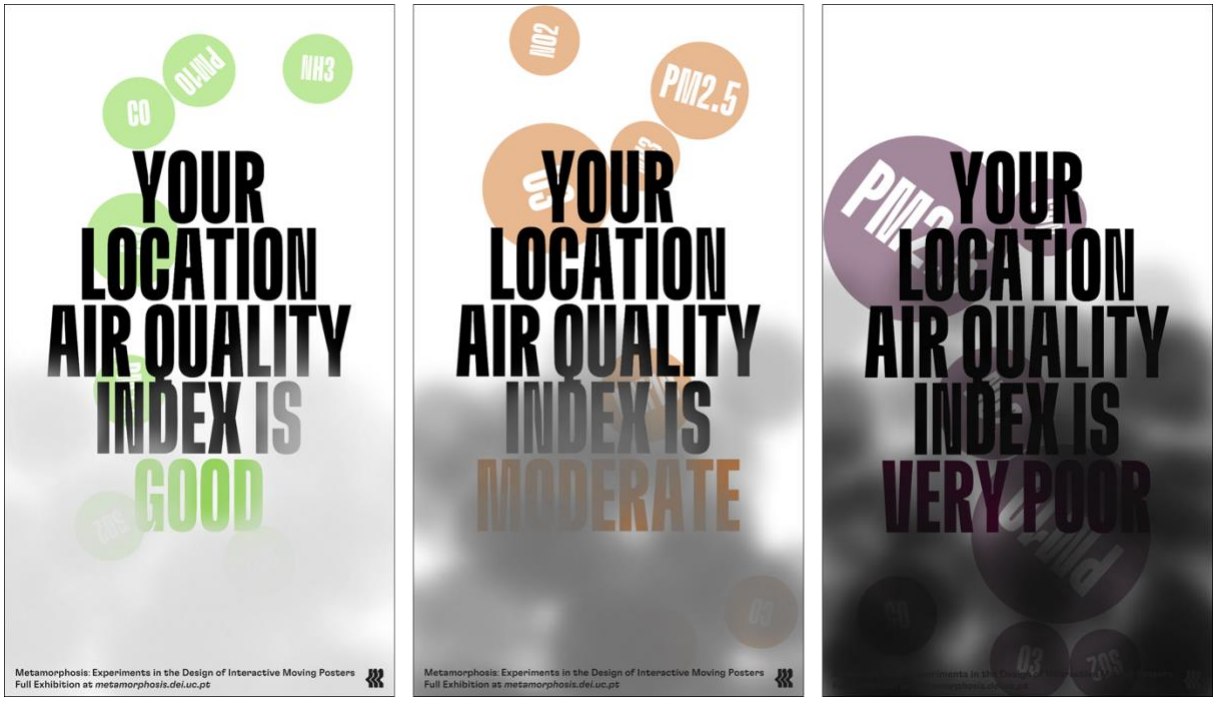


*Figure 3 Variations of the Air Pollution poster, from a place where the AQI is good (left) to a place where AQI is very poor (right).*

The displayed message informs about the current air quality, adjusting itself based on the current AQI value, from good (1) to very poor (5). Concerning the visualisation, each pollutant is represented by a circle that changes its area according to data retrieved for the API. The circle is small if the value is good and bigger if the value is bad. The circles' area is determined by a logarithmic function that maps the retrieved values, concerning a predefined minimum and maximum value for each pollutant. These minima and maxima values are defined according to the prejudice of each substance to the air quality. The presented pollutants are Carbon Monoxide (CO), Nitrogen Monoxide (NO), Nitrogen Dioxide (NO2), Ozone (O3), Sulphur Dioxide (SO2), Fine Particles Matter (PM2.5).

Also, based on the AQI value, the variable part of the message and the fill of the ellipses in the visualisation are highlighted by changing their colour. For each AQI value from 1 to 5, the colours green, yellow, orange, red and purple were used, respectively.

Finally, a system of smog particles was used to figuratively represent the human-related causes of air pollution. This way, when a person is detected in front of the poster (using a face recognition API), the system creates particles in a random position near the bottom edge of the poster. These particles are in motion on the canvas, disrupting the readability of the poster. Whenever no one is recognised, the particles disappear. The brightness of the smog particles is also defined based on the AQI value. If it is good (1) the particles are lighter; if AQI is very poor (5), the particles are darker.

## *3.2 Biodiversity Loss Poster*

We have designed a poster that warns about the negative impact of present-day humans' activities in natural ecosystems (see (Cardinale *et al.,* 2012)). Figure 4 displays some variations of this poster, which is composed of two kinds of variable elements: (I) the ecosystem; and (II) the human.


*Figure 4 Variations of the Biodiversity Loss poster. From left to right: (I) poster in its initial stage; (II) poster state during the visualisation of a user; and (III) poster's state after some time running.*

The ecosystem is composed of a set of pictorial representations of living beings. This way, the ecosystem is represented by a particle system, where any particle has a species associated. The pictorial representation of the particle is randomly defined from a set of species-related images. The initial state of the ecosystem is determined by a stochastic selection method informed by the estimated percentage of current known species, according to the taxonomic group defined by the International Union for Conservation of Nature (IUCN) (2021). By default, these particles are moving to an attractor in the centre of

the poster. At a predefined time (10s), a living being is removed from the poster (*i.e.* it is extinct), based on the probability of a lower estimated threatened species, also according to IUCN. The species and particles to be extinct are selected by a stochastic universal sampling method.

When a person is recognised in front of the poster, a pictorial representation of a human appears in a position based on her/his position on the front of the poster (identified using a face recognition method). This representation follows the person when he/she moves. Since this poster has the intent to communicate the impact of human activity on diversity loss, when a human appears, the particles in the ecosystem are retracted and the particles' lifespan is reduced to half. Similar to the other posters, when a person is recognised, a message concerning the number of endangered species is presented in the centre of the poster. This information is also based on data from IUCN.

### *3.3 Global Warming Poster*

We designed a poster considering the most visible consequence of global warming: the melt of polar glaciers and the consequent rise of the sea level (see (Dawson *et al.,* 2009)). The poster exhibits one lettering, displaying the designation "Global Warming", and a rectangle that increases and/or decreases its height according to the air temperature in the place where the poster is located. Figure 5 presents this poster in various locations and weathers. This poster is, then, composed of two variable elements: (I) the rectangle; and (II) the lettering.


*Figure 5 Poster of Global Warming in distinct locations and weathers. From left to right, posters from colder to hotter environments. Also, in the last poster, the message presented to the viewer is exhibited.*

The height of the rectangle changes according to the air temperature value in the place that the poster is viewed. The maximum height rectangle is representative of the hottest temperature registered on Earth (56.7º C). A minimum height rectangle is representative of the coldest air temperature registered (-89.2º C) (Current Results Publishing Ltd., 2021). Moreover, the rectangle colour alternates according to the air temperature, from blue (coldest temperature) to red (hotter temperature).

The overlap between the lettering and rectangle provokes a distortion in the lettering, similarly to a melting effect. This effect is created by the manipulation of the SVG filter *feDisplacement-Map* and varies according to the gathered air temperature. The higher the temperature, the higher the texture distortion. When the face of a viewer is detected in front of the poster, a message concerning the subject is displayed.

According to the version presented (physical or digital), this poster uses different ways of collecting air temperature. In the physical implementation, it gathers the air temperature from the physical surroundings, using an Arduino and an LM35 temperature sensor the online version, the Geolocation API is used to get the location of the viewer and then the Open Weather API (2021b) is used to get the forecast air temperature for that place.

### *3.4 Noise Pollution Poster*

Another poster has been designed to warn about the varied health problems related to noise pollution and louder sounds (see (Anees *et al.,* 2017)). This poster presents a dynamic typographical composition that behaves like a noise indicator. When the noise increases, the readability of the poster becomes poorer. Figure 6 displays this poster on various sound inputs. This poster is composed of two variable visual elements: (I) the dynamic typographical composition; and (II) a dynamic dotted halftone texture.

The typographic composition consists of the repetition of the word “noise” (see Figure 6). This composition decreases the overlap over the repetitions, from the centre to the edges of the poster. The word “noise” is repeated 24 times, 12 in each direction. The state of this visual element is based on the amplitude of the audio input, gathered from the surrounding environment (using a microphone). This way, the amplitude of the gathered ambient audio is translated into visual information to define the shape of the visual composition. The bigger the amplitude, the higher the number of repetitions displayed in the poster. In this sense, this animation resembles one symmetric amplitude volume indicator.

On the other hand, the dynamic dotted halftone texture decreases the readability of the poster when the noise increases. This way, the size of the dots on the pattern and the blur of the texture are related to the amplitude of the gathered ambient sound, based on a certain minimum and maximum threshold. When the amplitude increases, the distortion increases, making the poster difficult to read when the sound levels reach a certain range. Also, when

the sound reaches a certain level, a message appears warning the viewer that the current sound level might be prejudicial.

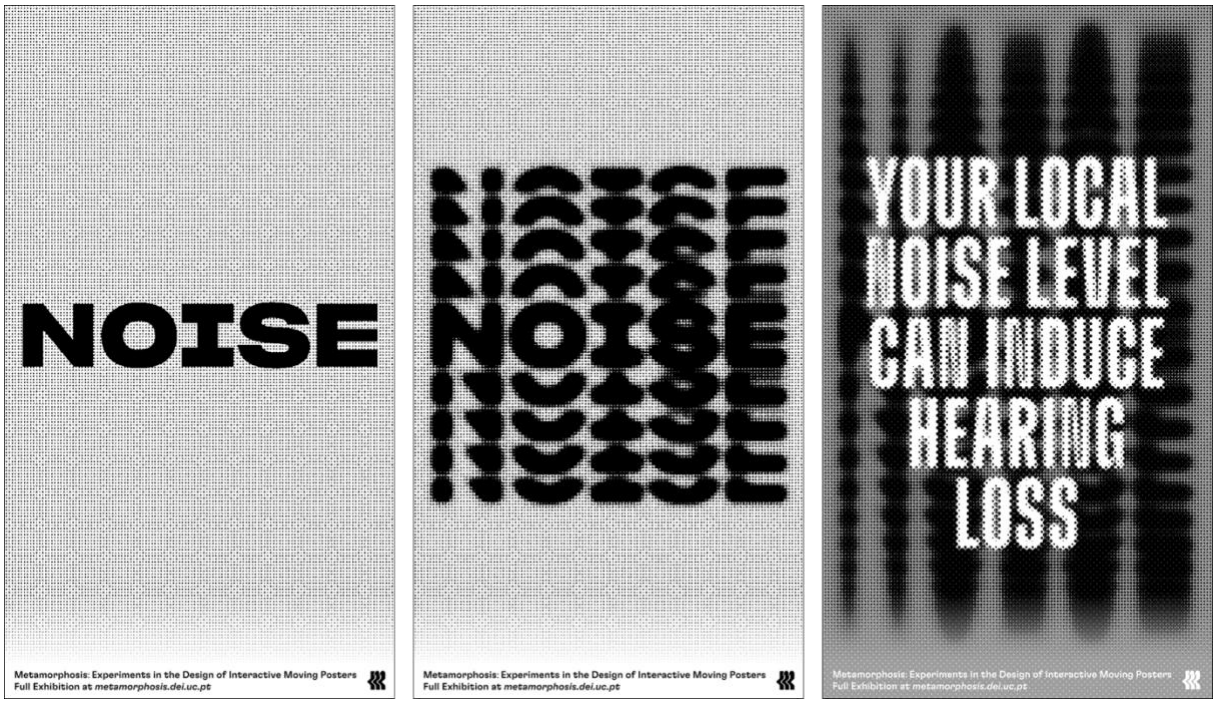


*Figure 6 Variations of the Noise Pollution poster. From left to right, one may observe example posters from a lower to a louder input audio. The rightmost poster also presents the message displayed to the viewer.*

## *3.5 Waste Production Poster*

Lastly, we have developed a poster that simulates the impact of the waste produced by humans and warns the viewer of the fact that most waste ends up in landfills or open dumps (see (Hoornweg *et al.,* 2013)). This poster is, therefore, a metaphorical simulation of an open waste dump. Figure 6 presents some variations of this poster, composed of two types of variable elements: (I) waste elements; and (II) a tailor-made message regarding waste production.

The poster is mostly composed of waste elements "dropped off" on the poster. At a certain time, a waste element is selected and dropped on the poster. By empirical exploration, we have defined this time as 10 seconds. The type of waste is selected based on a certain probability, by a pool selection method, according to data from Municipal Solid Waste (see (EPA, 2018)). The visual representation of each waste element is randomly selected from a set of predefined images for each type. A physics engine is employed to simulate, in a more realistic manner, the drop of elements and the interaction with other elements. After a certain time, each waste element "decomposes" (*i.e.* it is removed from the poster). This time is based on the forecast of the decomposition time of each type of waste. We use a

logarithmic function to increase and decrease the removal time of elements with low and high decomposing times.

Once a person is detected in front of the poster (using face detection techniques), a certain amount of waste elements is dropped off. By empirical exploration, the number of elements has been defined as 40. Also, at the same moment, a message is presented, displaying the average amount of rubbish discarded daily (0.74 kg) and a video capture of the person's face is displayed inside the glyph "o" of the word "you".


*Figure 6 Variations of the Waste Production poster. From left to right, we observe the behaviour of the poster running. Also, in the last poster, the message presented to the viewer is exhibited.*

## 4. Evaluation

The developed posters were evaluated by measuring the successfulness of the transmission of their message and whether the explored interactive features have an impact on it. Due to the pandemic situation at the time, we could not ensure a safe physical controlled environment to perform a phenomenological and observational evaluation. This way, the evaluation had a preliminary nature and was performed through testing sessions carried out online through a user survey. In each test, the posters were evaluated individually (*i.e.* for assessing the communicative and visual features of each poster on its own) and collectively (*i.e.* for assessing the communicative and visual features of all developed posters as a collection). Since we were evaluating subjective information, the tests were designed to collect qualitative (mostly gathered through open-ended questions) and quantitative data (mostly gathered through multi-choice Likert scale questions).

Each test was divided into two stages. The first stage (S1), has been focused on the individual evaluation of each poster, questioning the visual appeal of the poster, and whether the interactive features have improved the transmission of the message compared with print and animated versions. Finally, the last stage (S2) focused on the overall evaluation of the employment of animated and interactive techniques in poster design scenarios. For each interactive moving poster developed, a print and moving-only version has been designed for the purposes of this testing session. Examples of the animated and printed versions evaluated are accessible at https://cdv.dei.uc.pt/metamorphosis.

Eleven testing sessions were conducted. The participants visualised and interacted with posters in their online versions. The age group of the testing participants was between 22 and 30 years old. The next subsection will present the results of each testing stage.

## *4.1 Individual evaluation of Posters (S1)*

The first evaluation stage aimed to assess whether the interactive moving posters have improved the transmission of the message compared to printed and moving-only posters. This way, users have been asked to observe the same poster in three distinct formats: print; moving; and interactive moving. Participants observed each poster set always in the same way, *i.e.* from the most traditional format (print) to the most unconventional one (interactive moving). We defined this arrangement intending to first contextualise participants about the features and context of the posters and, next, perceive whether new features improve the presented posters somehow. Thereafter, the users have been requested to perform the following tasks: (S1.1) to answer how attractive does each poster version looks, on a scale from 1 to 3, and following to explain this classification; (S1.2) to define which is the environmental issue that the poster is related to; (S1.3) to order the different posters version based on the effectiveness of the message transmitted and explain why this classification; and, finally, (S1.4) to give their opinion about what should be improved to increase the effectiveness of transmission of the poster message. Table 1 unveils the quantitative results of tasks S1.1 and S1.3.

On average, the users recognised that the posters, in all of their versions, are attractive (S1.1). The average of the evaluation of each version is always positive, *i.e.* greater than 1.5. Also, there are no notorious significant differences in the attractivity between versions. When we question the user why, they answer that often interactivity gives some contextual information; however, they also refer that the attractivity of posters in each format is similar and each format will work better in a specific context. Moreover, in task S1.2, we denoted that the poster subject is straightforward, and all the users understand the problems that all the posters are transmitting.

When we asked users to select the version that better transmitted the message (S1.3), in almost all posters, users preferred the interactive version. On the other hand, most of the users considered that the printed version is less effective in transmitting the message. The only exception is the Global Warming poster when users considered the animated version

more efficient and the interactive version less efficient. When we question the users about their choice, they often highlight that interactivity makes posters personal and, therefore, interactive versions sensitise better for the message. However, sometimes, some participants referred those interactive versions might be too invasive, and the interaction is sometimes unnecessary and difficult to understand. These comments more frequently happened in the Global Warming poster.

*Table 1 Quantitative results of tasks S1.1 and S1.2. For task S1.1, the table displays the arithmetic mean ($\bar{x}$) and the median ($\tilde{x}$) of the results for each poster version. For task S1.3, it presents the less and more effective poster format based on the user selections.*

| | **S1.1 Posters' attractiveness** | | | **S1.3 Message transmission effectiveness** | |
|---|---|---|---|---|---|
| | Print | Moving | Interactive Moving | Most effective version | Less effective version |
| Air Pollution | $\bar{x}$: 1.63 / $\tilde{x}$: 2 | $\bar{x}$: 2.18 / $\tilde{x}$: 2 | $\bar{x}$: 2.45 / $\tilde{x}$: 3 | Interactive M. (6 users) | Print (9 users) |
| Biodiversity Loss | $\bar{x}$: 2.45 / $\tilde{x}$: 3 | $\bar{x}$: 2.45 / $\tilde{x}$: 3 | $\bar{x}$: 2.72 / $\tilde{x}$: 3 | Interactive M. (9 users) | Print (6 users) |
| Global Warming | $\bar{x}$: 2.36 / $\tilde{x}$: 3 | $\bar{x}$: 2.36 / $\tilde{x}$: 3 | $\bar{x}$: 2.09 / $\tilde{x}$: 2 | Moving (7 users) | Interactive M. (6 users) |
| Noise Pollution | $\bar{x}$: 2.27 / $\tilde{x}$: 3 | $\bar{x}$: 2.72 / $\tilde{x}$: 3 | $\bar{x}$: 2.36 / $\tilde{x}$: 3 | Interactive M. (6 users) | Print (6 users) |
| Waste Production | $\bar{x}$: 2.36 / $\tilde{x}$: 2 | $\bar{x}$: 2.36 / $\tilde{x}$: 2 | $\bar{x}$: 2.36 / $\tilde{x}$: 3 | Interactive M. (8 users) | Print (6 users) |

Finally, most of the suggestions for changes proposed by users (S1.4) were related to some performance issues in the interactive versions. The poster that most of the users gave suggestions about (7 users) was the poster concerning Global Warming. For instance, users suggested making the word "warming" more readable, increasing the blurry effect and/or changing the rectangle behaviour to be more like the ocean.

## *4.2 Overall Evaluation of the employment of interactivity and animation techniques (S2)*

In the evaluation second stage, we overall assessed whether animation and interactivity aimed at the compression of the messages. This way, we asked users three questions: (S2.1) to answer if animation helped in the comprehension of the message and explain more comprehensively her/his answer; (S2.2) to answer if interactivity helped in the comprehension of the message, especially compared with animation, and explain more

detailed her/his answer; and, finally, (S2.3) to select the version which he/she thinks will stand most in people's memory.

Most of the users (7 users) consider that animation techniques promote a better comprehension of the message (S2.1). On the other hand, 2 users considered that most of the time it helped, but it depends on the subject and visualisation context. The other 2 users considered that animation did not improve the effectiveness of the posters. When questioned to explain their answers in more detail, the users often highlighted that movement enables them to tell a story and, consequently, makes viewers realise and pay attention to the problem more efficiently. On the other hand, in relation to iterative techniques (S2.2), also most of the users (9 users) considered that interactive techniques allow a better comprehension of the message and 2 users considered that, most of the time, it helped but it depends on the subject and visualisation context. Most of the users mentioned that interaction helped to establish a connection between them (viewers) and the design and, therefore, helped to involve them in the poster's subject in a more personal way. Lastly, almost all users (10 of 11) selected the interactive version as the one they think will stand most in people's memory (S2.3); only a user selected the animated version instead.

## 5. Conclusion and Future Work

In this paper, we present a set of interactive moving posters that explore the employment of generative and interactive approaches in the context of poster design. These posters are composed of visual elements that react directly and indirectly to environmental data. The design of these posters addresses some climatic problems, focusing especially on the human impact on the environment. The explored problems are (I) Air Pollution, (II) Biodiversity loss, (III) Global Warming, (IV) Noise Pollution and (v) Waste production. Each poster is a self-contained communication artefact. However, these share a set of common visual features to keep the visual cohesion between them.

We conducted testing sessions to assess whether the developed posters transmit the message in a more efficient, personal, and engaging way than print and only animated versions. Due to the pandemic situation, we could not ensure participants a safe and controlled environment to conduct the evaluation sessions. This way, we carried the evaluation out through an online user survey.

The questioned participants considered, on average, that all the designed posters are visually attractive either in printed, moving, or interactive versions. Nonetheless, we observed that some poster versions are more eye-catchy and communicative than others.

Most of the participants consider that animation and interactivity techniques promote a better comprehension of the message. Also, they identified that interactive versions, in most cases, transmit the message most efficiently, often referring to that it makes posters more personal and remarkable, since their experience is related to their actions.

Although the evaluation sessions could not be conducted in the most suitable and unbiased environment, these enabled us to preliminary study the potential of this approach and pinpoint future directions for this work. Future work, therefore, will focus on the further observational and phenomenological evaluation of the communication and engagement potential of the interactive moving posters, especially in a physical setup and with a more diverse and controlled testing group. Also, we aim to design and develop new posters exploring other environmental issues and subjects, and further explore the employment of this approach in commercial scenarios.

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