

[coordenação]
Heitor Alvelos
José Carneiro
Rui Vitorino Santos

AN INFODEMIC



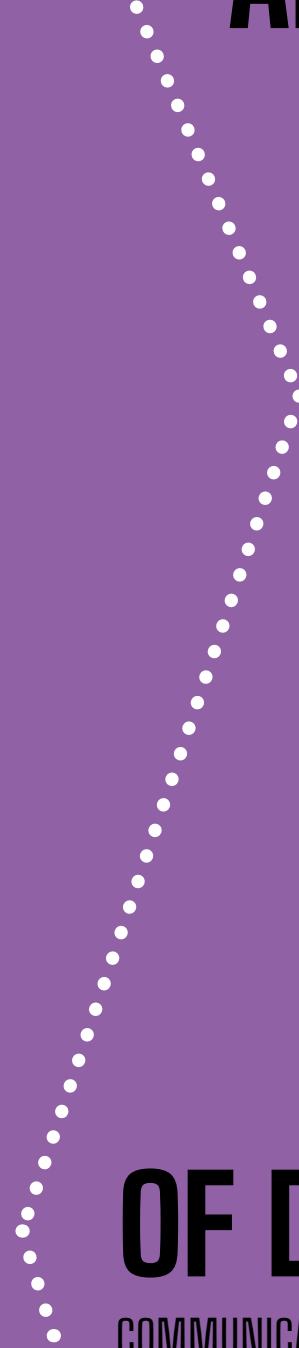
OF DISORIENTATION

Communication design as mediator between scientific
Knowledge and cognitive bias. The case study of portugal
Before, during, and after the pandemic.

SCI—BI



AN INFODEMIC



OF DISORIENTATION

COMMUNICATION DESIGN AS MEDIATOR BETWEEN SCIENTIFIC
KNOWLEDGE AND COGNITIVE BIAS. THE CASE STUDY OF PORTUGAL
BEFORE, DURING, AND AFTER THE PANDEMIC.



COUNCIL OF FRAGILE

I CAN'T BELIEVE
WE'RE MARCHING
FOR FACTS

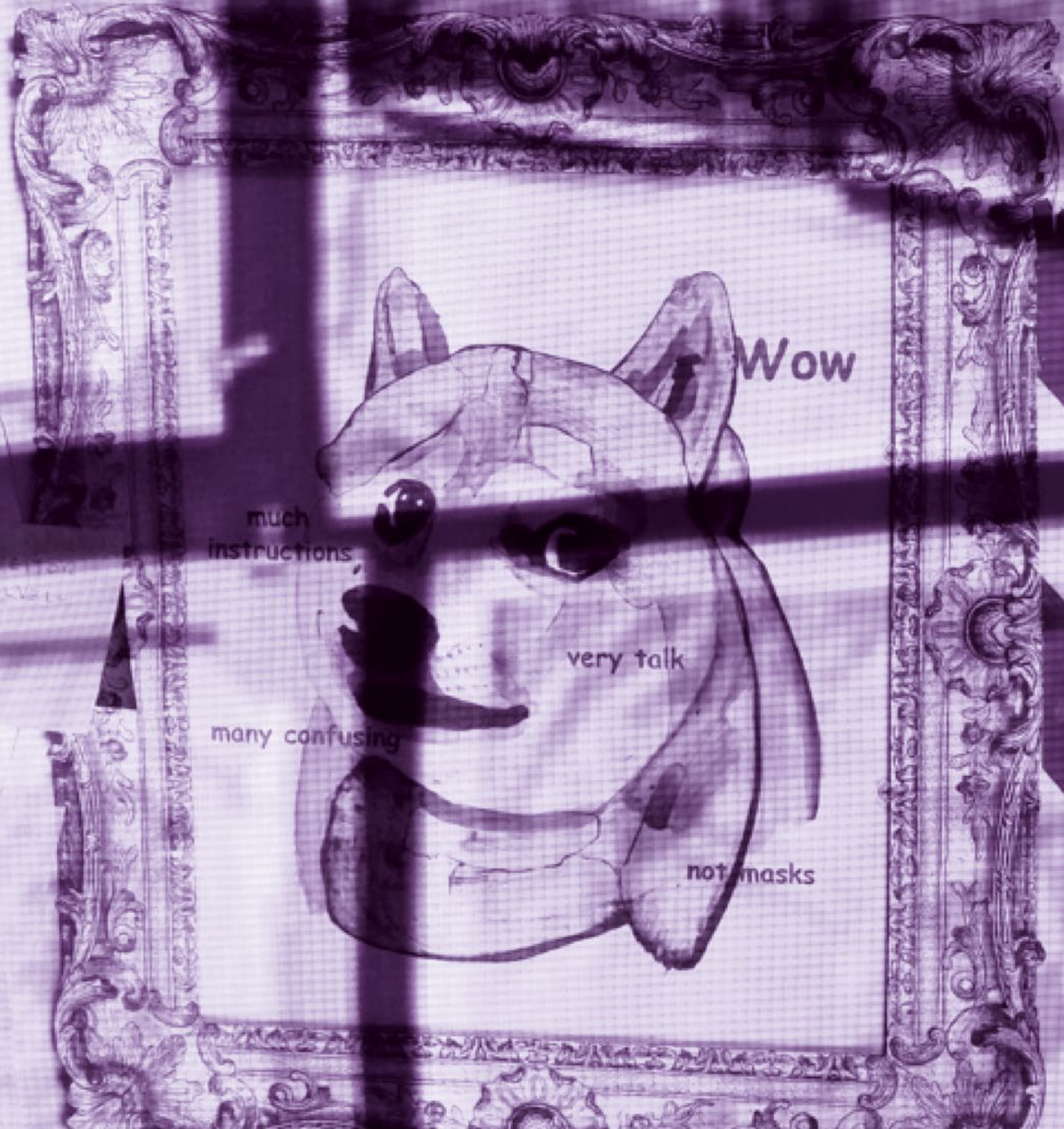
wow
such vaccinated
not covid

many health

wow



many conspiracy



Wow

much instructions

very talk

many confusing

not masks



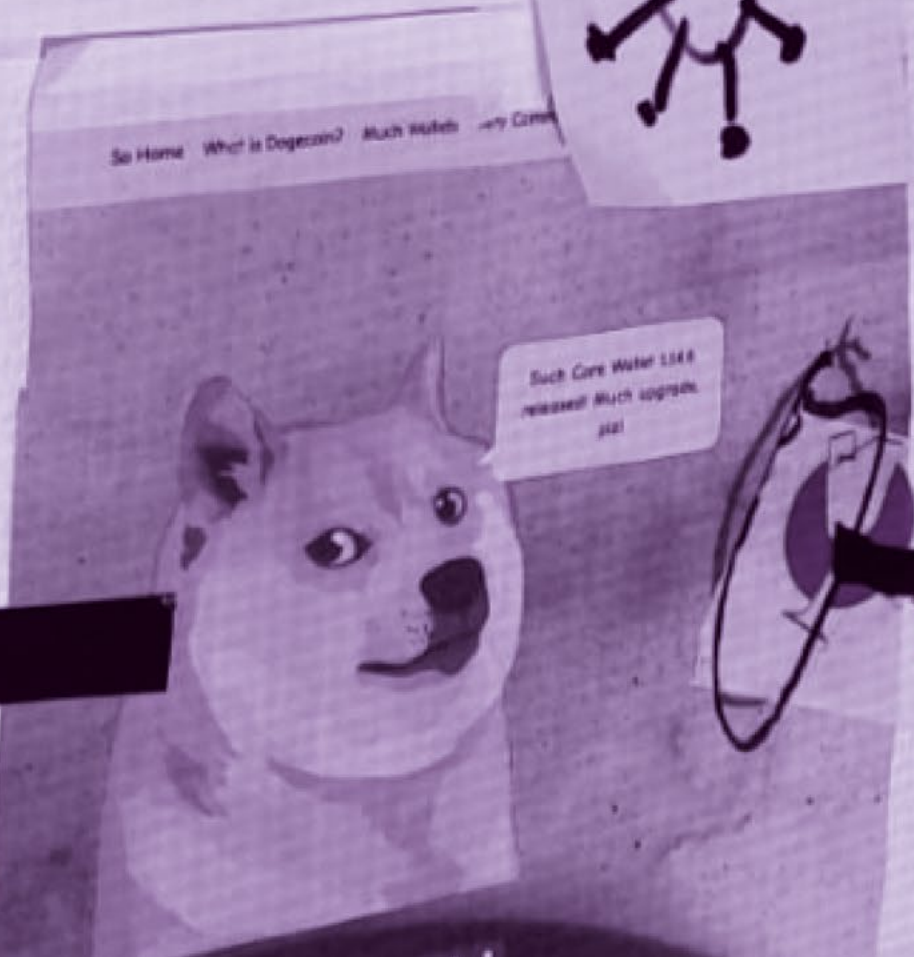
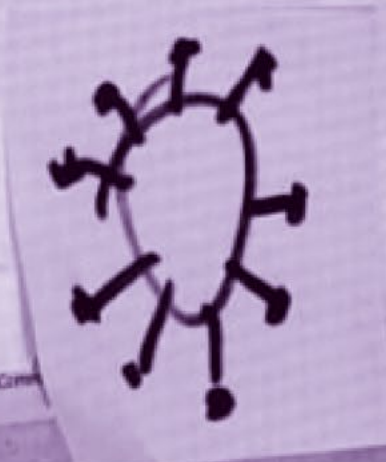
YU

SCI

TUMB TUMB
ADRIANOPOLI OTTOBRE 1912
TUUUMB IN LIBERTÀ
PAROLE TURKE TUURU TUURU
EDIZIONE FUTURISTA
DI FERRARA
con illustrazioni di MARIO
SALVI



TECHNO
OPTIMIST
MANIFESTO



FRAGIL OF

Wh

CONTENTS

- 13 **FOREWORD**
- 17 **ABOUT THE PROJECT**
- 27 **PRIMAL SOUP**
- 33 **JUST BETWEEN MEME AND YOU**
- 43 **IT'S ALWAYS BEEN THERE**
- 47 **MEME WORKSHOPS**
- 61 **REELS WORKSHOP**
- 69 **COMMUNICATING THE EXPERIENCE
OF THE PANDEMIC THROUGH MEMES**
- 73 **T-SHIRT PROTOTYPES**
- 77 **THE STOLEN EXHIBITION**
 - 79 **Y U NO TRUST SCIENCE???**
**ENGAGING WITH POST-DIGITAL AUDIENCES ON THE
SUBJECT OF RELIABLE SCIENTIFIC KNOWLEDGE**
- 85 **INFOGRAPHICS WORKSHOP**
 - 87 **CREATING INFOGRAPHICS ON COVID-19
CONSPIRACY THEORIES**

93	PRINTED MEMES WORKSHOP	
95	EXPLORING ONLINE MEMES AS PEDAGOGICAL TOOLS IN HEALTH KNOWLEDGE AND BEHAVIOUR	
105	KEYNOTE LECTURE AND ROUND TABLE	
109	TETHERED RATIONALITY A MODEL OF BEHAVIOR FOR THE REAL WORLD	
115	THE FORENSIC ANNOTATION OF A FEVER DREAM	
131	WHEN IN MEMELAND, SPEAK IN MEMES	
151	CONHECIMENTO CIENTÍFICO POR ENTRE VIESES COGNITIVOS E COMPORTAMENTAIS	
155	STEAL THIS MEME EXHIBITION	
165	INTERVIEWS	
171	DATA COMICS WORKSHOP	
173	USING DATA COMICS TO COMMUNICATE COMPLEX PANDEMIC-RELATED INFORMATION	
189	MDI WORKSHOP PANDEMIC YEARBOOK	
195	DESIGN AGAINST DISINFORMATION EXHIBITION	
205	O—U AN EXHIBITION OF MEME SYMPTOMS AND SIDE EFFECTS	
217	FANZINES WORKSHOP	
219	DESIGNING AGAINST DISINFORMATION	
237	THE DAILY STRUGGLES OF SCIENTISTS	
239	OS DILEMAS QUOTIDIANOS DOS CIENTISTAS	
253	DESIGNING TOWARDS A RECONCILIATION BETWEEN TRADITIONAL AND ONLINE MEDIA	
257	SELFIE MUSEUM	
261	DAD FOCUS GROUP	
269	FEEDBACK LOOP FOCUS GROUP	
273	FOCUS GROUP I3S	
279	ASSOCIATED STUDIES	
283	TYOLOGIES CHART	
287	POSITION PAPER	
289	THE DUTY TO FOLLOW UP A POSITION PAPER ON DESIGN AGAINST DISINFORMATION	

FOREWORD

The present book is somewhat of a paradox. It addresses and documents an exploratory research project on the current, ongoing volatility of knowledge reliability. Throughout the research, we have become deeply aware of how the seemingly exponential speed and complexity of events and developments is far surpassing our ability to fully comprehend and act upon them. Indeed, the core term is “exploratory”, as our original research ambition to make sense of phenomena, causes and impact of disinformation, particularly in regards to its online ramifications, preceded the game-changing launch of ChatGPT by half a year... An expressive vouch for action research, if there ever was one. We need to be on the case, as the case does not wait.

If the narratives and responses to the recent pandemic served as an anchor and a means to specify a time-frame for the research hereby presented, the ambition was always to reach conclusions and issue recommendations that could be applied elsewhere, both in thematic terms (other health crises) and pervasive structural challenges (cognitive chasms, ideological implications, scientific mistrust). These conclusions and recommendations, stemming from the multitude of action-based research experiments conducted, are presented at the end of this book. They have emerged as less analytical or prescriptive than expected, and more as calls for a substantial reinvention of formal discourse and parameters of literacy.

We have illustrated this proposed reinvention to the extent that current technologies and associated dynamics permit; however, it is the principle of a continued semantic and rhetorical self-scrutiny and self-reinvention that must be projected and employed beyond the present research - because the collapse of cognitive consensus is ongoing, and the issue of perception is itself becoming a growing concern when it comes to the tangible reliability of what we witness, mediate, consume and ultimately believe. As technological sophistication and algorithmic self-sufficiency expand towards territories not yet fully comprehended, so we must engage in radically sobering pedagogies of perception, cognition and discourse.

As such, and despite taking the form of a printed book, we believe the present research is actually taking its first steps: a quest for lucidity will only get more difficult in the coming years, it seems. Itself, the book chronicles and documents an early exploration of the hypothesis that Communication Design may be a key agent in addressing multiple manifestations of disinformation; but in truth, the most decisive content we provide in this volume is the URL to the ongoing Typology Chart, where further developments and perplexities will continue to be inscribed. And this is the paradox of the present book: it is only as good as the work ahead.

HEITOR ALVELOS

August 2024

**“INSTITUTIONAL COMMUNICATORS/
PUBLIC HEALTH ENTITIES DO NOT
UNDERSTAND THAT THE WAY PEOPLE
COMMUNICATE HAS CHANGED [...]:
YOU HAVE TO BEGIN TO UNDERSTAND
THE POWER OF STORYTELLING.”**

Renée DiResta

In Conspirativity Podcast 154: The Truth Wars, 18 May 2023

ABOUT THE PROJECT

DIAGNOSIS:

Recent years have seen the emergence of two particular challenges to scientific knowledge and employment by citizens. In both instances, communication design may be underperforming in its potential for contribution:

- 1.** The exponential rise of social media use has potentiated an equally exponential range of phenomena such as fake news, pseudo-science and superstition; as alluring, de-centralised, continuously reconfiguring webs, their circulation and adaptability tend to far surpass those of rigorous knowledge.
- 2.** The recent pandemic and corresponding public policies (rules of confinement and vaccination programs in particular) seem to have further eroded the already precarious, aforementioned scenario. A range of misinformation channels and content have reached significant sectors of the population – just as the general media’s portrayal of the health crisis was largely reduced to statistical extrapolations, and the broadcasting of a largely hermetic, prescriptive discourse on the part of health authorities, often lacking in intelligibility with the greater public.

Despite current decreases in pandemic levels, issues of mistrust remain and will likely retain an impact in future instances, health-related or otherwise.

The above issues have been addressed both through increased technological sophistication of digital tools, and the adoption of logical discourse; however, both seem to have fallen short in tackling the scale and complexity of the phenomena of misinformation.

HYPOTHESIS AND RELEVANCE:

The present project posits that communication design may be an efficient tool in both filtering unreliable knowledge and contributing to a more empathetic dialogue between scientific expertise and citizen concerns. The premises of this hypothesis can be translated as follows:

- 1. Scientific complexity is not always readily translatable to those outside the fields of study;**
- 2. A correlation between scientific diagnosis and public policy is equally complex and not always clear to citizens;**
- 3. Statistical representation may benefit from more intelligible and accessible interfaces: graphic, figurative, even documentary;**
- 4. An exhaustion over the pandemic may be worsened by overused media communication strategies;**
- 5. An excessive reliance in digital technology and data overflow may have been falling short of its tangible applicability;**
- 6. Citizens may tend to bypass statistical and evidence-based reliability if it happens to be contrary to their own narrative, experience, or preceding beliefs;**

- 7. A behavioural regulation and corresponding pedagogy in crisis scenarios may need to consider subjective components and levels of literacy more than it has so far;**
- 8. A closer scrutiny of information fluxes in social media, as well as online field work towards more dynamic communication channels, may be essential to the success of scientific and policy-based communication strategies.**

As far as relevance, we further posit that historical patterns and the heritage of the present pandemic may help in future communication and regulation of health-related crises and further scenarios of public impact, namely by using communication design as an interface towards engagement and reciprocity.

OBJECTIVES:

- To confirm or refute the above hypothesis and associated premises;
- To mediate spaces for reciprocal recognition between scientists and citizens;
- To provide tangible contributions to a multidisciplinary approach to scientific communication in health information and associated policies;
- To scrutinise formal and semantic components of online media of civic vocation;
- To further unpack the current ambivalence between reliable and unreliable information;
- To provide working contributions to the legitimisation of the design discipline, testing its specific tools, strategies and methodologies in a pertinent and timely field of cognitive density.

METHODOLOGY:

An overview

The project is organised as an iteration in the following phases:

1. Field work and content gathering/ taxonomy towards confirming, refuting and adjusting the above hypotheses;
2. Production of exploratory communication design prototypes based in the findings of phase 1;
3. Prototype evaluation by diversified demographics;
4. Production of communication design specimens adjusted according to evaluation findings;
5. Public presentation of specimens, findings, methodologies and policy recommendations.

MAIN OUTCOMES:

- Scientific dissemination throughout the project;
- Good practice recommendations in the communication of public policies;
- Archives of content and data gathered throughout the project;
- Communication design prototypes: posters, publications, online media;
- Public talks between normally unconnected demographics;
- Documentary audiovisual content;
- Networked dissemination via online channels and radio broadcasts;
- Design model for curricular employment;
- A white paper on contemporary scientific communication in health sectors.

THE CASE STUDY OF PORTUGAL

The project focuses on Portugal as a case study, due to empirical proximity, the relatively contained expression

of pseudoscience and ideologically driven bias, and a largely successful strategy in tackling the pandemic crisis in terms of civic cooperation. From the findings, the project will ensure a taxonomy differentiating contextual, phenomenological (non-replicable) issues, and replicable / scalable factors that may be employed in further developments.

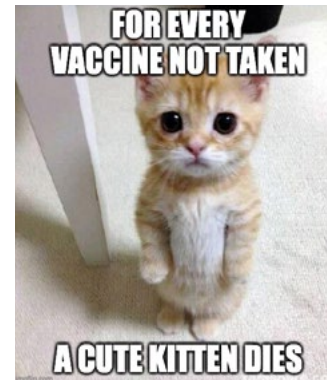
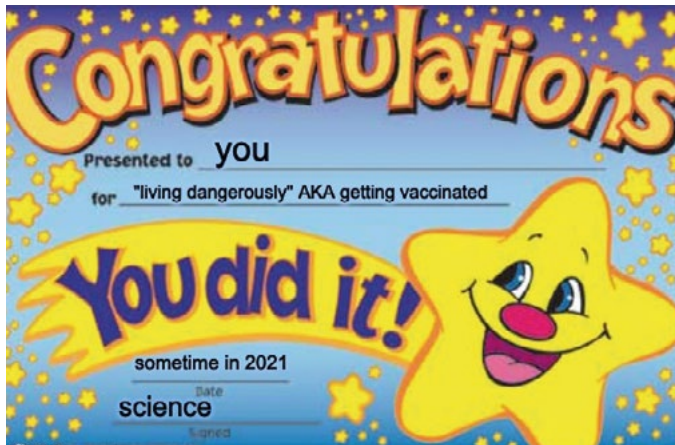
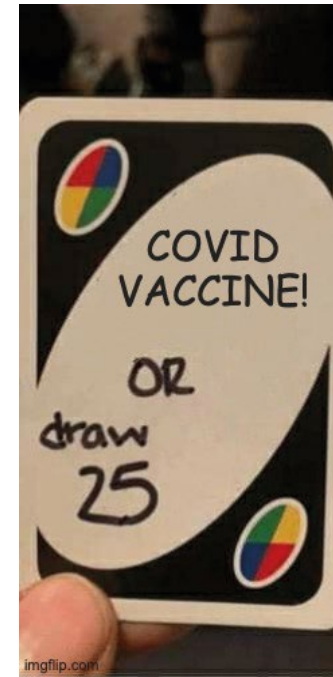
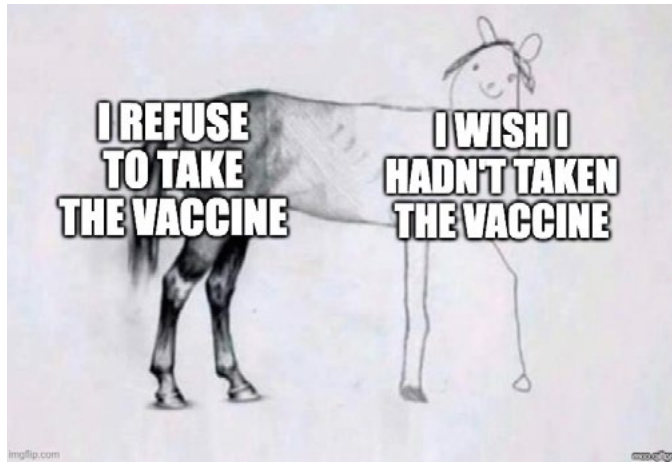
SCI-BI
A PROJ...

YOUR 3
ARE

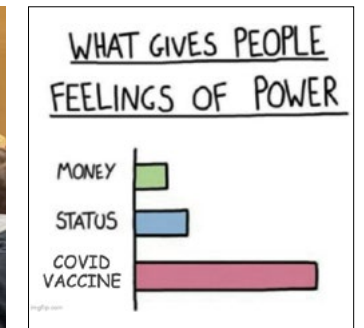


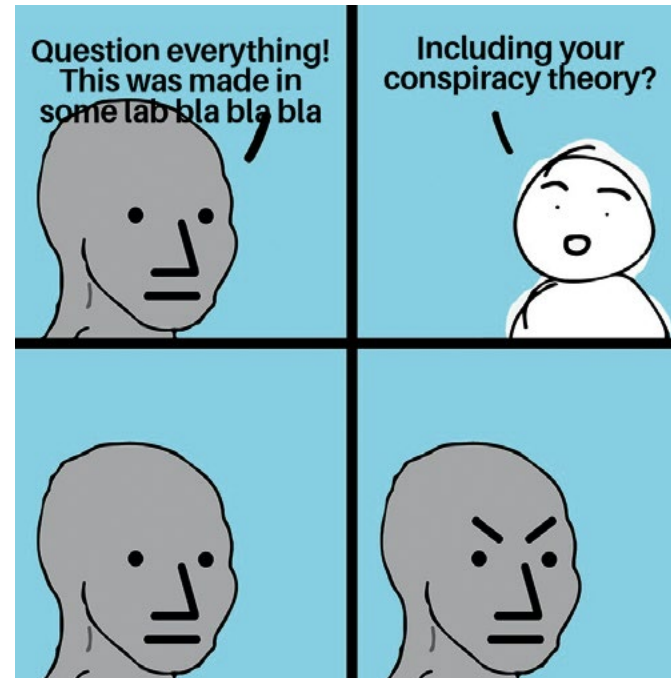
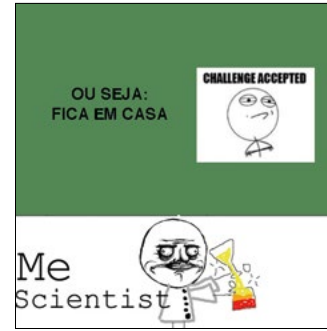
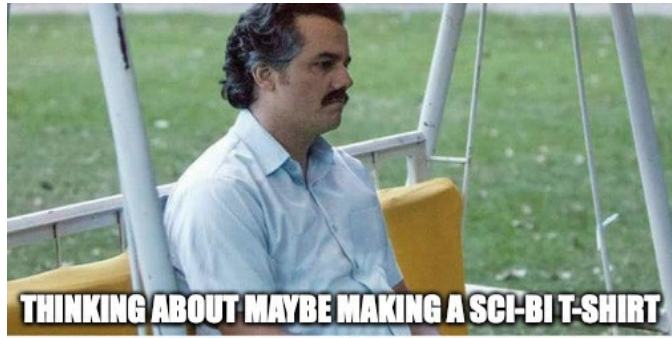
PRIMAL SOUP

The project began with a series of memes produced by the team, in order to stir up ideas and approaches to the project challenge. They were largely random and intuitive, replicating their root online ecosystem. The following pages include samples of the outcomes.



	Infodemic
	"infodemic" (2020)





But it says it right here



JUST BETWEEN MEME AND YOU

In June 2023, a first analysis stemming from ongoing memes workshops (April-June) was presented at the IAFOR Paris Conference on Education.

JUST BETWEEN MEME AND YOU

*Online memes as health communication tools in
Design and Media Arts higher education curricula*

This study posits that current online trends of mistrust in health policies may be partly overcome through an exploratory employment of memes. It aims at filling a critical gap whereby unexpected communication channels might succeed in addressing subjective bias seemingly immune to fact-based cognitive persuasion channels. We propose that the classroom may be a particularly apt context for this exploration: as part of the core lexica of younger generations, memes may act as pathways to stimulating actual research. Furthermore, by hypothesising that scientific knowledge and policies may incorporate aesthetics and semantics of online media, we aim at unpacking an often polarised debate around health communication – as particularly evident during the recent pandemic. These premises inform a set of assignments under implementation in various higher education Design and Media Arts courses in Portugal; exercises cover a range of approaches to pandemic-related health communication, trust and behaviour, employing visual languages and semantics of memes as a primary mechanism; we aim to create an ambivalence that dilutes expectations of formality and univocal authority, thus facilitating engagement. Assignments include: translation of scientific jargon, unexpected perspectives, before/after dynamics, humour and non-threatening irony, personal testimonies, and random image-text coupling. Visual outcomes and relevant testimonies from participants are currently under validation and will be presented. We further envision a scalability and visibility beyond both the classroom environment and the disciplines in question. The study is developed under the framework of the project “An Infodemic of Disorientation: communication design as mediator between scientific knowledge and cognitive bias”.

KEYWORDS

- Health-related memes;
- Graphic design in social media;
- Public health communication;
- Art and design education.

INTRODUCTION

In recent years, an empirical consensus has been forming regarding a gradual rise of public mistrust towards reliable health information; this has been particularly visible, and has become particularly poignant, throughout the recent COVID-19 pandemic (2020-23), with multiple theories and practices contesting scientific knowledge on the subject (Lazarus et al, 2002). Concomitantly, citizen adherence to health policies saw a significant decrease, often to the point of hostility, coinciding with the promotion of alternative (and ineffective) therapies, unexpected alliances between wellness communities and conspiracy-driven propaganda, and even outright fabrications (Russell, 2022).

Health policies have often been contested, with the “vaccines cause autism” (Kata, 2011; Walker, n.d.) controversy (Wakefield, 1998; redacted) laying the groundwork for a template narrative branching into multiple, ongoing variations (Germani & Biller-Andorno, 2021); however, the exponential proliferation of social media (Ortiz-Sánchez, 2020), both in its global technological outreach and its recurring “thought bubble” communities, have amplified the issue to an unforeseen scale (Raballo et al, 2022). This may be partly explained by the exponential ease in sharing subjective, partial, unreliable, unproven or deliberately false content, coupled with a pressing, addictive need for subscribing to graspable, aggregating narratives on the part of online users.

These graspable narratives are often the opposite of what health sciences can readily provide, as methods and advancements entail degrees of epistemological complexity and require an expertise that is not necessarily readily present in the general population; this may become an additional factor in understanding the frequent accusations that health experts and authorities are involved in secretive, punishing activity, when in fact what we see is inevitable epistemological hermeticism.

A great effort is often invested in translating complex health knowledge and phenomena into concepts and linguistic formulations that the general public can understand as the basis for specific health policies; however, health researchers and authorities largely communicate via facts, infographics, statistics and logic, while large segments of the population are currently communicating via deconstructive images, humour, rumours, and individual testimonies. While understandable from a semantic viewpoint, we argue that this chasm needs a degree of dilution in order for health policies to reach skeptic segments of the population.

DiResta (2023) states this dilution as a duty in face of a changed communication landscape, and places the onus on authorities: “Institutional communicators / public health entities do not understand that the way people communicate has changed [...]: you have to begin to understand the power of storytelling” – a point often observed throughout the empirical groundwork of the present research, in how a single testimony of a vaccine reaction gone wrong presented

in mainstream media may compromise, in the minds of the audience, the understanding of statistical evidence that points to such occurrence as residual.

Additionally, the expectation that the cognitive process is purely rational has by now been debunked by psychologists and cognitive neuroscientists; Goel (2022) encapsulates it as “The Reasoning Mind Recruits the Instinctive Mind”. In the present context, this phenomenon translates as the duty of health authorities to take into account subjective components in their engagement processes with the population. It is fair to recognise that an appeal to emotional components has been present in public health campaigns – particularly gratitude to health professionals, and fear of death; however, they remain staunchly within the parameters of the expected semantics of authoritative discourse.

Given the above premises, the present research has posited and rehearsed a disruptive hypothesis to the aforementioned chasm: current online trends of disinformation and mistrust in health policies may be partly overcome through an employment of social network aesthetics and semantics on the part of authorities. Furthermore, Communication Design and Media Arts may assist in this process by capacitating students and professionals in both technical and semiotic skills required. As such, the design course classroom may be an apt context for an exploratory re-purposing of social media source materials such as reels. As part of the native lexica of younger generations, these may act as pathways to stimulating actual knowledge-seeking by citizens, while diluting pre-emptive expectations of formality and univocal authority, thus facilitating cognitive and behavioral engagement.

DEVELOPMENT

In order to test the aforementioned hypothesis, and following a series of anonymous interviews with COVID-19 deniers and vaccine-hesitant citizens, a set of meme-related assignments were developed in four higher education Design and Media Arts courses in Portugal, on a BA, MA and PhD level. The assignments were preceded by an introduction that addressed the above issues. The workshops were conducted with teams of one to three students using a team-based learning approach. Students of an international background (namely Portugal, Brazil, Argentina and France) were thus invited to generate memes and reels that addressed pandemic-related content under four possible categories: testimonial, informative, instructive, and deconstructive. These were further unpacked as a pragmatic set of directives, including: translation of scientific jargon, rendering complex data accessible, and employing humour and non-threatening irony.

The framework involved a series of core concepts familiar to design students: tactical media, figures of speech, storytelling, edutainment, activism, remix cultures, subvertising, culture jamming, and hacktivism; students were invited

to pursue one or more of these concepts. Workshop length varied between one and two hours, and discussion was encouraged, both during the briefing and the execution. Despite the provided guidelines and frameworks, workshops tended to be open-ended and intuitive, as the exploratory nature of the hypothesis demanded further, unexpected insights to surface throughout.

CONCLUSIONS

A preliminary assessment of the conducted workshops has revealed the following evidence:

1. Humour and irony were the most popular approach; this is concurrent with the prevailing stream of semantics in social media contexts, thus revealing a compatibility of the generated specimens with the desired locus of their circulation;
2. workshops focusing on infographics as translation of complex data and knowledge required a more structured, pedagogical approach – particularly as a measure of quantitative rigour was at stake; this balance between intuition and fact-based information is at the crux of the challenge, and will need further refinement;
3. a noteworthy number of students resisted the challenge of revisiting the recent pandemic; however, rather than a purely retrospective exercise, the research aims at laying a groundwork in communication templates that may prove useful in future instances, health-related or otherwise. As such, resorting to the experience of the pandemic should be regarded as a mechanism for rooting the resulting specimens on empirical, lived experience, while clarifying that health (and scientific) knowledge and policy communication as a whole will ultimately be the added value emerging from the various exercises;
4. responses have ranged from a hesitancy to participate, to a substantial commitment to testing a pedagogy of health; this is concurrent with classroom dynamics, accordings to students' interests and skills;
5. students have learned the basic premises of ascertainment of credible sources of scientific information, identify red flags and manipulation techniques commonly used in disinformation, and recognize the value of evidence-based reasoning. They can therefore themselves act as pedagogues, throughout the learning process, and as future design professionals.

Further validation will occur through a public exhibition of selected specimens, in partnership with the University of Porto's Science and Technology Park, in October 2023; surveys will be conducted with visitors, in order to systematize the outcomes into a second iteration of creative production. The process of systematization is itself contributive to a model, in progress, identifying the various issues

in scientific knowledge and policy, their causes and contexts of operation, and the potential roles of design in overcoming said issues. The model will ultimately form the basis of a set of recommendations regarding health communication in social media environments, aiming at content integration in design and digital media art courses, as well as policy recommendations to researchers and health authorities, including a set of core principles in communicating health information and policies beyond facts and statistics, and the presence of design and activism as consulting agents in communication processes.

A first, critical selection and taxonomy of workshop outcomes can be viewed at: <http://tiny.cc/memeandyou>.

ACKNOWLEDGEMENTS

This work is funded by national funds through FCT – Fundação para a Ciência e a Tecnologia, I.P., under the scope of the project 2022.08322.PTDC (Portugal).

HEITOR ALVELOS

SUSANA BARRETO

CLÁUDIA RAQUEL LIMA

ELIANA PENEDOS-SANTIAGO

JORGE BRANDÃO PEREIRA

PEDRO ALVES DA VEIGA

REFERENCES

- DiResta, R. (2023, 18 May) 154: The Truth Wars [Audio podcast episode]. In *Conspirativity. Conspirativity* podcast. <https://www.conspirativity.net/episodes/154-the-truth-wars-renee-diresta>
- Germani, F., & Biller-Andorno, N. (2021). The anti-vaccination infodemic on social media: A behavioral analysis. *PLOS ONE*, 16(3), e0247642. <https://doi.org/10.1371/journal.pone.0247642>
- Goel, V. (2002) *Reason and Less: Pursuing Food, Sex, and Politics*. The MIT Press
- Kata, A. (2011). Anti-vaccine activists, Web 2.0, and the postmodern paradigm – An overview of tactics and tropes used online by the anti-vaccination movement. *Vaccine Special Issue: The Role of Internet Use in Vaccination Decisions*. Volume 30, pp.3778-3789.
- Lazarus, J.V., Wyka, K., White, T.M. et al. Revisiting COVID-19 vaccine hesitancy around the world using data from 23 countries in 2021. *Nat Commun* 13, 3801 (2022). <https://doi.org/10.1038/s41467-022-31441-x>
- Ortiz-Sánchez, E.; Velando-Soriano, A.; Pradas-Hernández, L.; Vargas-Román, K.; Gómez-Urquiza, J.L.; Cañadas-De la Fuente, G.A.; Albendin-García, L. Analysis of the Anti-Vaccine Movement in Social Networks: A Systematic Review. *Int. J. Environ. Res. Public Health*, 17, 5394 (2020). <https://doi.org/10.3390/ijerph17155394>
- Raballo, A., Poletti, M., & Preti, A. (2022). Vaccine Hesitancy, Anti-Vax, COVID-Conspiracionism: From Subcultural Convergence to Public Health and Bioethical Problems. *Frontiers in Public Health*, 10, 877490. <https://doi.org/10.3389/fpubh.2022.877490>
- Russell, F. (2022). Pox populi: Anti-vaxx, anti-politics. *Journal of Sociology*, 0(0). <https://doi.org/10.1177/14407833221101660>
- Walker, J. (n.d.) A Vaccine Hesitant Decoder Ring. Retrieved from <https://www.conspirativity.net/transmissions/a-vaccine-hesitant-decoder-ring>



IT'S ALWAYS BEEN THERE

In September 2023, a presentation at the Barcelona Arts and Media Conference presented and unpacked historical parallels between traditional satire specimens and contemporary memes, arguing for an aesthetic and semantic continuity.

IT'S ALWAYS BEEN THERE

*Online Memes as a Current Variation
of Traditional Editorial Satire*

This paper argues that, despite their novelty as an online, participatory phenomenon, memes can be regarded and understood in the tradition of satire. By identifying recurring components of satire – traditionally a key component of printed media, as caricature, cartoons and editorial narratives, a literature review analyses recurring approaches and developments, as media themselves evolve.

Furthermore, a comparison of specimens, both printed and online, reveal similarities in communication strategies employed by both traditional satire and memes.

In this way, we aim to unpick the prevailing narrative on social media as a brand new phenomenon, devoid of historical parallel in terms of aesthetics, semantics, and circulation. While acknowledging the speed of circulation and omnipresence of memes as an unprecedented phenomenon, we argue that their semiotic premises reveal a continuity, rather than a contrast, with prior editorial content. The core distinction, however, resides in the collapse of traditional editorial channels and agendas, whereby the prior model of content production versus consumption is now replaced with an ongoing, self-referential and self-perpetuating online dialogue.

MARTA FERNANDES

HEITOR ALVELOS

PEDRO PAULO



MEME WORKSHOPS

Between April and July 2023, four hands-on workshops with Design and Media Arts students were conducted in order to test the viability of memes as generators of communication and debate regarding COVID-related health measures. The following pages include samples of the outcomes.

CONTEXTUALIZATION

Recent years have seen an emergence of two challenges to scientific knowledge and employment by citizens. In both instances, communication design may be underperforming in its potential for contribution:

1. The exponential rise of social media use has potentiated a range of phenomena such as fake news, pseudo-science and superstition; as alluring, de-centralised, continuously reconfiguring webs, their circulation and adaptability tend to far surpass those of rigorous knowledge;
2. The recent pandemic and corresponding public policies (rules of confinement and vaccination programs in particular) seem to have further eroded the aforementioned scenario. A range of misinformation channels and content have reached significant sectors of the population - just as the general media's portrayal of the health crisis was largely reduced to statistical extrapolation, and a largely hermetic discourse on the part of health authorities often lacked in intelligibility.

Despite current decreases in pandemic levels, issues of mistrust remain and will likely retain an impact in future instances, health-related or otherwise. Tackling the pandemic has included both increased technological sophistication, and the adoption of logical discourse; however, both seem to have fallen short in addressing the scale and complexity of the phenomena of misinformation.

THE PERTINENCE OF THE WORKSHOPS

The nine workshops were conducted between March and July 2023 as part of the exploratory project "Sci-Bi: An Infodemic of Disorientation: Communication Design as a Mediator Between Scientific Knowledge and Cognitive Bias." The case study focused on Portugal before, during, and after the pandemic.

Our research team conducted these workshops with students (groups of 1-3) from the following institutions: the *University of Porto*, *Lusófona University*, *Polytechnic of Leiria*, *Polytechnic of Cávado and Ave*, the *Portuguese Open University* and the *Polytechnic of Porto*.

It was important for us to conduct these workshops within the context of the project mentioned above because science disinformation has become a pressing problem in today's society. Misinformation, misleading claims, and distorted facts can have detrimental effects on public understanding, decision-making, and trust in scientific research. Science often involves complex concepts that may be challenging for the general public to grasp. Communication design students can play a vital role in translating and visualizing scientific information in a clear, accessible, and engaging manner. By understanding the nuances of science disinformation, they can be more effective in creating visual content that educates and counters misleading narratives. The outputs were essentially of three kinds, infographics, reels and memes.

By engaging communication design students in workshops focused on science disinformation, we can equip them with the knowledge and skills needed to tackle this issue effectively and empower them to become responsible and informed communicators who can actively combat misinformation and promote accurate scientific information. These workshops can also help communication design students develop critical thinking skills. They learn to evaluate and discern credible sources of scientific information, identify red flags and manipulation techniques commonly used in disinformation, and recognize the importance of evidence-based reasoning. These skills are crucial not only for combating disinformation but also for promoting a scientifically literate society.

Also, Science disinformation is a multidimensional issue that requires collaboration among various fields, including communication design, journalism, science, and technology. Workshops provided a platform for interdisciplinary collaboration, allowing students to learn from one another's expertise and perspectives.

In an era dominated by social media and online platforms, individuals have become active contributors to the digital landscape. By engaging communication design students in workshops on science disinformation, we empower them to become responsible digital citizens who are aware of the impact of their online presence and capable of promoting accurate information while countering misinformation.

The workshop held at Lusófona University was done in a curricular context, within the Design course of the 1st year of the Communication Design degree. It was proposed to 16 students, two of them from the Erasmus program (one from France and one from the Czech Republic).

Students were invited to create memes related to experiences lived or observed during the pandemic and/or post-pandemic period. Approaches could include one of the following possibilities:

- iii. Meme Pandemic advice: how to encourage the use of the mask, social distancing, vaccination...;
- iv. Meme Did you know?: a meme that highlights an interesting or surprising fact about the pandemic which could approach like the history of pandemics, the science behind vaccines or the impact of COVID-19 on the economy;
- v. Meme Before, During and After: a meme that combines images representing life before, during and after the pandemic, emphasizing the contrasts;
- vi. My Biomeme: a meme based on a personal episode from the pandemic.

The meme could be static or an animated gif and could resort to existent images or students' own images. They could use any software, although it was suggested the use of tools designed specifically for the creation of memes such as Meme Generator (<https://imgflip.com/memegenerator>).

Although the proposal was given in a class context, only 13 students out of the 16 completed it: 7 students presented 1 proposal (each); 1 student presented 2 proposals; 3 students presented 3 proposals; 1 student presented 5 and another student presented 6. That is, 29 proposals for memes were collected.

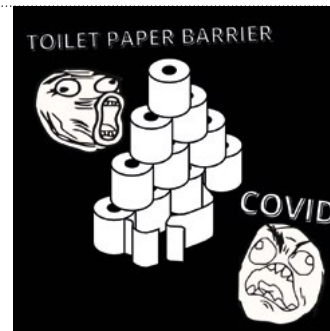
One hour of class was dedicated to brainstorming ideas. After a time of reflection, each student reported possible ideas for the meme based on lived or observed experiences in the pandemic period. Most of the students chose to work the subject My Biomeme and Before, During and After. No students chose the themes Meme Pandemic advice and Meme Did You Know That? The pandemic seemed to be a distant topic, which, at first stage, they appear to have little desire to remember. When encouraged to think of short anecdotes from everyday life, they showed more enthusiasm and immediately started to tell funny situations that they later used in the meme, such as the toilet paper race ("InesMacedo_COVID2.jpg" and "Inês Matos meme 2.jpg"), and situations that they considered to be inconsistent, such as not being able to leave the house unless it was to go to Mass ("Cláudia Sequeira meme covid 0.jpg").

The practical work was completed outside the class context, but certain works were still appreciated and commented on in the following class. The project was completed in a two week period, with some corrections afterwards.

In addition to the topics covered in class, described above, there were several allusions to the length of time that the lockdown took ("Leah_Meme_1.jpg" and "InesMacedo_covid1.jpg") and comparisons between life before and during the pandemic ("Inês Matos meme 1.jpg"). Other topics covered were the online classes, the vaccine, the weight gain verified in many confined people, and the fear of coughing in public due to the negative connotation that this act was associated with (the possibility of being infected with covid).

The use of figures of speech such as irony, satire, parody and hyperbole were widely used in the memes created ("Eleanora Kuzina MEME 3_ELLA.jpg", "Eleanora Kuzina MEME 2_ELLA", "Mara meme1.png"). This kind of approach may have been influenced by the fact that a lesson was recently devoted to the use of figures of speech in the production of visual communication.

CLÁUDIA RAQUEL LIMA
JORGE BRANDÃO PEREIRA
JOSÉ CARNEIRO
MARTA FERNANDES
PEDRO ALVES DA VEIGA
SUSANA BARRETO



.....

 Ines_Macedo_COVID2.jpg
 Cláudia Sequeira meme covid 0.jpg



.....

 Inês Matos meme 2.jpg
 Leah_Meme_1.jpg
 InesMacedo_covid1.jpg



.....

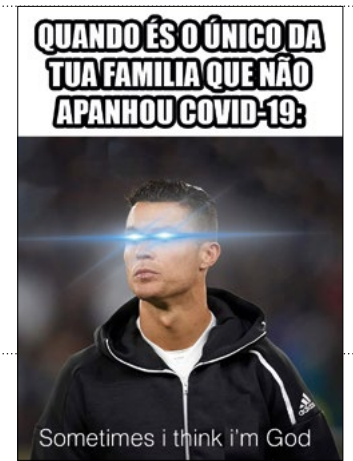
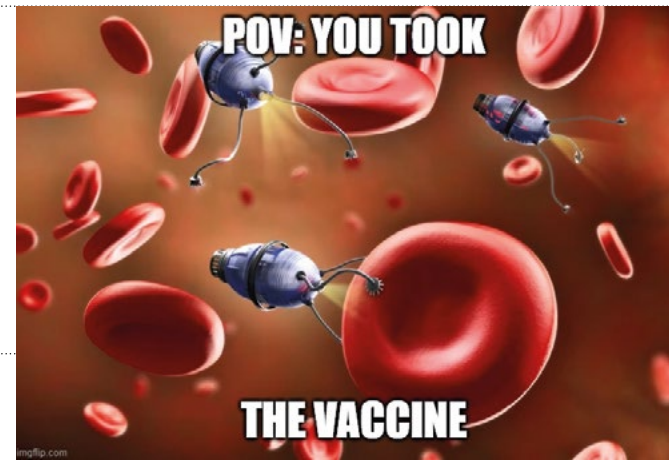
 Inês Matos meme 1.jpg
 Eleanora Kuzina MEME 3_ELLA.jpg



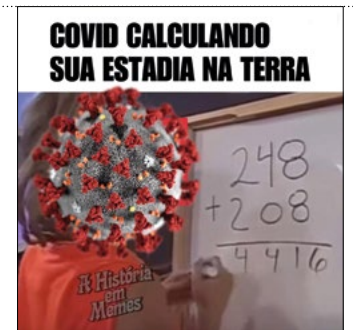
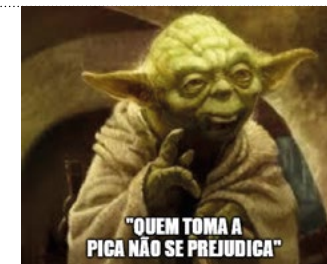
.....

 Eleanora Kuzina MEME 2_ELLA.jpg

 Mara meme1.png



there is no vaccine for covid-19	Panik
scientists have invented a vaccine with proven results	Kalm
they are full of Bill Gates chips for sure!!!	Panik



.....

 Nuno Henrique meme1.jpg

.....

 Nuno Henrique meme2.jpg
 Veronika Indysova.jpg

 Maria Pinto3.jpg

.....

 Daniela Costa.jpg

.....

 Tiago Loureiro Meme.jpg

 Aida Zholdassova2.jpg

.....

 Ana Martins3.jpg
 André Costa4.png

.....

 Diogo Santos2.jpg

 Giovana Kumschlies8.jpg



Cristina_Mano_Meme.jpg

DavidCunha_3.jpg

Nika Bilandžić.jpg

Fernanda Nunes_Maria župirolli_1.jpg

Ines_Borges_Meme.jpg



Rita Pereira2.jpg

Sofia Moreira.jpg

Tiago Fontes.jpg



Willian_Ferreira_1.jpg

Giovana Kumschlies1.jpg



Fernanda Nunes_Maria župirolli_2.jpg



Lisa Waletzko4.jpg

Mafalda Cunha.jpg

Ludmila Sen.jpg

Renato Rodrigues.jpg

Simão_Ferreira(1).jpg

Inês Matos meme 5.jpg

Willian_Ferreira_2.jpg

AnaAzvedo_2.jpg



REELS WORKSHOP

In May 2023, a hands-on workshop with BA Design students was conducted in order to test the viability of reels as generators of communication and debate regarding COVID-related health measures. The following pages include samples of the outcomes.

REELS WORKSHOP

Curricular design project, held at *School of Arts and Design Caldas da Rainha - Polytechnic of Leiria*, involving 2nd year students from the BA in Graphic & Multimedia Design. We received a total of 19 video clips produced by 38 students.

Considering the curricular contents of the course, we chose to use a video animated format with a strong presence and dissemination ability in social media. According to Mark Zuckerberg (Julien, J. 2022) Reels already account for 20% of the time people spend on Instagram. “In Q2 2022 alone, the median interaction count for Reels was almost 40% higher versus traditional videos, according to Emplifi data. Reels are extremely flexible in how they can be shared among audiences, making them much more versatile than feed posts. Users can easily share Reels with friends via Stories, and discover Reels on the Explore page, as the Instagram algorithm continues to favor this content format over others. Since the start of 2022, Reels have become the most engaging post type on Instagram” (Julien, J. 2022).

Students were organised in pairs and were invited to create Reels or Youtube Shorts for social media related to experiences lived or observed during the pandemic and/or post-pandemic period. Approaches could include one of the following possibilities:

- i. Pandemic advice: how to encourage the use of the mask, social distancing, vaccination...;
- ii. Scientific Jargon: create a Reel or Youtube Short that ironises with scientific jargon and technical language that makes it difficult for non-scientists to understand research finding;
- iii. Did you know?: a reel that highlights an interesting or surprising fact about the pandemic which could approaches like the history of pandemics, the science behind vaccines or the impact of COVID-19 on the economy; iv) Before, During and After: a reel that combines images representing life before, during and after the pandemic, emphasising the contrasts;
- iv. My Bioreel: a reel based on a personal episode from the pandemic.

The reel, besides his short and teasing communication nature (average duration 15 seconds), was expected to embed type animation. any software could be used as long as it was exported to *MP4.

TIME DEDICATED

24 hours

RESULTS

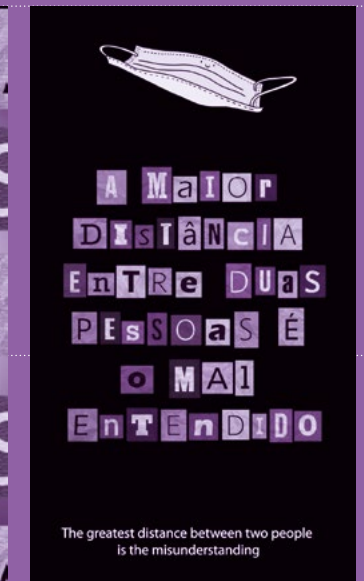
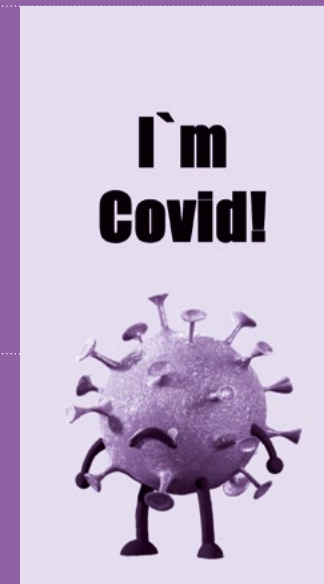
Approaches / How students related to the topic

- Introspective and personal;
- Irony;
- Superficiality: don't care or feel uncomfortable talking about the pandemic;
- Manifest against the design challenge.

ELIANA PENEDOS-SANTIAGO

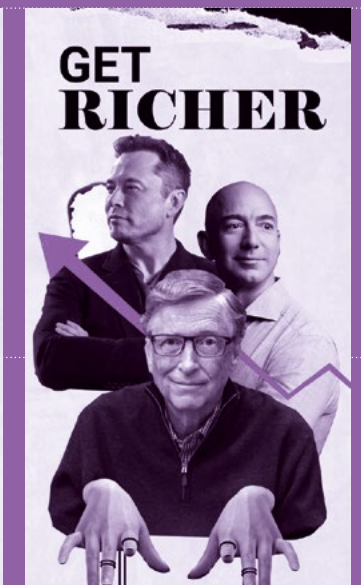
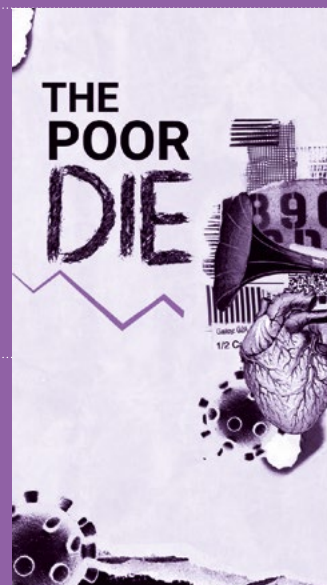
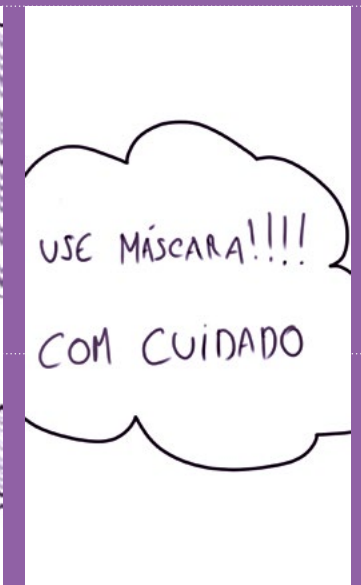
REFERENCES

Julien, J. (2022). Brands are Driving Higher Reach and Engagement by Posting Instagram Reels. Social Media Today Online. <https://www.socialmediatoday.com/news/Brands-Driving-Higher-Reach-and-Engagement-via-Instagram-Reels/632817/>



Ana Faria & Joana Lopes.mp4

Ana Nogueira & Daniela Mendes.mp4



André Santos & Rita Cruz.mp4

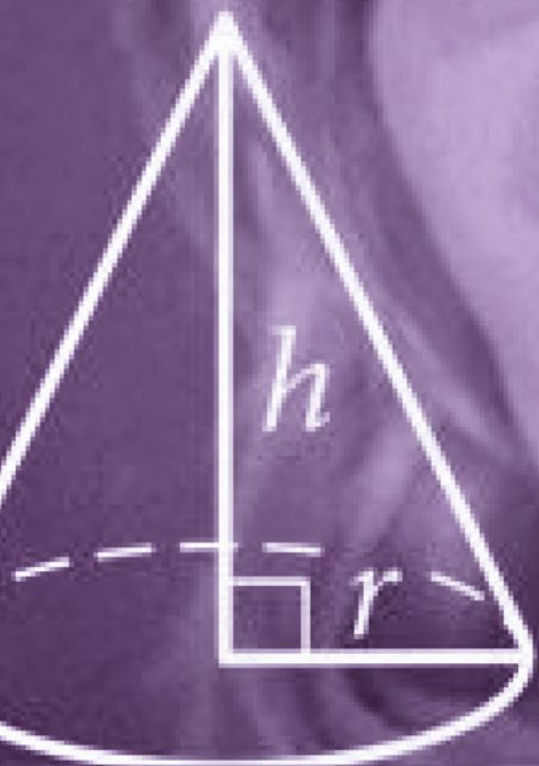
Francisco Gomes & Miguel Rodrigues.mp4

Hugo Oliveira & Ricardo.mp4

Luisa Fernandes & Sofia Pinto.mp4



$$V = \frac{1}{3} \pi r^2 h$$



$$V =$$



$$ax^2 + bx + c = 0$$

COMMUNICATING THE EXPERIENCE OF THE PANDEMIC THROUGH MEMES

In July 2023, a first analysis of the student workshops conducted up to that point was presented at the 11th European Conference on Arts & Humanities.

THE 11TH EUROPEAN
CONFERENCE ON ARTS
& HUMANITIES
(IAFOR ECAH 2023),
13 - 17 JULY

COMMUNICATING THE EXPERIENCE OF THE PANDEMIC THROUGH MEMES

A Design Approach in Higher Education.

This article presents and analyses the ongoing outcomes of a series of pedagogical exercises in various BA design courses in Northern Portugal on the subject of the recent pandemic. Students have been invited to express their lived and observed experiences of this period by using online meme semantics, aesthetics and tools.

The motivations for this exploratory approach in design classroom environments are threefold: online communication as an ambivalent territory of subjective deconstruction and frequent objective misinformation, the recognition of pandemic memes as a humorous pacifying resource throughout the crisis, and an intuitive enquiry into emerging forms of content design, more readily used and understood by younger generations.

The broader context for these workshops is the hypothesis that reliable health information needs to diversify its formal conventions in order to reach more reticent demographics; however, the aforementioned classroom briefings have been ideologically neutral. Testimony-based narratives and personal views have instead been chosen as entry points to the observation of aesthetic and semiotic premises that might prove useful and scalable in the process of communicating science.

Once the pedagogical briefings have concluded, a series of public exhibitions of selected outcomes will further extend the debate beyond the classroom.

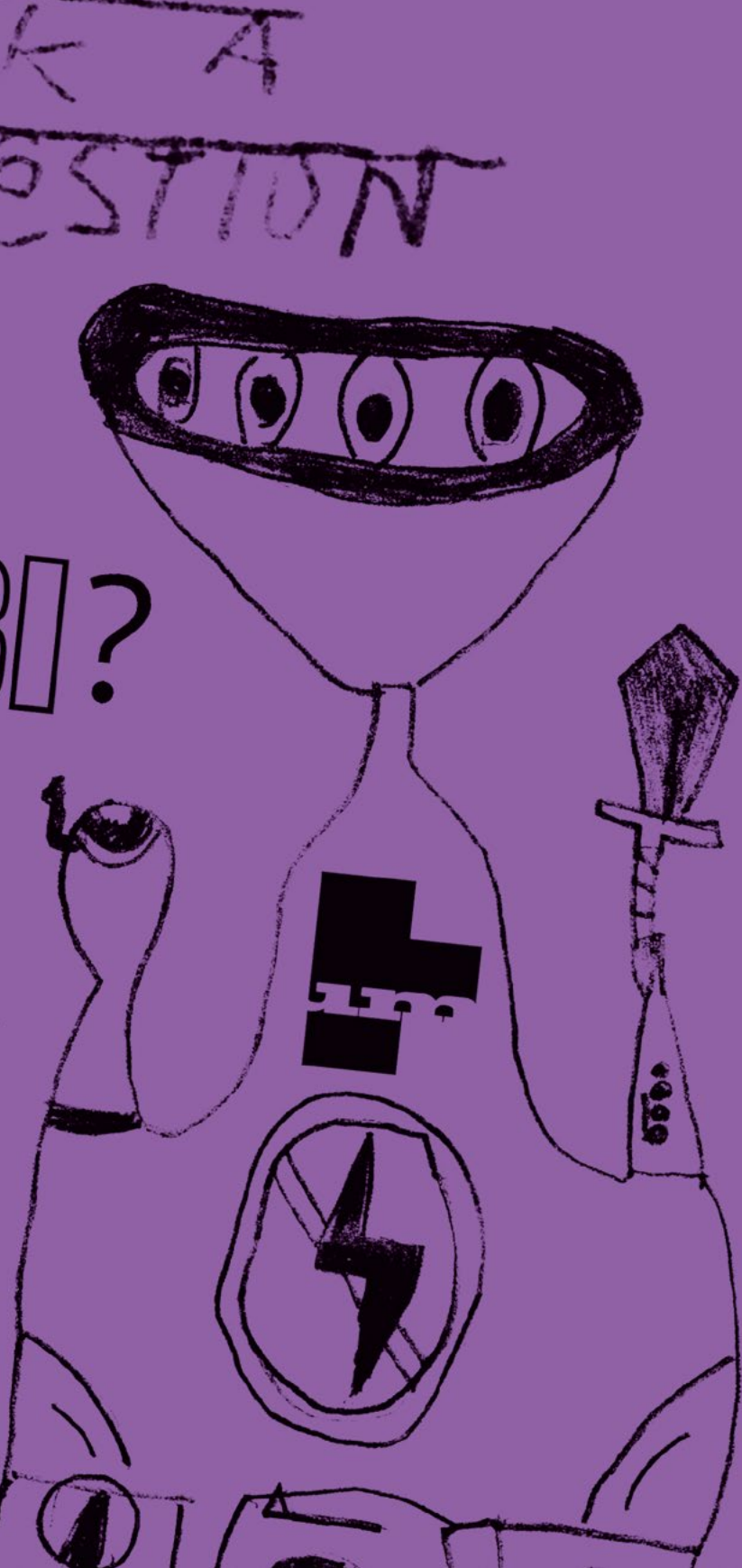
CLÁUDIA RAQUEL LIMA

HEITOR ALVELOS

SUSANA BARRETO

MARTA FERNANDES

ELIANA PENEDOS-SANTIAGO



K A
QUESTION

RI?

DO
BALKGRO
RESEAR

CONST
A
HYPOTH

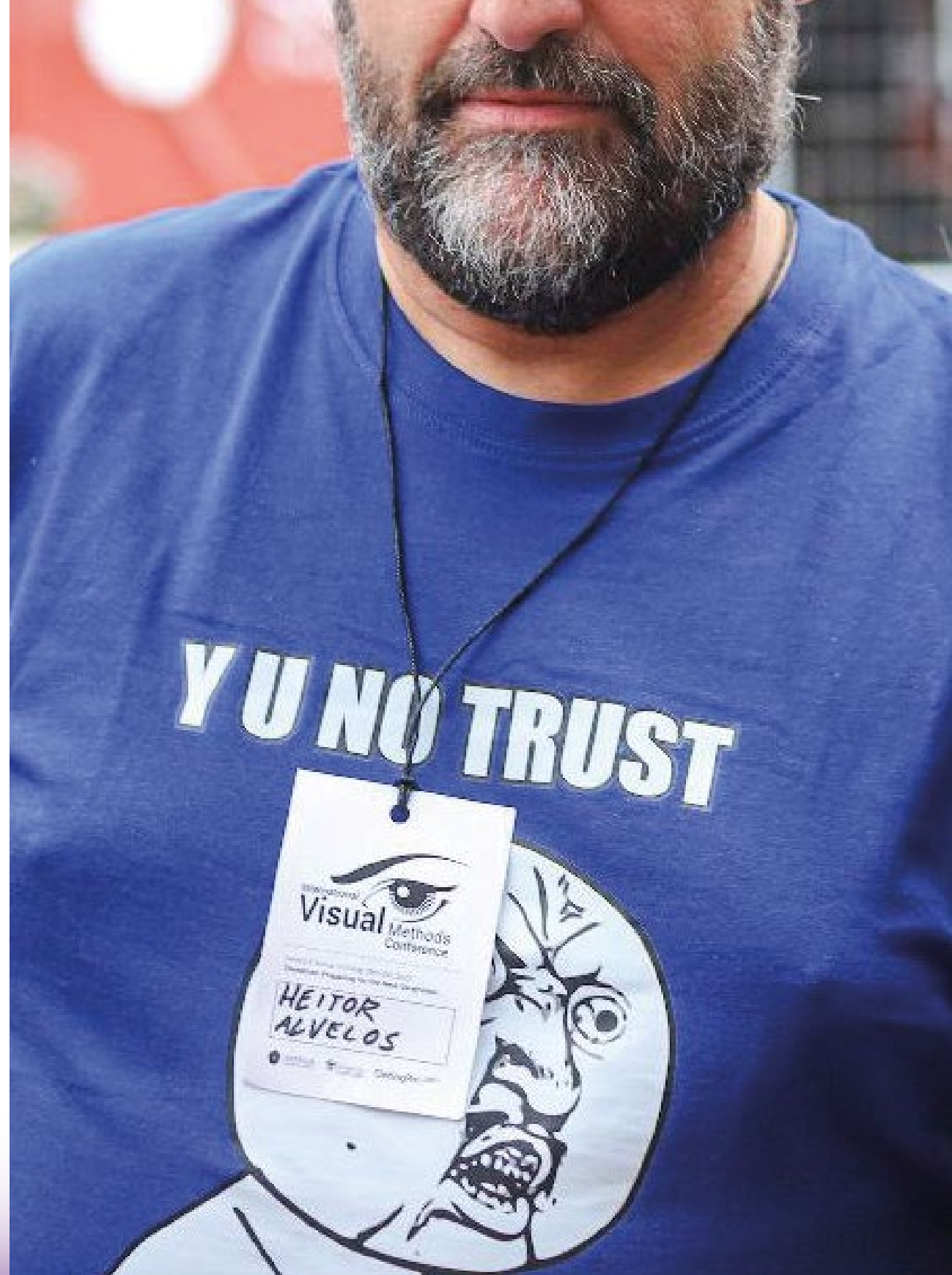
TEST
YOUR
HYPOTHE

T-SHIRT PROTOTYPES

From May 2023 to May 2024, various prototypes of pandemic and science-related t-shirts were produced. These employed memes, comics and illustration aesthetics in order to test a subjective sense of belonging and a “cool” factor felt by potential consumers/wearers. The following pages include samples of the outcomes.



RUI VITORINO SANTOS
JÚLIO DOLBETH
PEDRO ALVES DA VEIGA
HEITOR ALVELOS





THE STOLEN EXHIBITION

In May 2023, an exhibition was presented as part of the 8th International Visual Methods Conference. The exhibition gathered a selection of content produced within the scope of the project to date. The aim was to gather feedback from researchers specialising in visual methodologies, for further methodological refinement within the project. The following pages include samples of the outcomes.

Y U NO TRUST SCIENCE???

Engaging with post-digital audiences on the subject of reliable scientific knowledge

This exhibition proposal addresses the need to engage with post-digital audiences on the subject of reliable scientific knowledge. There is by now ample empirical evidence of multiple phenomena of disinformation, with social, political and health motivations and impact, an issue made more pressing throughout the recent pandemic and subsequent antagonism in regards to public health policies and vaccination programs.

We posit that this antagonism is partly fuelled by the fact that reliable scientific information is most often communicated via factual, objective and statistical means, while struggling to consider and incorporate subjective and emotional bias. We therefore find it imperative that scientists, governing bodies and media channels look for ways to translate science in forms and aesthetics that are more compatible with the intricacies of social media.

With the above in mind, this exhibition proposes a range of exploratory digital artefacts that attempt to carry reliable knowledge through the conundrums of online subjectivity, incorporating humor, story-telling and testimonies in ways that are more readily recognisable by online users.

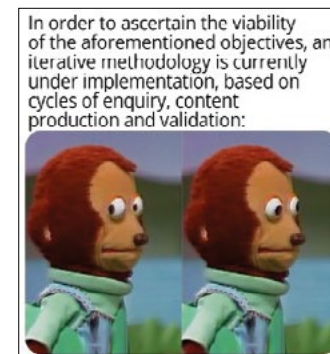


Fig. 01



Fig. 02

The featured meme drafts aim to lay the foundation for a longer-term dialogue, whereby scientific agents are willing to engage with science deniers by using prevalent channels, semantics and aesthetics of these audiences, therefore conveying science while shedding the impression of rightful authority, often misunderstood as arrogance or even malevolence. The drafts are humorous, humble and empathic, while aiming to retain the ability to persuade; they focus on the recent pandemic, as it provides a focus that may be promptly analyzed and tested within a non-ideological scope. Granted, the acute issues of the early stages of the pandemic have now subsided; however, we argue that retrospective wisdom may constitute an ideal testbed for future challenges.

The project that hosts the present exhibition, “An Infodemic of Disorientation”, is currently under development by a team of design researchers who posit that communication design may act as a mediator between scientific knowledge and cognitive bias: as Design itself is undergoing a fruitful process of diversification and multi-cultural acknowledgment, so it needs to ensure a tangible role in overcoming the current crisis in scientific trust.

A selection of 11 memes produced by the research team will be on display, in printed, large format, both as a provocation on the volatility of online circulation, and as an invitation to test meme production as a legitimate means of knowledge engagement. Furthermore, a complementary online platform will encourage visitors to footnote the exhibition through reactions, discussions, testimonies and viewpoints.

A work-in-progress of visual materials to be selected for the exhibition can be accessed at <http://tiny.cc/yunotrust>; More specimens are being produced, in order to reach a final, coherent selection. Size of prints is flexible, and adaptable to available space; they will be mounted and ready for display. A 12th panel will contain a contextual essay. The exhibition will include work by the authors/curators, as well as work by the broader research team.

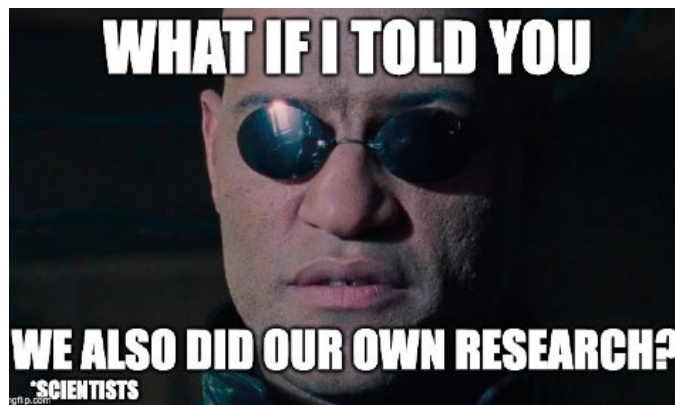


Fig. 03

KEYWORDS

- Science communication;
- Scientific Bias;
- Meme design;
- Design for Public Health;
- Social media literacy.

HEITOR ALVELOS

SUSANA BARRETO

JORGE BRANDÃO PEREIRA

PEDRO ALVES DA VEIGA

CLÁUDIA RAQUEL LIMA

ELIANA PENEDOS-SANTIAGO

MARTA FERNANDES

JÚLIO DOLBETH





INFOGRAPHICS WORKSHOP

In June 2023, a hands-on workshop with BA Communications Sciences students, at the *Faculty of Humanities, University of Porto* was conducted. The approach was pedagogical, and concerned the use of infographics to best translate complex health-related information and policies to a broad public. The following pages include samples of the outcomes.

CREATING INFOGRAPHICS ON COVID-19 CONSPIRACY THEORIES

ABSTRACT

This workshop report describes the process and outcomes of a series of workshops conducted by two design lecturers to two classes of first-year Communication Science students at the *Faculty of Humanities, University of Porto*. The objective of the workshop was to facilitate the production of infographics based on conspiracy theories surrounding Covid-19 within the context of the Sci-Bi research project.

INTRODUCTION

The workshops spanned four days of lessons, taking place over a period of one month. The initial phase involved an introduction to the topic, wherein students were provided with guidance on identifying conspiracy theories related to Covid-19. Subsequently, the students were tasked with creating an infographic focused on one of the five pre-defined topics presented in class:

1. Covid-19 as a biological weapon.
2. Involvement of pharmaceutical companies in Covid-19.
3. Concerns about vaccine safety due to rapid development.
4. Link between 5G technology and the spread of Covid-19.
5. Covid-19 as a creation benefiting the rich and powerful.

METHODOLOGY

During the workshop, students were organized into groups consisting of two to three individuals. Each group had the freedom to choose one or more conspiracy theories to address. The final deliverable took the form of an A3-sized PDF designed to simulate a newspaper layout.

RESULTS

The completed infographics will be showcased in a public exhibition of the Sci-Bi project at Maus hábitos in October 2023, providing an opportunity for wider dissemination and engagement with the topic.

CONCLUSION

Through the workshops, students were able to acquire practical skills in infographic design and develop a deeper understanding of conspiracy theories surrounding Covid-19. The resulting infographics serve as informative visual representations that contribute to the ongoing discourse on this subject.

MARTA FERNANDES
SUSANA BARRETO



Afonso G. e Pietro B.

Clara L.

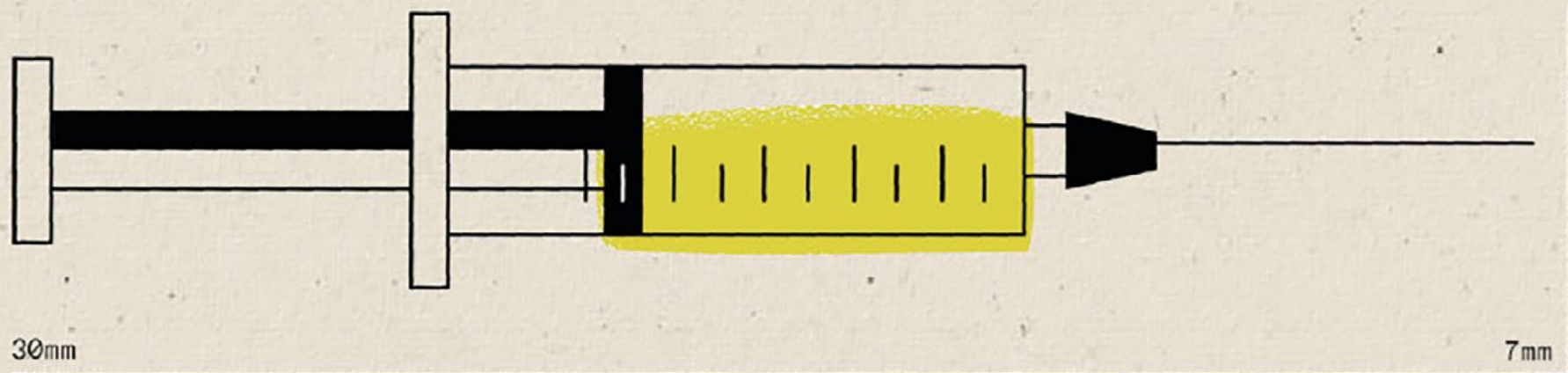
Daniela V. e Leonor A.

Hugo M., Inês C. e Mariana M.

Julia F., Wesley N. e Vini G.

Tasmin G.

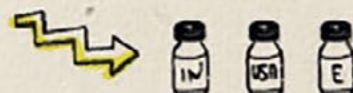
VACINAÇÃO CONTRA COVID-19



VACINAÇÃO CONTRA COVID-19

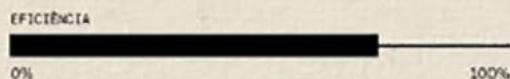
A 10 de janeiro de 2020 foi sequenciado e partilhado com toda a comunidade científica o primeiro genoma do SARS-CoV-2. Desde então, farmacêuticas e empresas de biotecnologia lançaram-se em busca de uma vacina contra a covid. Conseguiram em menos de um ano o que normalmente leva uma década a alcançar.

Todos os dias milhões de pessoas recebem a dose da vacina que se espera vir a pôr fim à pandemia. As vacinas da Pfizer/Biontech e a chinesa Sinopharm foram as primeiras a serem usadas de forma generalizada em países como o Reino Unido, os Estados Unidos ou os Emirados.



EFICIÊNCIA DA VACINAÇÃO

As vacinas contra o COVID-19 têm mostrado alta eficácia na prevenção da doença. Elas reduzem significativamente as chances de infecção e ajudam a evitar complicações graves.



Uma só dose tem eficácia de 57% na proteção de infecções sintomáticas após duas semanas.

MONITORAMENTO DE SEGURANÇA

As vacinas são rigorosamente avaliadas para garantir sua segurança antes de serem aprovadas para uso. Sistemas de farmacovigilância monitoram a segurança das vacinas após a sua distribuição em larga escala.

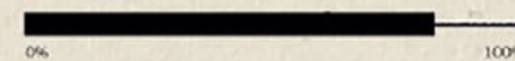
QUAIS AS VACINAS DISPONÍVEIS?

Atualmente, existem várias vacinas autorizadas e em uso contra o COVID-19 em diferentes países ao redor do mundo. Aqui estão algumas das vacinas mais amplamente conhecidas:



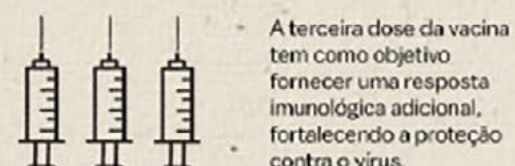
IMUNIDADE COVID-19

É preciso que uma grande percentagem de portugueses tenha desenvolvido anticorpos para que o seu organismo consiga combater o vírus.



O intervalo entre as doses pode variar dependendo da vacina

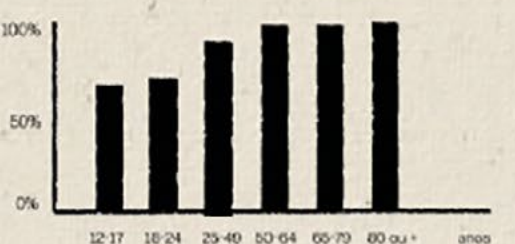
90%



Os países da UE, asseguram o direito de adquirir um número suficiente de doses, num determinado prazo.

DISTRIBUIÇÃO POR GRUPO ETÁRIO

Pessoas vacinadas com pelo menos uma dose e com vacinação completa, por grupo etário. Não inclui doses de reforço.



POPULAÇÃO VACINADA

95,0% da população já recebeu pelo menos a primeira dose da vacina



92,6% da população já está completamente vacinada

58,3% dose de reforço

22.907.726 doses da vacina em Portugal





PRINTED MEMES WORKSHOP

Exploring Online Memes as Pedagogical Tools in Health Knowledge and Behaviour. In September 2023, a one-hour workshop was conducted at BAMC/IAFOR Conference, Barcelona. It explored the semantic and pedagogical implications of printing and manually captioning popular memes.

EXPLORING ONLINE MEMES AS PEDAGOGICAL TOOLS IN HEALTH KNOWLEDGE AND BEHAVIOUR

This exploratory workshop consisted of a rapid, intuitive, exploratory session around the following briefing: create a meme that displays understandable, accessible health-related content. The workshop addressed current scientific mistrust - partly due to a chasm between hermetic authoritative discourse, and the allure of subjective skepticism. Online disinformation has been pointed out as a main contributing factor in this phenomenon, particularly during the recent pandemic: often critical of scientific reliability, often using crude humour and irony - yet always direct, impactful, and accessible.

The session therefore explored how health experts and policy-makers could benefit from communicating beyond formal discourse, adopting online semantics and aesthetics as tools for a pedagogy with skeptical demographics.

Participants consisted of voluntary conference delegates attending the respective session. Hand-produced memes explored the unlikely merging of reliable scientific information and delirious online semantics. A range of visual content, sourced from online meme communities and meme generator apps (and printed prior to the session), were provided in order to be captioned with statements created on the spot: images were printed prior to the session, and captions were handwritten using markers.

This revisitation of tangible, material processes goes against expectations that memes have an exclusively digital existence, thus opening new possibilities for hybrid discourse and outcomes.

Lastly, the group reflected on the pedagogical applicability of the outcomes in design classrooms, online communities, and public campaigns.

The output was a collection of large-size, low-resolution printed/hand-written memes. The workshop ended with a group discussion on the viability and applicability of the produced drafts and adopted processes.

KEYWORDS

- Design for health;
- Meme design;
- Online health communication;
- Scientific mistrust;
- Exploratory design.

INTRODUCTION

The workshop “Exploring Online Memes as Pedagogical Tools in Health Knowledge and Behaviour” intended to garner a practice-based, contributive reflection to the ongoing exploratory project “An Infodemic of Disorientation: communication design as mediator between scientific knowledge and cognitive bias”. The project stems from empirical and authoritative evidence on the apparent rise in science skepticism due to the proliferation of misinformed and misleading online content, resulting in beliefs and behaviours that resist fact-checking and logic; this double challenge is most clearly substantiated by DiResta (2023): “Institutional communicators / public health entities do not understand that the way people communicate has changed [...] you have to begin to understand the power of storytelling”, in articulation with Goel (2022): “The Reasoning Mind Recruits the Instinctive Mind.”

We thus hypothesise that scientific knowledge and pedagogy may benefit from looking into an adoption of online media formats, semantics and aesthetics that have often been undervalued in their efficacy to reach subjective cognitive and behavioural components. By adopting accessible formats often associated with skeptical and negationist trends, the project aims at testing the viability of science and policy-making reaching demographics that have so far resisted acting on proven evidence, while often displaying overt hostility. Given the proliferation of online media, and corresponding exponential complexity, the workshop focused on the employment of memes.

As part of the conference program, the workshop was offered to delegates, who in themselves are unlikely to correspond to the target profile of the science skeptic: this factor was taken into account, dictating that the session would adopt a strategic perspective, rather than a direct pedagogical exercise.

Seven participants joined out of a choice between ongoing parallel sessions; their presence and participation were anonymous, as a means to ensure unfiltered discussion. Several of the participants stated simple curiosity as the deciding factor for their presence; one potential participant decided to leave the session once the premise was explained, out of an apparent disinterest in the topic.

The workshop was the last activity in a session that included one prior presentation; it had a total length of 50 minutes, divided into four sequential stages:

1. Contextualising presentation (10 minutes);
2. Exercise instructions (5 minutes)
3. Practice-based exercise (20 minutes);
4. Open discussion on outcomes and possible developments (15 minutes).

The contextualisation was based on the aforementioned premises, with visual examples of previously generated content within the scope of the project; the materials provided consisted of:

1. A1-sized print-outs of fourteen memes, devoid of caption, selected according to online circulation and recognition - two copies per meme, so as to foster polysemic approaches (Fig. 1);
2. Black, red and blue markers for manual captioning;
3. Masking tape for hanging captioned memes.

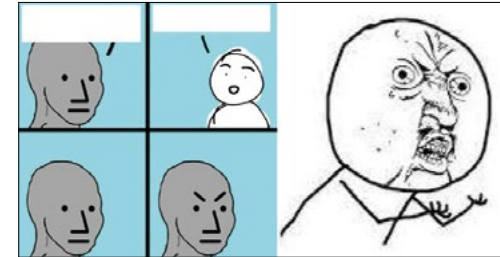


Fig. 01 Examples of blank memes provided as workshop materials. Source: imgflip (online)

The motivation for printing out memes rather than conducting the workshop in a digital/online environment stemmed out of the chance to explore the extent of tangible, in-person dynamics, rather than fulfill a contextual expectation. Furthermore, materials-based activity tends to foster immersive, empathic dynamics, as opposed to a tendentially fragmented, antagonistic nature of online media. The print-outs were hung on the room’s four walls prior to the session; participants were free to pick up the ones they would like to caption according to the workshop premises, and subsequently gather them cumulatively on the (blank) projection screen. Rapid, intuitive action was encouraged (Fig.2): this was ultimately fostered by an aforementioned choice of in-person, tangible experience and the printed materials provided. Upon conclusion, a total of twenty meme print-outs had been captioned by participants.



Fig. 02 Stage 3 of the workshop. Source: the authors

CONCLUSION



Fig. 03 A sample of workshop outcomes.

Stage 4 of the workshop, a discussion of the outcomes and participants' experience, provided insights to be incorporated into the broader project. While provisionally pointing towards the original hypothesis on the understanding that further exploratory sessions and participants will be needed, the workshop provided an additional set of issues to be further analysed and incorporated. These are summed up below, while Figure 3 documents a sample of the outcomes.

Further issues besides a provisional confirmation that memes may be adopted as a tool for the engagement with skeptic demographics included:

1. The rapid, intuitive approach meant that a significant percentage of generated captions deviated from the briefing of scientific engagement: 35% captions were deemed off-topic, while an additional 10% created meta-narratives on the workshop itself. This was nevertheless regarded as a tolerable contingency in order to maintain the overall flow of the session;
2. Once the exercise was concluded, one participant raised uncertainty regarding the efficacy of the original hypothesis, i.e. the employment of social media formats by extraneous entities and individuals. The participant rightfully pointed out that online trends seem to be imbued by auras of "cool authenticity", undercurrents that are as volatile as they are unreplicable; this comment points towards the possibility that the original hypothesis may be employed as a pedagogical strategy that younger generations may subsequently develop in their own terms, rather than proposing a direct employment by scientists and policy-makers;

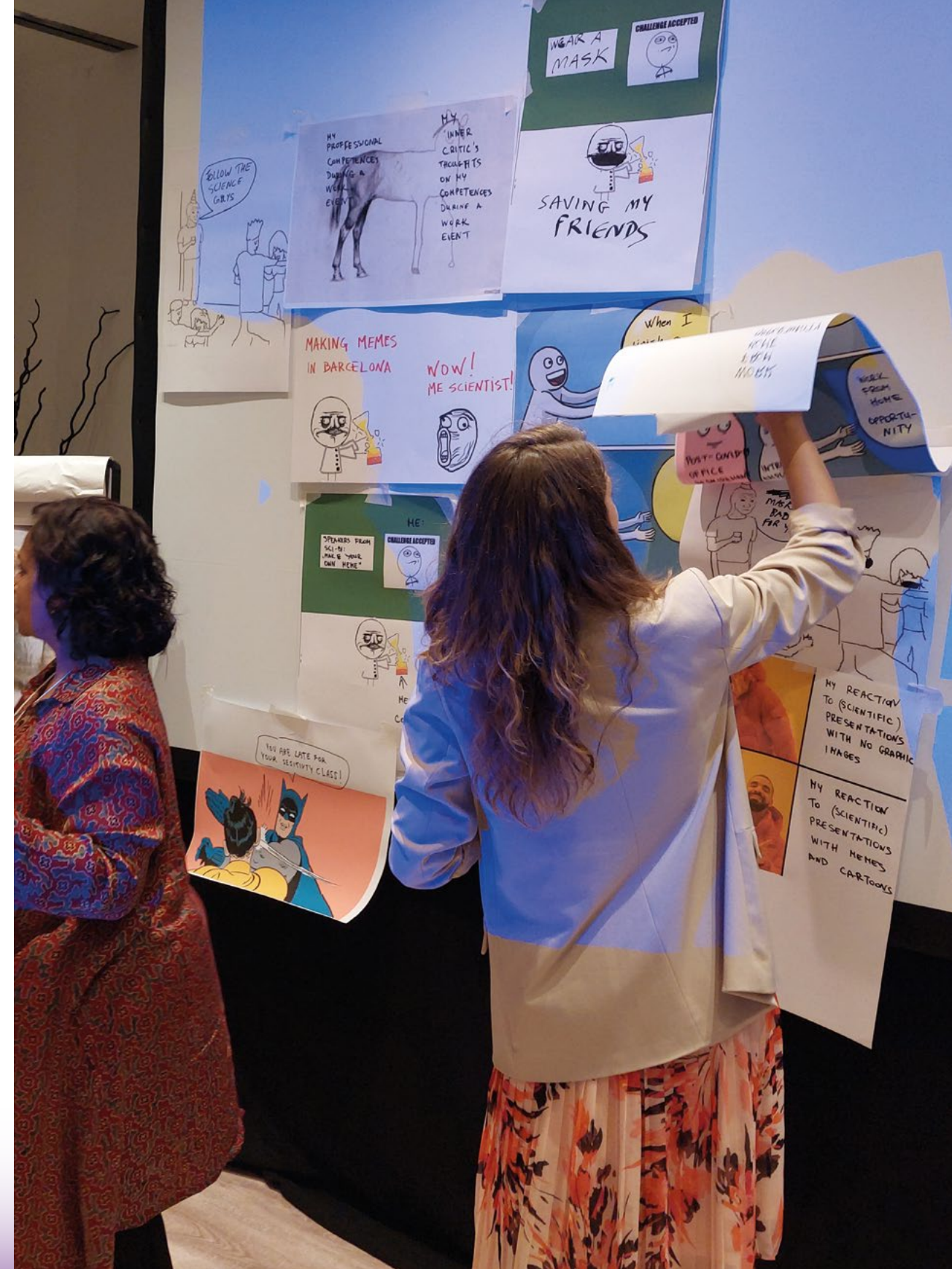
3. One participant, a professional illustrator, voiced a level of perplexity in face of the briefing and processes; nevertheless, he was an active, engaged participant, and stated he would reflect further on the experience.
4. As educators, two participants expressed an interest in developing similar approaches in their classroom environments, particularly in regards to the employment of printed material originating in online/digital environments. According to these participants, offline group dynamics around online content looked promising as a strategy for a hands-on re-engagement of digital native students, as well as a potential strategy for dissipating tensions around sensitive topics.

The overall consensus was that the workshop had been successful as an exploratory endeavour, and came across as a particularly unexpected activity within a conference format; however, both the short duration and the small number of participants dictated that only a glimpse of possible answers could be envisioned. Further, longer workshop environments will need to be developed in order to consolidate an unequivocal answer to the stated hypothesis; meanwhile, this particular experiment proved useful in rehearsing in-person dynamics and reiterating a largely open space among the current, urgent imperatives regarding a pedagogy of scientific accessibility and policy-driven behaviours.

ACKNOWLEDGMENTS

This research is funded by national funds through the FCT – Fundação para a Ciência e a Tecnologia, I.P. (Portugal), under the scope of the project 2022.08322.PTDC. The project is developed in the scope of the Unexpected Media Lab, a research group of ID+, Institute for Research in Design, Media and Culture.

HEITOR ALVELOS
JORGE BRANDÃO PEREIRA



REFERENCES

- Arkenbout, C., Wilson, J., & de Zeeuw, D. (Eds.). *Critical Meme Reader: Global Mutations of the Viral Image*. Amsterdam: Institute of Network Cultures (2021).
- DiResta, R. (2023, 18 May) 154: *The Truth Wars* [Audio podcast episode]. In *Conspirituality*. Conspirituality podcast. <https://www.conspirituality.net/episodes/154-the-truth-wars-renee-diresta>
- Goel, V. (2002) *Reason and Less: Pursuing Food, Sex, and Politics*. Cambridge: MIT Press.
- Meme Generator (n.d.), <https://imgflip.com/memegenerator>, last accessed 2023/10/24

Conceptual devices:

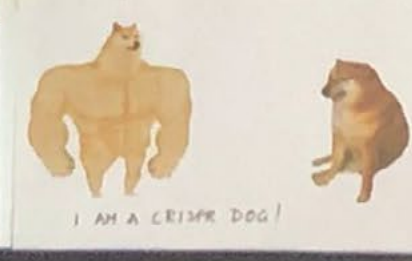
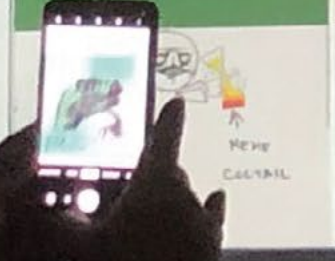
- figures of speech
- storytelling
- edutainment
- activism
- subvertising

IN BARCELONA

NOW!
ME SCIENTIST!

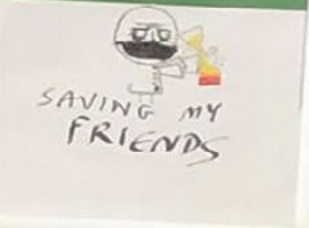


HE
STARTED FROM
SAYING "I
WANT TO
BE A
SCIENTIST"
AND NOW
HE'S
A
SCIENTIST



I AM A CRIPPER DOG!

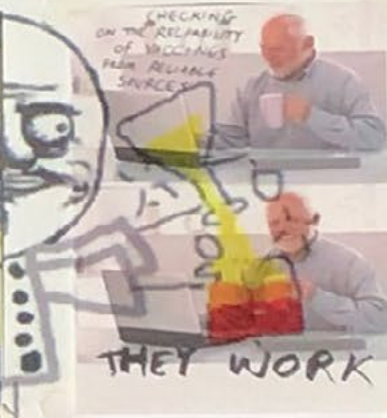
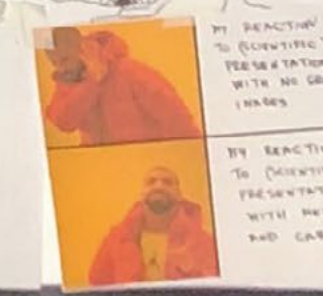
WEAR A
MASK



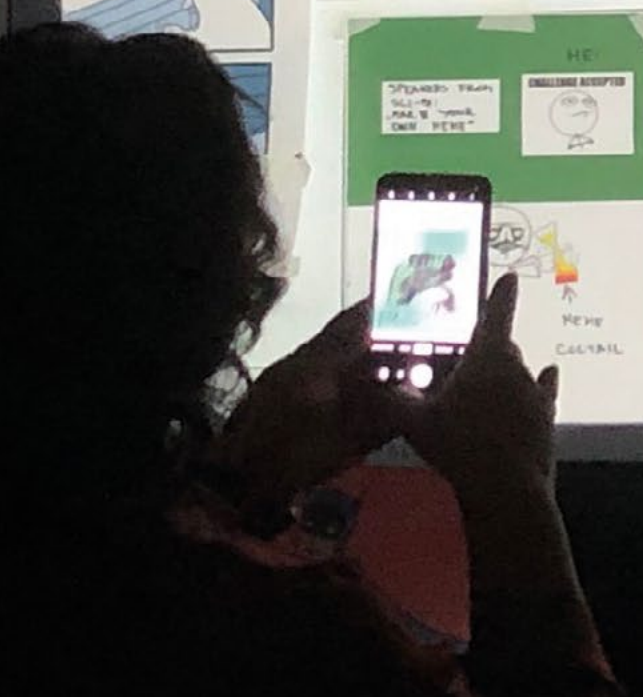
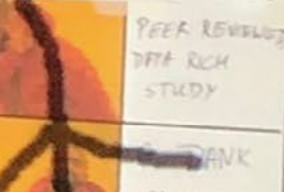
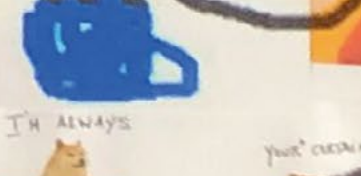
When I
finish a
thesis
article



DID YOU KNOW THAT
BY SELF-ISOLATING
YOU'RE MAKING SCIENCE?



PID I JUST
BECOME A
SCIENTIST?



Tethered Rationality
a model of behavior for the real world

Palestra e mesa redonda com
Vinod Goel
Professor de Ciências Neurocognitivas
York University, Canada

Quarta 20 Set, 15h
UPTEC Asprela
Rua Alfredo Allen, 455
4200-135 Porto
All welcome

KEYNOTE LECTURE AND ROUND TABLE

On September 20, 2023, at UPTEC Asprela. Tethered Rationality: A Model of Behaviour for the Real World, a talk by Professor Vinod Goel. Followed by round table discussion with Fernando Barbosa (Laboratory of Neuropsychophysiology, *Faculty of Psychology and Education Science, University of Porto*), Joana Barros (Association Living Science) and Heitor Alvelos (Sci-Bi, LUME/ID+ U.Porto).

**“THE REASONING MIND RECRUITS
THE INSTINCTIVE MIND.”**

Vinod Goel

In Reason and Less: Pursuing Food, Sex, and Politics

Cambridge, MA: MIT Press, 2022

TETHERED RATIONALITY

A Model of Behavior for the Real World

ABSTRACT

A few years ago, it dawned upon me that despite studying human rationality for 20+ years there is actually very little real-world human behavior that I (or my colleagues) can actually explain. In response to this sobering realization, I have spent the last few years reconceptualizing much of what I know about reasoning and human behavior. I propose a model of tethered rationality that gets us closer to explaining teenage daughters, Trump neighbors, and vaccine deniers. The basic idea I advocate is that, while we have a reasoning mind that sets us apart from bats and baboons, this reasoning mind does not float above the biology. It is not powered by angel dust. It evolved on top of, and is integrated into, the neurobiology we inherited from our common ancestors with bats and baboons. That is, our reasoning mind is tethered to evolutionary older systems such as the autonomic, instinctive, and associative systems.

Taking this idea seriously leads to a model of tethered rationality whereby the autonomic, the instinctive, associative, and reasoning systems all have an input into behavior. The response generated by each system is in the common currency of feelings, with valence, arousal, and duration components. This allows for communication across systems and the generation of a blended response. The control structure is set up to maximize pleasure and minimize pain or displeasure. There is no central executive in charge. The reasoning system has an input into the response, but so do the other systems. Individual differences in behavior are explained not just in terms of individual differences at the level of beliefs and desires, but also individual differences at the level of the autonomic, instinctive, and associative systems.

Such an account drives human behavior back into the biology, where it belongs, and provides a richer set of tools to understand how we pursue food, sex, and politics.

VINOD GOEL

*Professor of Cognitive Neuroscience
Dept. of Psychology*



Tethered Rational

*A Model of Behavior
for the Real World*

Vinod Goel
York University, Canada

Goal: Convince you
exchange the purely
reasoning mind for the
tethered mind





THE FORENSIC ANNOTATOR OF A FEVER OF A DREAM

In November 2023, an installation was presented at ARTECH2024, *University of Algarve*. Presented as a work-in-progress, it took the shape of a hybrid between a mind map and a forensic chart, exploring connections, contexts and influences between a range of pandemic-related visual materials.

THE FORENSIC ANNOTATION OF A FEVER DREAM

An Ongoing Atlas of COVID - related Memes

ABSTRACT

This exhibition/installation is made of a set of online-generated meme classics referring to the recent COVID-19 pandemic, in their variations, interconnections, and conceptual/historical dynamics. Formally, it takes the shape of a hybrid between a mind map and a forensic chart. Pandemic-related memes have been chosen as root content, given the context of particularly intense and focused online activity from which they emerged. Besides displaying the original items, the exhibition engages in their epistemological and historical referencing, annotation and connection. The primarily online nature of the source references is rendered tangible in the exhibition/installation, gradually occupying and saturating the locus. Memes are printed, drawn and photographed in a range of formats and media, and annotations/connections are made using handwriting and various forms of tape (including unspooled magnetic tape from discarded VHS cassettes).

CCS CONCEPTS

- Human-centered Computing;
- Collaborative and social computing;
- Empirical studies in collaborative and social computing.

KEYWORDS

- COVID memes;
- Hybrid media;
- Meme studies;
- Contemporary semiotics.



Fig. 01: Draft model for installation (detail), 2023. Image by the author.

PROCESS

Three processes intertwine throughout the gradual set-up of the exhibition:

1. Materialising online content - a likely obsolete activity by 2023, one would have argued, and yet it is by now evident that the expectation of digital pervasiveness (as well as a corresponding expectation of analogue redundancy) clearly underestimated the growing levels of epistemological density and complexity that allow for this binary conundrum not only to coexist, but even become a continuum - and as such, foster unexpected hybrid dynamics. In the exhibition, memes are present in multiple material formats: as straight jpeg print-outs on paper and fabric, as projections, as commercial gadgets, and as hand-produced pastiches of traditional arts (namely drawing and ceramic tiles). Additionally, a cross-fading slideshow of visual, contextual and historical references are projected in superimposition with the materials on display.



Fig. 02: Classic meme renditions as t-shirt and flag (2023).

2. Historical and semiotic referencing - despite their novelty factor, memes may be regarded as heirs to a range of creative and cognitive practices, from comics to remix culture, from Warburg's Mnemosyne¹ panels to 20th-Century avant-garde practices, Fluxus² and Cut-ups³ at the forefront. Multiple references such as these are included in the exhibition, duly contextualised and linked with the specimens that reveal correspondences and affinities. These links are physical connections made through the employment of tape as connecting thread. Memes themselves contain quotation and appropriation as intrinsic premises, both appropriating and subverting historical and contemporary references, and acting as templates for seemingly endless processes of semantic re-signification.

¹ Christopher D. Johnson, 2013. *About the Mnemosyne Atlas*. Retrieved from <https://warburg.library.cornell.edu/about> (accessed 27 June 2023).

² Thomas Kellein and Jon Hendricks. 1995. *Fluxus*. Thames & Hudson, London.

³ William S. Burroughs and Brion Gysin. 1978. *The Third Mind*. Viking Press, New York.



Fig. 03: Original Covid-related Doge meme (2020), and hand-painted rendition by the author (2023).

3. The overall approach and aesthetic are humble, precarious, provisional. They are closer in appearance to a detective board than a sensory-driven artistic experience: although the aesthetic component is not rejected, it is not the driver, but rather a consequence. Annotations and inter-relations are themselves an ongoing process of logic, pattern recognition and epiphany, and therefore can occur during set-up, as well as throughout the display - as further connections and contextualisations are identified throughout.

CONCEPTUAL FRAMEWORK

Conceptually, there are epistemological, philosophical and pedagogical components at work: by displacing the expectations that memes live exclusively in digital form, we propose an entry point to a form of post-digital delirium - a prelude to a yet-to-be-written, archeological narrative, a decipherment of an apparently random, psychoanalytical interchangeability of signs and their corresponding media. The exhibition also proposes a glance at the zeitgeist, at the rubble of the "wreckage [blown by the storm] we call progress" (Benjamin, W., cited by Wark, S., 2021)⁴ - both through the visual lexica of memes, somewhere between cartoon-like hilarity and darker, cynical semantics - as well as through poetic deconstructions of COVID legislation, in the form of ironic

soundbites and nonsensical discourse⁵. Perversely, this debris-like randomness, itself a symptom of excessive contemporary consumer habits, finds its regular antidote in the handmade niche product - just like conspiracy slogans may be regarded as a lexical catharsis of the current neurosis of over-legislation. These paradoxes themselves feed the ethos of the exhibition.

Beyond this conceptual framework, the employment of materiality signals the current, renewed interest in craft and process among segments of contemporary creatives - even as we witness an exponential rise in command-driven AI art: it is by now evident that the expectation of digital pervasiveness, and corresponding analogue redundancy, clearly underestimated the growing levels of epistemological density and complexity that allow for opposites not only to coexist, but even hybridise and foster each other reciprocally.



Fig. 04: Meme variation addressing vaccine hesitancy with potential pedagogical implications (2023); collage by the author.

⁴ Scott Wark. 2021. *A Postdigital Angel of History? On 'Meme Theory'*. In: Chloë Arkenbout, Jack Wilson and Daniel de Zeeuw (Eds.). *Critical Meme Reader: Global Mutations of the Viral Image*. Institute of Network Cultures, Amsterdam, pp. 165-175.

⁵ Franco Berardi. 2012. *The Uprising: On Poetry and Finance*. Semiotext(e), Los Angeles.

SUBJECT

An additional word on COVID memes as the center point of the exhibition: the recent pandemic turned out to be a time of intense online content production, firstly as a mechanism of humorous solace in face of unprecedented experience and anxiety (confinements, statistics, tracing apps and protective behaviours), then as carriers of pandemic-related information and disinformation that would end up acting as both pedagogical and delirious. Once the pandemic subsided, what were at the time residual digital artefacts with a tangible role could be forgotten for all we knew or cared; and yet, we argue, they signal the subjective ways in which we faced the pandemic beyond clinical and authoritative discourse. We posit that they may hold an essence of our emotional responses to a unique global experience, a mutant form of poetic genre where metaphors and absurdity abound; and as such, COVID memes may be worth further historical, cultural and sociological scrutiny.

The exhibition, therefore, provides the destitute meme with a warp, a means of further resonance beyond its original, transitory context: it is, in a way, future archeology. It embraces the paradox of contemporaneity, welcoming both online content and material tradition, lo-res aesthetics, residues of dead media, and a renewed presence of the crafted object.



Fig. 05: Draft model for installation (detail), 2023. Image by the author.

SET-UP AND LAYOUT

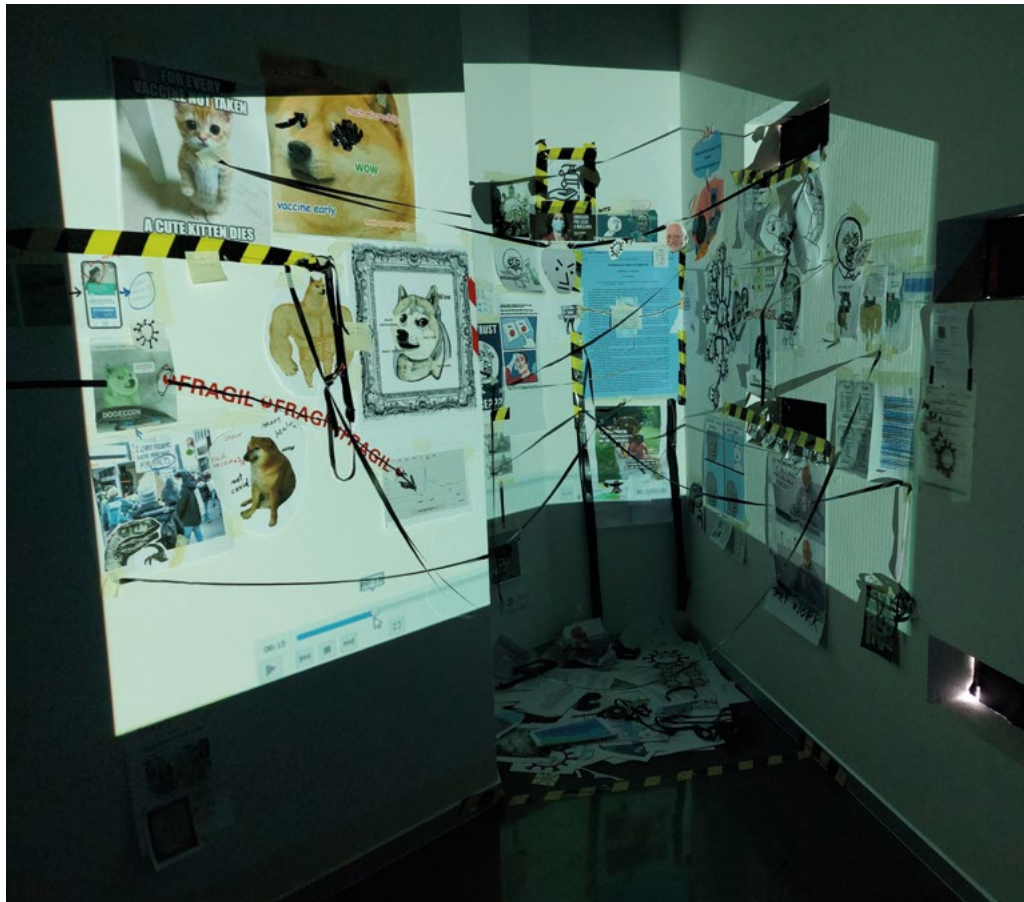
The exhibition requires:

- a softly-lit room, roughly 16 square meters, balancing ambient light with a single, continuous projection; if necessary, the exhibition may be adapted to other room sizes;
- within that room, one blank wall will be used for display; materials can be pasted by employing masking tape and spray mount, without damage to wall finish; occasionally, a small nail may be necessary for heavier pieces (frames and tiles);
- one projector with RCA or HDMI for laptop connection (ideally, projector and laptop to be provided by the organisation, but this can be negotiated should the present proposal be approved);
- all other materials and requirements to be provided by the author.

ACKNOWLEDGMENTS

The exhibition is presented in the scope of a research project dedicated to inventorying and activating online media as behavioral agents in health-related knowledge and policies. A test run was held in a classroom environment with MA Media Arts students in late 2022; both the original concept/briefing and the content of the exhibition's present version are entirely authored by the researcher. Images presented in this proposal are originally sourced from Facebook and imgflip.com, in various instances further manipulated by the author.

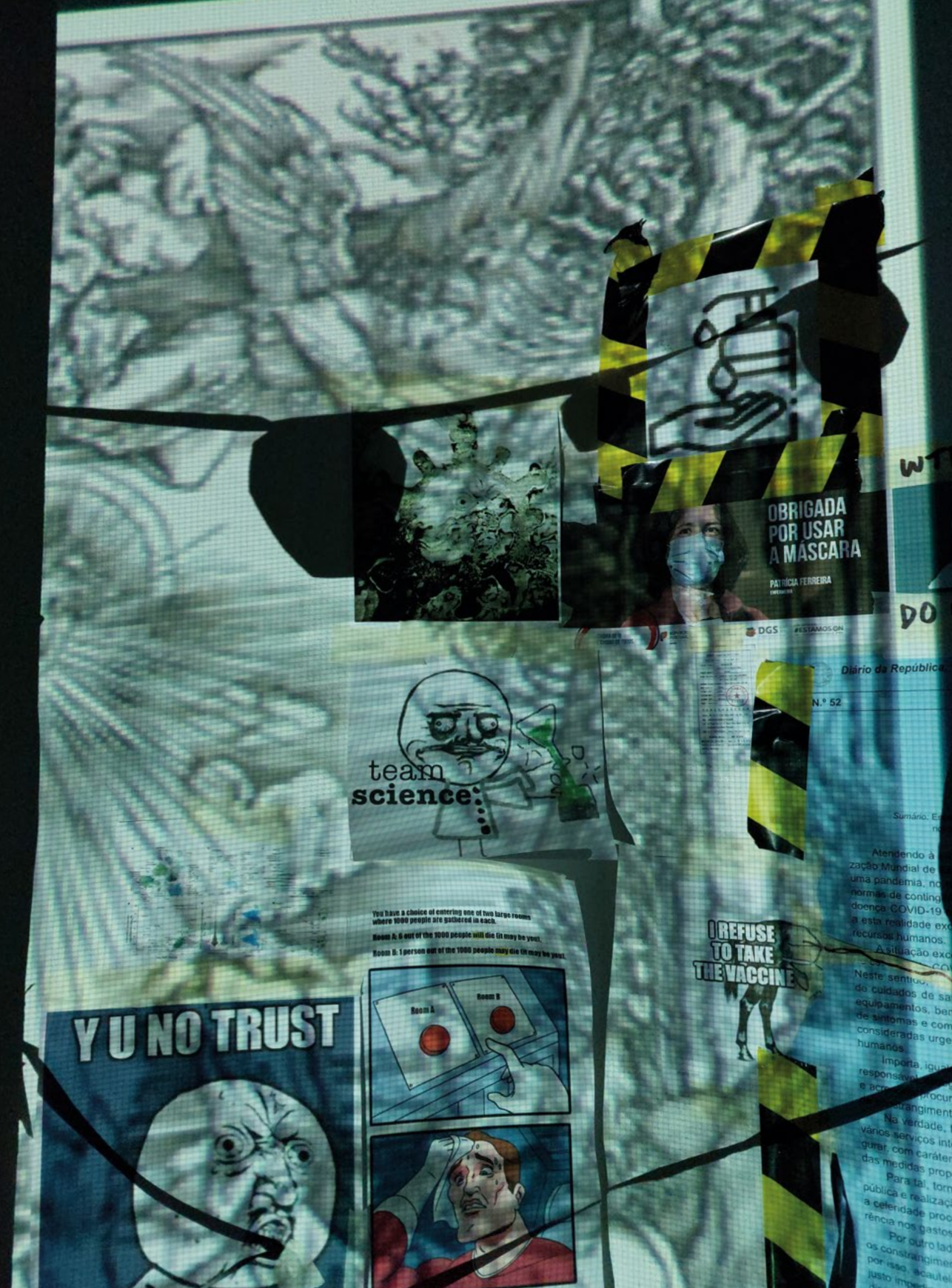
HEITOR ALVELOS





GIL





WHEN IN MEMELAND, SPEAK IN MEMES

*Contributions of design towards the betterment
of online behavior regarding public health*

ABSTRACT

This research tackles a current tendency towards scientific mistrust among segments of the population: we posit that channels traditionally employed by scientists and policy-makers may not be sufficient to reach skeptical individuals and communities, as exponentially and pervasively evident in social media circles. We thus propose to explore informal online channels and formats such as memes, short videos, and forums, where the involved demographics tend to obtain information they deem reliable and relatable: in fact, formal channels of scientific communication are often regarded by skeptics as authoritarian and driven by obscure agendas. In this research, we focus on health policy behavior as a locus of conflict in recent years due to the pandemic, with Portugal as a case study. Informed by both online field work and in-person interviews with health policy skeptics, the project has so far produced a collection of visual artifacts for social media circulation. Validated specimens aim to become templates for the adoption of health policies.

KEYWORDS

- Design for Science;
- Health policy;
- Social Media Design;
- Pandemic memes;
- Science communication in Portugal.

INTRODUCTION

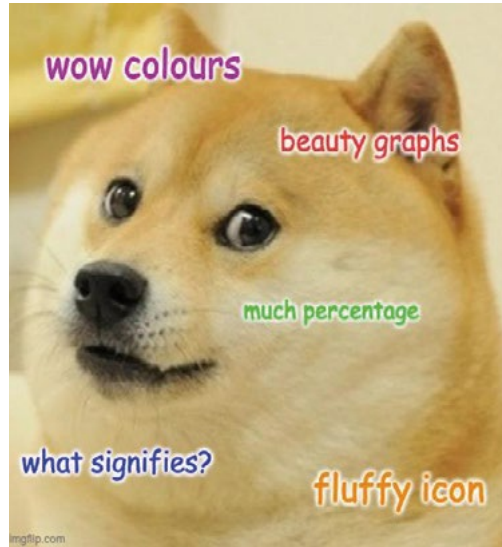


Fig. 01 Doge meme generated by the authors.

Recent empirical and documented evidence has been pointing towards online social media as a primary factor in the rise of scientific mistrust (Yeung, A. W. K., et al., 2021; Brownell, S. E., & Price Jr., J. V., 2021); the issue became particularly pressing during the recent global pandemic. We therefore posit that both the semantics and contexts employed by scientists and decision-makers in their pedagogical and persuasive attempts may benefit from addressing emerging, informal online channels and formats. This hypothesis is informed by public health and psychology studies that reveal frequent cognitive biases that tend to evade fact-based persuasion (Betsch et al., 2010; Broniatowski et al., 2018; Donzelli et al., 2018; Igoe, 2019; Gerts et al., 2021), as well as the observation of a potential over-formalization of channels of health policy often regarded by population segments as authoritarian and elitist (Frosch, D. L., May, S. G., Rendle, K. A., Tietbohl, C., & Elwyn, G., 2012).

We further posit that communication design may play a specialist role in this calibration of health policy behavior in social media platforms: we aim at testing the possibility of a pedagogy of science and behavioral persuasion through the adoption and configuration of memes, infographics, short videos, data comics and humorous textual content. This possibility is in line with both the aforementioned evidence of subjective components in cognitive processes, and the roles of communication design as a harmonizing agent between the rational and the expressive.

Empirical evidence has been largely collected during the COVID-19 pandemic in the context of Portugal, namely in regards to confinement rules enacted by the government, daily statistics and outlooks provided by health authorities, and vaccination programs set from early 2021 onwards. The largely failed employment of a tracking mobile phone app has been observed as well, both as an indicator of a possible overreliance on digital technology, and as evidence of a self-imposed limitation on the semantics of digital communication.

It must be pointed out that the present research is not focused on occurrences of flat-out science denial, including so-called complementary and alternative medicine practices (Coulter et al., 2004), nor conspiracy theories as collective phenomena of mobilization: both the motivations and socio-ideological dynamics of these radical expressions tend to entail a degree of cognitive and behavioral entrenchment that memes and data comics, however accessible, would inevitably struggle to address; instead, the research chooses to focus on relative degrees of hesitancy and inability to process, translate and apply complex reliable information in daily contexts (Figure 1).

The objectives of the research can thus be summarized as:

- To test the viability of employing social media content to engage audiences that are skeptical or hesitant regarding the adoption of public health policies;
- To acknowledge and employ subjectivity and expression as rooted components of a reliable engagement with public health;
- To contribute to the promotion of civic vocation in participatory online media;
- To broaden the scope for more receptive and engaged dynamic between scientific knowledge, and citizen narratives and expectations;
- To broaden the scope of design studies and practice among contemporary online phenomena;
- To legitimize exploratory roles design may perform in the receptivity of health policy within emerging media contexts;
- To translate complex health information, knowledge and data into broadly accessible and persuasive formats.

Despite the specificity and ambition of the aforementioned objectives, it must be emphasized that the project follows an overall exploratory approach; both the volatility of social media (in its nature and impact) and the unique circumstances of the recent pandemic, dictate an ability to open up to potentially unprecedented approaches to design. As a consequence, the above objectives are primarily regarded as long-term outcomes of a consortium of interested parties, with an iterative methodological vocation; within this broader scope, the tangible aim of the present, exploratory project is primarily to open up a space of scrutiny and possibility, along with the respective seeds of engagement.

STATE OF THE ART

The recent global pandemic crisis (COVID-19, 2020-2022) has presented multiple challenges to scientific development and policy implementation: among a diverse range of responses, both by authorities and citizens, Portugal stood as an overall successful case of viral containment by social behavior and vaccination implementation: explicit dissent was rare, and episodes of public hostility even more residual. However, three core issues remained throughout:

- A general absence of a tangible, accessible communication strategy on the part of authorities was evident: a press conference in a formal environment frequently employing hermetic terminology was broadcast daily on open TV channels (Serviço Nacional de Saúde, n.d.); the press conference was accompanied by fairly abstract and generic slogans, devoid of concrete information or instructions (“Protect yourself”, “We will beat the virus”, and “Take care of yourself, take care of others”)(Figure 2).
- The attempt to trace infections through mobile phone technology (Oliveira, R., & Mendonça, J. M., 2020) largely proved to be a failure, even the subject of ridicule (Pinto, S., Oliveira, E., & Costa e Silva, E., 2021);
- A discreet segment of the population chose not to follow governmental instructions, due to a multitude of reasons including suspicion of the timing of the vaccine, privacy and surveillance concerns, superstition, and a trust in alternative tips and therapies primarily disseminated through online platforms - as ratified by Dimoff, J. D., Dao, A. N., Mitchell, J., & Olson, A. (2021).



Fig. 02 Still from daily press conference by Portuguese National Health authorities during the pandemic, broadcast live on national television. Source: Serviço Nacional de Saúde, n.d.

With regards to the first issue, successful examples of tangible instructions were identified, such as a campaign for mask wearing that makes effective use of subjective components (Figure 3) – thanking people for wearing a mask, rather than imposing it, and having actual individuals (health workers) setting the example in order to provide a more personal semantic of engagement. However, examples of positive communication were still the exception.



Fig. 03 Examples of positive reinforcement campaign employing testimonies and gratitude. Source: Serviço Nacional de Saúde, n.d.

On the other hand, the issue of pandemic containment through digital technology can essentially be regarded as a deterministic endpoint of over-reliance on big data; despite the promise of its theoretical model, its implementation proved impossible: it would involve complex processes of registration, activation, professional involvement, and software update. When the Portuguese Prime Minister suggested the possibility of its mandatory use, the software became the subject of irreversible ridicule - this, adding to the debate on the aforementioned issues of privacy and governmental surveillance. This approach to pandemic containment, we argue, suffered from both a degree of digital dogma and a lack of awareness of subjective components, while breaking a tacit yet pervasive contemporary expectation that the vocation of mobile technology be driven by entertainment and ease.

However, the core issue under discussion in the present research is the understanding that most instances of skepticism occurred due to both a lack of accessible and concise information, as well as an over-formalisation of health policy discourse on the part of authorities - as proposed by Dillard & Shen's "Theory of Psychological Reactance" (2005). As traditional media channels focused on intricate statistical and infographic representation of the pandemic, online media channels engaged in a diametrically opposite exercise: humorous content as a tool for overcoming anxiety (Figure 4), slogans, expressions of solidarity, and personal testimonies. The problem, however, was that this largely benevolent and innocuous content randomly coexisted with misleading health information, factual manipulation and statements of a conspiratorial nature, and wellness philosophies aspiring to become an alternative to scientific efficacy. Furthermore, the appeal

of this latter content was rarely matched by reliable sources of information and pedagogy: given the choice between a formal governmental edict and an ironic set of enjoyable memes, however questionable, a large segment of online users instinctively gravitate towards the latter. This was empirically witnessed and experienced by the authors as design and media researchers, and as citizens and online users themselves during the various stages of the pandemic.



Fig. 04 Y U.NO meme generated by the authors, based on empirical analysis of pandemic memes.

On an international level, specific entities attempted to reconcile this dichotomy by employing online languages and aesthetics in their official communication; an example is the set of memes and tags created by the U.S. National Foundation for Infectious Diseases (Figures 5 and 6). These were made available on their website, along with the message: “Share these infectious disease memes to help spread awareness, not disease. Select an image below to view a full size version and save to your device. Share on social media with the hashtags #GetVaccinated, #VaccinesWork, and/or #FightFlu. Tag your friends and family to remind them to #GetVaccinated to help stay healthy!”



Fig. 05 Example of meme made available by the U.S. National Foundation for Infectious Diseases (n.d.).

It is this type of engagement that the present research attempts to pursue, by further weaving authoritative health information and policy into social media, and by generating specimens and prototypes covering subjective behavioral response. Subsequently, we expect to propose an equivalent harmonization of formal and informal channels of communication in the Portuguese context.

A proposition on the recent pandemic could be regarded as redundant, given its retrospective nature. However, we argue for its validity for two main reasons: firstly, the design and management of communication during the pandemic contained an inevitable degree of improvisation as the crisis unfolded, with little time for the strategic analysis that may now be ensured; and secondly, the present study ultimately aims at being relevant and partially contributive to future crises scenarios.



Fig. 06 Example of meme made available by the U.S. National Foundation for Infectious Diseases (n.d.).

LITERATURE REVIEW

Numerous studies in recent years have highlighted the influence of the internet, and in particular, social media towards scientific literacy and population behavior (Kata, 2010; Mitra et al., 2016; Benoit & Mauldin, 2021). The emerging general consensus is that the casual and unregulated nature of social media has profoundly altered access to reliable information, and changed the way knowledge is approached and disseminated (IDA, 2018; Benoit & Mauldin, 2021). This new "boundless ecosystem" (Karafillakis et al., 2021) has inevitably affected conversations on public belief: studies suggest that while the immediacy and informal nature of social media may appear to provide an advantage to thought leaders towards influencing public perception (IDA, 2018), it also fosters an unmediated spread of misinformation (Chou et al., 2009; Keelan et al., 2010; Igoe, 2019).

This "infodemic" of differing veracities is presently in sharp focus since social media platforms acting as vectors are actively scaffolding the spread of wrong and unfounded information (Wang et al., 2019; Puri et al., 2020); recently, it has undermined worldwide efforts towards controlling the COVID-19 pandemic (Gerts et al., 2021; Loomba et al., 2021; Demuyakor et al., 2021). The sheer bulk of varying information has also aggravated the mistrust of data linked with risk perceptions and safety of the vaccines (Kennedy et al., 2021), thereby driving hesitancy and risking further lives (Wilson & Wiysonge, 2020; Latkin et al., 2021; Loomba et al., 2021; Chadwick et al., 2021).

A further scrutiny of thought leaders driving the anti-vaccination movements reveals that in conjunction with celebrities who use their prominence on social media to speak on topics that they are not experts in (Igoe, 2019; Herrera-Peco et al., 2021), there are social media influencers who spread scientific sounding disinformation by providing "misleading causal explanations" (Igoe, 2019). Correspondingly, there is evidence that since individuals exhibit a greater proclivity towards engaging with negative information around vaccination than positive views (Blankenship et al., 2018; Li et al., 2020; Puri, et al., 2020), a fraction of anti-vaxxers, who produce a majority of content, can cluster audiences and become "echo chambers" (Levy, 2021; Karafillakis et al., 2021; Demuyakor et al., 2021; Jiang et al.; 2021) for further amplification. Conversely, content producing pro-vaxxers have been found not engaging sufficiently with a broader community with similar concerns (Demuyakor et al, 2021). Adding to this is the plain evidence that scientific knowledge tends towards epistemological complexity and disciplinary hermeticism, whereas disinformation tends to offer a readily understandable reading of the issue at stake; consequently, "people learning about topics are vulnerable to hubris" (Ballantyne and Dunning, 2022). Furthermore, the ample evidence of this polarization indicates a pressing need for a third stance towards mutual engagement: we thus argue that a dialogue may be fostered within a shared dialectic involving scientists, policy-makers and moderate skeptics.

This research, accordingly, posits that to understand, and specifically, to mitigate such occurring antagonisms within the general public towards the filtering and processing of relevant information in matters of health and safety, it has become imperative for governing bodies to examine and incentivise forms of new media that are actively demonstrating the capacity to engage and influence public opinion. Memes, as Nieubuert (2021) indicates, hold the ability to function as digital propaganda leaflets in the same way as their analogue antecedents, bonding people under an idea. As exploratory signs with semiotic reasoning, they are a "tool for cognitive representation" (Scherz, 2022). Furthermore, as stated by Grace and Fiyinfolu (2022), "[...] satire, music and comedy are not just made to make the audience laugh; the underlying issue is for them to be used as tools for reforming the society."

The study elaborates its mapping from the aforementioned COVID-19 crisis, particularly in the Portuguese context, as a primary case study, from where it endorses to understand, and specifically, to employ it as source material towards the organization of taxonomies and communication patterns, including visual and discursive ones. This will enable the integration of findings on the allowances and affordances of designing reliable health information in public health research and communication, namely for online social media contexts.

METHODOLOGY AND PRELIMINARY FINDINGS

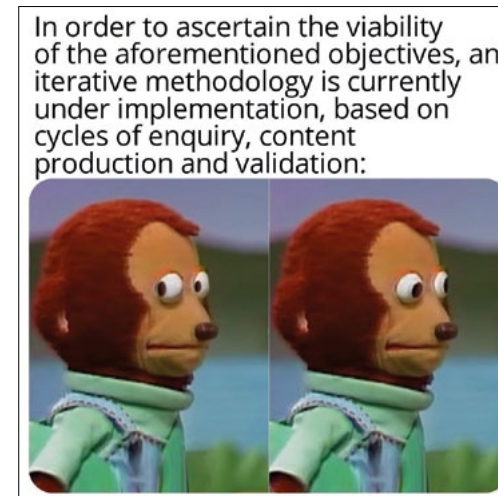


Fig. 07 Self-reflective meme generated by the authors.

The present study is being informed by the retrospective analysis of empirical recollections and collection of online specimens and discussions during the pandemic; this empirical activity took place mostly on Facebook, from the onset of the pandemic up to its gradual replacement by subsequent global narratives. Despite a predominant non-participatory approach in order to ensure the neutrality of the observation, the occasional written online exchange in comments and forums largely confirmed an entrenchment of users' beliefs, often mistrustful or derisive of official health communication channels and content.



Fig. 08 Example of imgflip meme template and user interface: Buff Doge vs. Cheems Meme. Source: imgflip.com

The above content and experience has therefore paved the way for both an empirical identification of characteristics to be employed by reliable sources in order to reach skeptical online segments, and an exploratory production of meme prototypes. These have mostly made use of the popular online meme generator “imgflip”, thus ensuring both a semantic recognisability upon the employment of popular meme imagery, and an intuitive interface with user-friendly design tools. An example of a pre-existing visual template and user interface is presented as Figure 8.



Fig. 09 Metaphorical meme with pedagogical component, generated by the authors



Fig. 10 Classroom workshop in the scope of the present research group activity. Photography by Cláudia Raquel Lima.

A set of ongoing in-person interviews with COVID skeptics complements the aforementioned participant observation, where anonymity is offered as desired by interviewees. Patterns running through these interviews include:

- Skeptical subjects tend to avoid calling themselves “deniers”, while in fact they do often deny the efficacy of vaccines, or bundle their suspicion with broader geopolitical stances that include financial interests on the part of pharmaceuticals and governmental motivations;
- There seems to be a prevalent suspicion of official channels of communication (television is mentioned often), accompanied by a degree of pride in resorting to alternative means of information such as personal youtube channels.

The aforementioned activity has been complemented by the design of a series of creative activities, where both members of the research team and design students have been generating meme prototypes for online and offline engagement, trust and pedagogy. These activities have so far included private weekly online responses to preselected meme imagery, the organization of exploratory meme generation and discussion sessions with team members (Figures 7, 9 and 11), and the curricular insertion of meme production workshops in Design and Digital Media Arts courses, as well as an exploration of online/offline engagement by printing out generated content, thus opening up further contexts of resonance (Figure 10). Further iterations of these various actions will ensure gradual cycles of validation and adjustment (Figure 13).

We regard this latter activity as particularly relevant, as it brings input by younger generations with a more intricate perspective on online dynamics, circulation and semantics, while allowing personal testimony to play a key role in engagement.

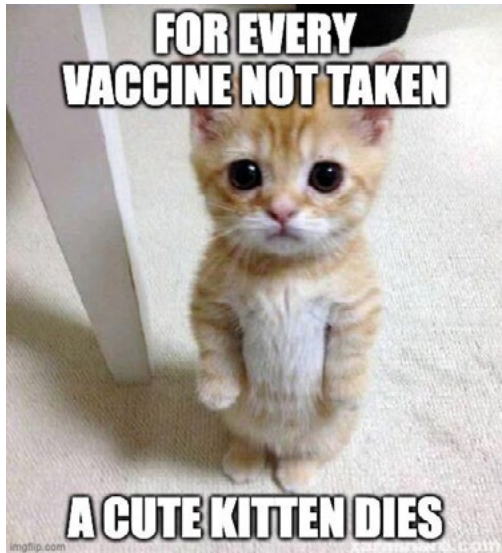


Fig. 11 Humorous meme generated in project workshop context.



Fig. 12 Setting up a display of meme printouts for open feedback at an international visual methods conference. Photography by Susana Barreto

Concomitantly, these various outputs are being shared within the context of events and channels of scientific dissemination - conferences, posters and articles (Figure 12), in order to further open the debate on the legitimacy and efficacy of using meme aesthetics and semantics in the persuasion of skeptical individuals and communities. Online presence remains discreet, while pondering the resolution of viral dissemination versus centralized communication on the part of the research.

Empirical findings emerging from the above activities include the following:

- Humour tends to be pervasive in social media, and proves to be an effective device for engagement;
- However, with the above in mind, irony-based humor tends to both antagonize dissenting views and entrench viewpoints;
- Caption-based memes using pre-circulating imagery denote a knowledge of the medium, and therefore tend to legitimize those producing and sharing them (Figure 7); other graphic elements such as specific typefaces may still ensure a level of familiarity among online users;
- Nevertheless, pre-circulating imagery does not need to be the exclusive visual source: memes may be constructed from original images;
- Tangible metaphors tend to be useful in illustrating complex information and knowledge, thus rendering them more accessible and understandable by online audiences (Figure 9);
- Personal testimonies tend to more readily engage with the readers'/viewers' subjective components;
- Content production should avoid mission statements that, in themselves, may preemptively invalidate the possibility of engagement. Providing content on a smaller, case-by-case basis may prove to be more efficient than gathering it under an encompassing viewpoint that may be regarded as patronizing or antagonizing.

We argue that these empirical findings are convergent with Dillard & Shen's "Theory of Psychological Reactance" (2005), in that they support individual freedom restoration of freedom, and give the individual the notion of being a part of the communication/solution - rather than enduring an authoritative type of communication/solution.

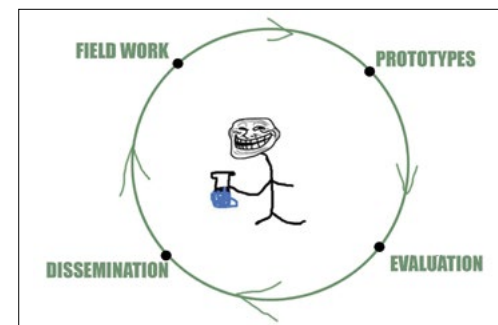


Fig. 13 Project methodology summarized in meme format. Source: the authors

Despite the gradual emergence of these empirical findings, given the aforementioned, unprecedented factors at work (as well as the intrinsic degree of complexity), full validation and measurement can only expect to be addressed as longer-term goals, namely through extrapolation and cross-disciplinary analysis; however, preliminary response from participating students and design peers has largely confirmed both the pertinence of the proposed engagement and the potential of generated specimens.

OUTLOOK

The present research posits that communication design and media arts may contribute to a constructive engagement with science and health policy skeptics in online environments. It acknowledges prior, psycho-cognitive evidence that knowledge and beliefs are not solely constructed by logic and factual information, but rather contain subjective components: it is precisely within this territory of subjectivity that we propose design may contribute, by employing online humor, aesthetics and symbolic validation as valid tools for a pedagogy of health policy behavior.

The case study of Portugal in the COVID-19 pandemic is the focus of the present research: both official and unofficial communication channels are being covered and analyzed, aiming at diluting the polarized perception whereby one is dogmatic and the other is unreliable (Figure 14). Methodologies include online ethnography, the collection of empirical evidence, retrospective access to documentation and memorabilia, the identification of underlying taxonomies, semi-structured interviews, and exploratory sessions in both research and learning contexts.

We expect further iterations (Figure 13) to validate produced materials, resulting in a set of prototypes and recommendations for science communication in online contexts that may effectively incorporate subjective components as pedagogical assets rather than impediments, as well as arguing for a core contribution of design in online behavioral changes regarding public health. Additionally, these further iterations will diversify the range of approaches beyond the premises of meme culture and Facebook, in order to include platforms, genres and formats such as TikTok, data comics, and critical readers.



Fig. 14 . Meme addressing the apparent conundrum of the present research. Source: the authors.

DISCLAIMER REGARDING USE OF THIRD-PARTY IMAGES

It is recognised that some of the external images (Figures 2 & 3) may be employed within the framework of the fair use doctrine, which permits their use for purposes of criticism, commentary, or education. This determination has been made after careful consideration of the nuances associated with fair use.

The authors have made every effort to accurately attribute and acknowledge the ownership of the external images. Proper citations, including source information and authorship, have been diligently provided in accordance with established citation conventions, thus respecting the intellectual property rights of these images.

ACKNOWLEDGEMENTS

This work is funded by national funds through the FCT – Fundação para a Ciência e a Tecnologia, I.P., under the scope of the project 2022.08322.PTDC.

HEITOR ALVELOS

JORGE BRANDÃO PEREIRA

ABHISHEK CHATTERJEE

SUSANA BARRETO

PEDRO ALVES DA VEIGA

CLÁUDIA RAQUEL LIMA

ELIANA PENEDOS-SANTIAGO

REFERENCES

- 1 Arif, N., Al-Jefri, M., Bizzi, I.H., Perano, G.B., Goldman, M., Haq, I., Chua, K.L., Mengozzi, M., Neunez, M., Smith, H. and Ghezzi, P.: Fake News or Weak Science? Visibility and Characterization of Antivaccine Webpages Returned by Google in Different Languages and Countries. *Front. Immunol.*, vol. 9, art. 1215, 1-12 (2018). <https://doi.org/10.3389/fimmu.2018.01215>
- 2 Ballantyne, N., Dunning, D.: Skeptics Say, 'Do Your Own Research.' It's Not That Simple. *The New York Times* (2022, January 3). <https://www.nytimes.com/2022/01/03/opinion/dyor-do-your-own-research.html>, last accessed 2023/05/31.
- 3 Benoit, S. L., Mauldin, R. F.: The "anti-vax" movement: a quantitative report on vaccine beliefs and knowledge across social media. *BMC Public Health*, 21(1), 1-11 (2021). <https://doi.org/10.1186/s12889-021-12114-8>
- 4 Bessi, A., Zollo, F., del Vicario, M., Scala, A., Caldarelli, G., Quattrociocchi, W.: Trend of Narratives in the Age of Misinformation. *PLOS ONE*, 10(8), e0134641 (2015). <https://doi.org/10.1371/journal.pone.0134641>
- 5 Betsch, C., Renkewitz, F., Betsch, T., Ulshöfer, C.: The Influence of Vaccine-critical Websites on Perceiving Vaccination Risks. *Journal of Health Psychology*, 15(3), 446-455 (2010). <https://doi.org/10.1177/1359105309353647>
- 6 Blankenship, E., Goff, M. E., Yin, J., Tse, Z. T. H., Fu, K. W., Liang, H., Saroha, N., Fung I. C.: Sentiment, Contents, and Retweets: A Study of Two Vaccine-Related Twitter Datasets. *The Permanente journal* 22(3), 17-138 (2018). <https://doi.org/10.7812/tp/17-138>
- 7 Brehm, S. S., Brehm, J. W.: *Psychological reactance: A theory of freedom and control*. Academic Press (2013).
- 8 Broniatowski, D. A., Jamison, A. M., Qi, S., AlKulaib, L., Chen, T., Benton, A., Quinn, S. C., Dredze, M.: Weaponized Health Communication: Twitter Bots and Russian Trolls Amplify the Vaccine Debate. *American Journal of Public Health* 108(10), 1378-1384 (2018). <https://doi.org/10.2105/ajph.2018.304567>
- 9 Brownell, S. E., Price Jr., J. V.: Overcoming the discourse of science mistrust: how science education can help during times of crisis and beyond. *Cultural Studies of Science Education* (2021). <https://doi.org/10.1007/s11422-021-10064-6>
- 10 Chadwick, A., Kaiser, J., Vaccari, C., Freeman, D., Lambe, S., Loe, B. S., Vanderslott, S., Lewandowsky, S., Conroy, M., Ross, A. R. N., Innocenti, S., Pollard, A. J., Waite, F., Larkin, M., Rosebrock, L., Jenner, L., McShane, H., Giubilini, A., Petit, A., Yu, L. M.: Online Social Endorsement and Covid-19 Vaccine Hesitancy in the United Kingdom. *Social Media + Society* 7(2), 1-17 (2021). <https://doi.org/10.1177/20563051211008817>
- 11 Chou, W. S., Hunt, Y. M., Beckjord, E. B., Moser, R. P., Hesse, B. W.: Social Media Use in the United States: Implications for Health Communication. *Journal of Medical Internet Research* 11(4), e48 (2009). <https://doi.org/10.2196/jmir.1249>
- 12 Coulter, I. D., Willis, E. M.: The rise and rise of complementary and alternative medicine: a sociological perspective. *Medical journal of Australia* 180(11), 587-589 (2004). <https://doi.org/10.5694/j.1326-5377.2004.tb06099.x>
- 13 Davies, P., Chapman, S., Leask, J.: Antivaccination activists on the world wide web. *Archives of Disease in Childhood* 87(1), 22-25 (2002). <https://doi.org/10.1136/adc.87.1.22>
- 14 Demuyakor, J., Nyatuame, I. N., Obiri, S.: Unmasking COVID-19 Vaccine "Infodemic" in the Social Media. *Online Journal of Communication and Media Technologies* 11(4), e202119 (2021). <https://doi.org/10.30935/ojcm/11200>
- 15 Dillard, J. P., Shen, L.: On the nature of reactance and its role in persuasive health communication. *Communication monographs* 72(2), 144-168 (2005).
- 16 Dimoff, J. D., Dao, A. N., Mitchell, J., Olson, A.: Live free and die: Expanding the terror management health model for pandemics to account for psychological reactance. *Social and Personality Psychology Compass* 15(3), e12585 (2021).
- 17 Donzelli, G., Palomba, G., Federigi, I., Aquino, F., Cioni, L., Verani, M., Carducci, A., Lopalco, P.: Misinformation on vaccination: A quantitative analysis of YouTube videos. *Human Vaccines & Immunotherapeutics* 14(7), 1654-1659 (2018). <https://doi.org/10.1080/21645515.2018.1454572>

- 18 Faasse, K., Chatman, C. J., Martin, L. R.: A comparison of language use in pro- and antivaccination comments in response to a high profile Facebook post. *Vaccine* 34(47), 5808–5814 (2016). <https://doi.org/10.1016/j.vaccine.2016.09.029>
- 19 Frosch, D. L., May, S. G., Rendle, K. A., Tietbohl, C., Elwyn, G.: Authoritarian physicians and patients' fear of being labeled 'difficult' among key obstacles to shared decision making. *Health affairs* 31(5), 1030–1038 (2012).
- 20 Gerts, D., Shelley, C. D., Parikh, N., Pitts, T., Watson Ross, C., Fairchild, G., Vaquera Chavez, N. Y., Daughton, A. R.: "Thought I'd Share First" and Other Conspiracy Theory Tweets from the COVID-19 Infodemic: Exploratory Study. *JMIR Public Health and Surveillance* 7(4), e26527 (2021). <https://doi.org/10.2196/26527>
- 21 Grace, A. M., Fiyinfolu, A. I.: A Discourse Analysis Of The Effectiveness Of Online Satire, Music And Comedy In Creating Awareness On Covid-19 Pandemic. *Journal of Positive School Psychology* 6 (8), 2132–2141 (2022). ISSN: 2717-7564
- 22 Herrera-Peco, I., Jiménez-Gómez, B., Romero Magdalena, C. S., Deudero, J. J., GarcíaPuente, M., Benítez De Gracia, E., Ruiz-Núñez, C.: Antivaccine Movement and COVID-19 Negationism: A Content Analysis of Spanish-Written Messages on Twitter. *Vaccines* 9(6), 656 (2021). <https://doi.org/10.3390/vaccines9060656>
- 23 Institute for Defense Analyses, <https://www.ida.org/>, last accessed 2023/03/21.
- 24 Igoe, K. J.: Establishing the Truth: Vaccines, Social Media, and the Spread of Misinformation. Harvard T. H. Chan School of Public Health (2019, July 10). <https://www.hsph.harvard.edu/ecpe/vaccines-social-media-spread-misinformation/>
- 25 Iloh, C.: Do It for the Culture: The Case for Memes in Qualitative Research. *International Journal of Qualitative Methods* 20 (2021). <https://doi.org/10.1177/16094069211025896>
- 26 Jiang, J., Ren, X., Ferrara, E.: Social Media Polarization and Echo Chambers in the Context of COVID-19: Case Study. *JMIRx Med* 2(3), e29570 (2021). <https://doi.org/10.2196/29570>
- 27 Karafillakis, E., Martin, S., Simas, C., Olsson, K., Takacs, J., Dada, S., Larson, H. J.: Methods for Social Media Monitoring Related to Vaccination: Systematic Scoping Review. *JMIR Public Health and Surveillance* 7(2), e17149 (2021). <https://doi.org/10.2196/17149>
- 28 Kata, A.: A postmodern Pandora's box: anti-vaccination misinformation on the Internet. *Vaccine* 28(7), 1709–1716 (2010). <https://doi.org/10.1016/j.vaccine.2009.12.022>
- 29 Keelan, J., Pavri, V., Balakrishnan, R., Wilson, K.: An analysis of the Human Papillomavirus vaccine debate on MySpace blogs. *Vaccine* 28(6), 1535–1540 (2010). <https://doi.org/10.1016/j.vaccine.2009.11.060>
- 30 Kennedy, E. B., Daoust, J. F., Vikse, J., Nelson, V.: "Until I Know It's Safe for Me": The Role of Timing in COVID-19 Vaccine Decision-Making and Vaccine Hesitancy. *Vaccines* 9(12), 1417 (2021). <https://doi.org/10.3390/vaccines9121417>
- 31 Latkin, C. A., Dayton, L., Yi, G., Konstantopoulos, A., Boodram, B.: Trust in a COVID-19 vaccine in the U.S.: A social-ecological perspective. *Social Science & Medicine* 270, 113684 (2021). <https://doi.org/10.1016/j.socscimed.2021.113684>
- 32 Levy, N.: Echoes of covid misinformation. *Philosophical Psychology*, 1–17 (2021). <https://doi.org/10.1080/09515089.2021.2009452>
- 33 Li, H. O. Y., Bailey, A., Huynh, D., Chan, J.: YouTube as a source of information on COVID-19: a pandemic of misinformation? *BMJ Global Health* 5(5), e002604 (2020). <https://doi.org/10.1136/bmjgh-2020-002604>
- 34 Loomba, S., de Figueiredo, A., Piatek, S. J., de Graaf, K., Larson, H. J.: Measuring the impact of COVID-19 vaccine misinformation on vaccination intent in the UK and USA. *Nature Human Behaviour* 5(3), 337–348 (2021). <https://doi.org/10.1038/s41562-021-01056-1>
- 35 McIntyre, L.: *How to Talk to a Science Denier: Conversations with Flat Earthers, Climate Deniers, and Others Who Defy Reason*. Cambridge: MIT Press (2022).
- 36 Meme Generator (n.d.), <https://imgflip.com/memegenerator>, last accessed 2023/04/02.
- 37 Mitra, T., Counts, S., Pennebaker, J.: Understanding Anti-Vaccination Attitudes in Social Media. *Proceedings of the International AAAI Conference on Web and Social Media*, 10(1), pp. 269–278 (2016). <https://ojs.aaai.org/index.php/ICWSM/article/view/14729>
- 38 National Foundation for Infectious Diseases: *Infectious Disease Memes* (n.d.). <https://www.nfid.org/immunization/infectious-disease-memes/>
- 39 Nieuwuurt, J. T.: Internet Memes: Leaflet Propaganda of the Digital Age. *Frontiers in Communication* 5 (2021). <https://doi.org/10.3389/fcomm.2020.547065>
- 40 Oliveira, R., Mendonça, J. M.: Staway Covid. Contact Tracing for Covid-19. *INESC TEC Science&Society* 1(1), 58–61 (2020). <https://science-society.inesctec.pt/index.php/inesctecsociedade/article/view/33>
- 41 Parreira, R.: Dois anos de COVID-19: da falta do papel higiênico à variação Omicron. Ainda se lembra dos primeiros memes? In *SapoTék* (2022). <https://tek.sapo.pt/multimedia/artigos/dois-anos-de-covid-19-da-falta-do-papel-higienico-a-variacao-omicron-ainda-selembra-dos-primeiros-memes>
- 42 Pinto, S., Oliveira, E., Costa e Silva, E.: A Controvérsia na Cobertura Mediática de Saúde: A Aplicação Stayaway Covid e as Fontes de Informação. *Comunicação e Sociedade* 40 (2021). <http://journals.openedition.org/cs/6039>
- 43 Puri, N., Coomes, E. A., Haghbayan, H., Gunaratne, K.: Social media and vaccine hesitancy: new updates for the era of COVID-19 and globalized infectious diseases. *Human Vaccines & Immunotherapeutics* 16(11), 2586–2593 (2020). <https://doi.org/10.1080/21645515.2020.1780846>
- 44 Scherz, L.: I'm Not Lonely, I have Memes: The Cognitive, (Dis)Embodied Experience of Depression Memes. In Arkenbout, C., Scherz, L. (Eds.) *Critical Meme Reader #2: Memetic Tacticality*, 140–148. Institute of Network Cultures (2022).
- 45 Serviço Nacional de Saúde. *Conferência de Imprensa* (n.d.). <https://www.sns.gov.pt/conferencias-de-imprensa-diaras/>, last accessed 2023/04/02.
- 46 Shifman, L.: The Cultural Logic of Photo-Based Meme Genres. *Journal of Visual Culture* 13(3), 340–358 (2014). <https://doi.org/10.1177/1470412914546577>
- 47 Wang, Y., McKee, M., Torbica, A., Stuckler, D.: Systematic Literature Review on the Spread of Health-related Misinformation on Social Media. *Social Science & Medicine* 240, 112552 (2019). <https://doi.org/10.1016/j.socscimed.2019.112552>
- 48 Wilson, S. L., Wiysonge, C.: Social media and vaccine hesitancy. *BMJ Global Health* 5(10), e004206 (2020). <https://doi.org/10.1136/bmjgh-2020-004206>
- 49 Xu, Z., Ellis, L., Umphrey, L. R.: The Easier the Better? Comparing the Readability and Engagement of Online Pro- and Anti-Vaccination Articles. *Health Education & Behavior* 46(5), 790–797 (2019). <https://doi.org/10.1177/1090198119853614>
- 50 Yeung, A. W. K., Tosevska, A., Klager, E., Eibensteiner, F., Tsagkaris, C., Parvanov, E. D., Navaz, F. A., Völk-Kernstock, S., Schaden, E., Kletecka-Pulker, M., Willschke, H., Atanasov, A. G.: Medical and health-related misinformation on social media: Bibliometric study of the scientific literature. *Journal of Medical Internet Research* 24(1), e28152 (2022). <https://doi.org/10.2196/28152>

CONHECIMENTO CIENTÍFICO POR ENTRE VIESES COGNITIVOS E COMPORTAMENTAIS

Uma pedagogia por via das redes sociais?

Apresentamos o projecto “Uma Infodemia de Desinformação” [Sci-Bi], dedicado à exploração e validação de redes de pedagogia científica por via de ferramentas das redes sociais. Pretende-se promover a discussão pública dos seus primeiros resultados, desde já no próprio ENCC.

O aumento exponencial do uso de redes sociais tem potenciado fenómenos como notícias falsas, pseudociência e superstição; a sua capacidade de disseminação tem ultrapassado larga e sistematicamente os mecanismos de comunicação e pedagogia científica em vigor. Acresce que a recente pandemia e correspondentes políticas públicas aceleraram o surgimento de canais e conteúdos de desinformação mobilizadores de sectores significativos da população - enquanto os media generalistas se têm mantido em modo de extrapolação estatística, a par de um discurso científico geralmente denso e hermético por parte das autoridades.

O projecto Sci-Bi propõe que o design seja uma ferramenta para um diálogo empático entre a proficiência científica e os comportamentos dos cidadãos. As premissas são duas:

- Os cidadãos tendem a ignorar fiabilidade estatística e empírica contrária à sua própria narrativa, experiência, ou convicções antecedentes;
- Um escrutínio e análise de redes sociais, bem como trabalho de campo online para canais de comunicação mais dinâmicos, podem ser essenciais para o sucesso de estratégias de comunicação pública e científica.

A METODOLOGIA É ITERATIVA

- 1.** Trabalho de campo online em redes sociais com posições pró e anti-ciência;
- 2.** Produção de protótipos exploratórios de comunicação online (memes, reels, rage comics);
- 3.** Avaliação dos protótipos por demografias-chave, e conseqüente aperfeiçoamento;
- 4.** Disseminação de espécimes, metodologias e recomendações de comunicabilidade e pedagogia (junto de autoridades sanitárias, entidades científicas e escolas de design).

O projecto foca-se em Portugal como estudo de caso devido à proximidade empírica, ao grau de expressão de pseudo-ciência e à viabilidade de criação de uma rede de cooperação cívica, pedagógica e institucional.

HEITOR ALVELOS
SUSANA BARRETO
MARTA FERNANDES



STEAL THIS MEME EXHIBITION

In December 2023, an exhibition was held at UPTEC Asprela, the technological site of the U.Porto business incubator. A broad range of printed memes was presented, and visitors were invited to take their favorites with them. The aim was to generate debate with young entrepreneurs who might incorporate emerging visual languages in their future technological solutions.

STEAL THIS MEME

Exploratory memes for citizen health

Esta exposição reposiciona a cultura dos memes online de duas formas:

- Imprimindo-os, torna-os de algum modo mais presentes. E ao imprimir os memes, devolvemos à palavra “roubar” o seu sentido original, resgatando-a ao sinónimo digital de “partilhar” (que em si também é uma perversão do significado original). Roube mos memes, por isso. Os pequeninos, por favor, que os grandes são caros e laboriosos.
- E se os memes se puderem tornar numa ferramenta de pedagogia? A recente pandemia provocou muitos debates, desabafos e hilaridades nas redes sociais; estranhamente, nem os cientistas nem as autoridades tentaram sequer comunicar por via das linguagens e estéticas online: mais voláteis, mas também mais acessíveis aos cidadãos (e inteligíveis por estes) do que as protocolares conferências de imprensa. Os memes ficaram assim, em grande parte, entregues às piadas inconsequentes e às teorias da conspiração. Foi pena. Mas não terá de ser assim no futuro... porque haverá situações futuras, é inevitável. Assim, queremos desde já ensaiar formas de comunicar e ensinar informação fiável: que não se resume a factos, evidências e estatísticas. Porque a razão humana também se faz de humor e subjectividade.

Os memes foram produzidos em contextos de workshops curriculares na FBAUP e sessões de investigação no ID+. Nem todos cumprem os preceitos; mas uma parte dos resultados aponta caminhos a desenvolver em futuras exposições e recomendações.

Produção e Design da Exposição: Susana Barreto, Rui Vitorino Santos

Coordenação UPTEC: André Forte

Design Gráfico: Júlio Dolbeth

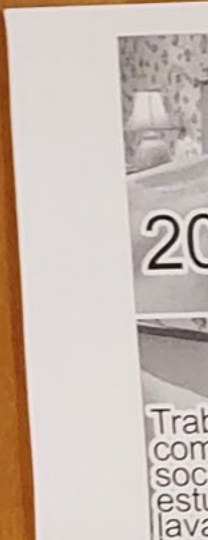
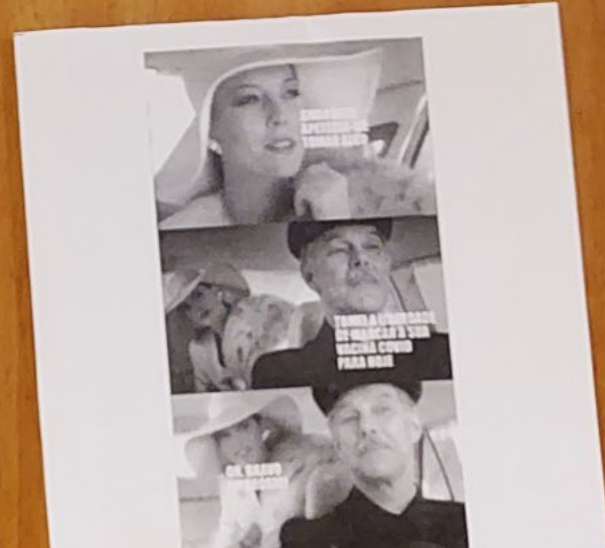
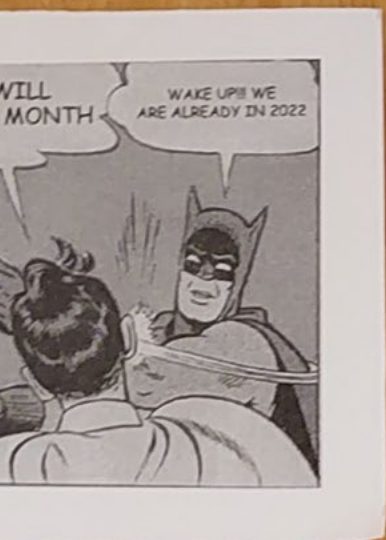
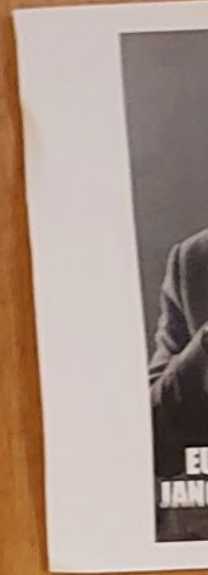
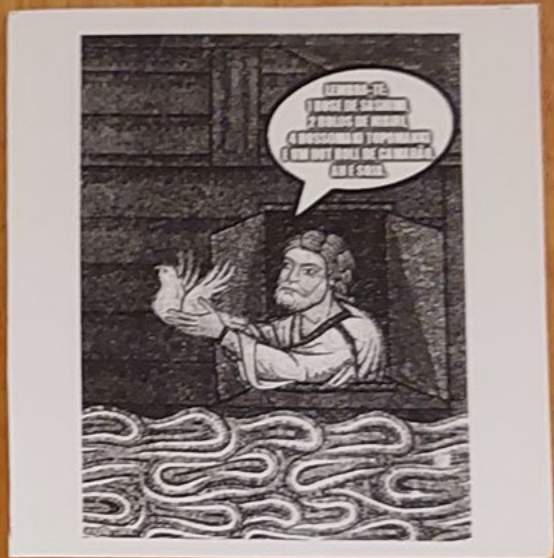
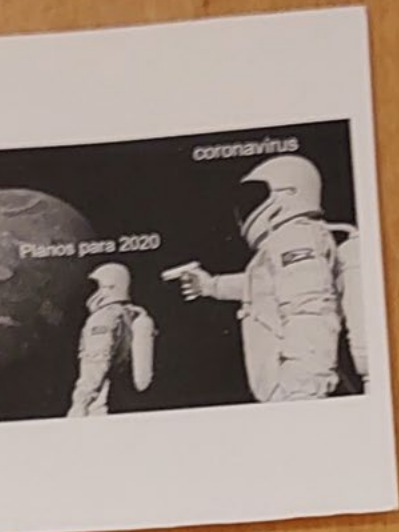
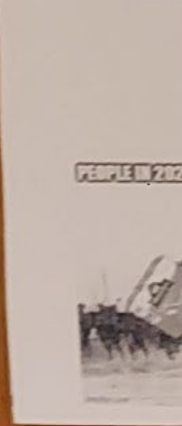
Coordenação do Projecto: Heitor Alvelos

Uma produção LUME - Unexpected Media Lab

@ ID+, Instituto de Investigação em Design, Media e Cultura





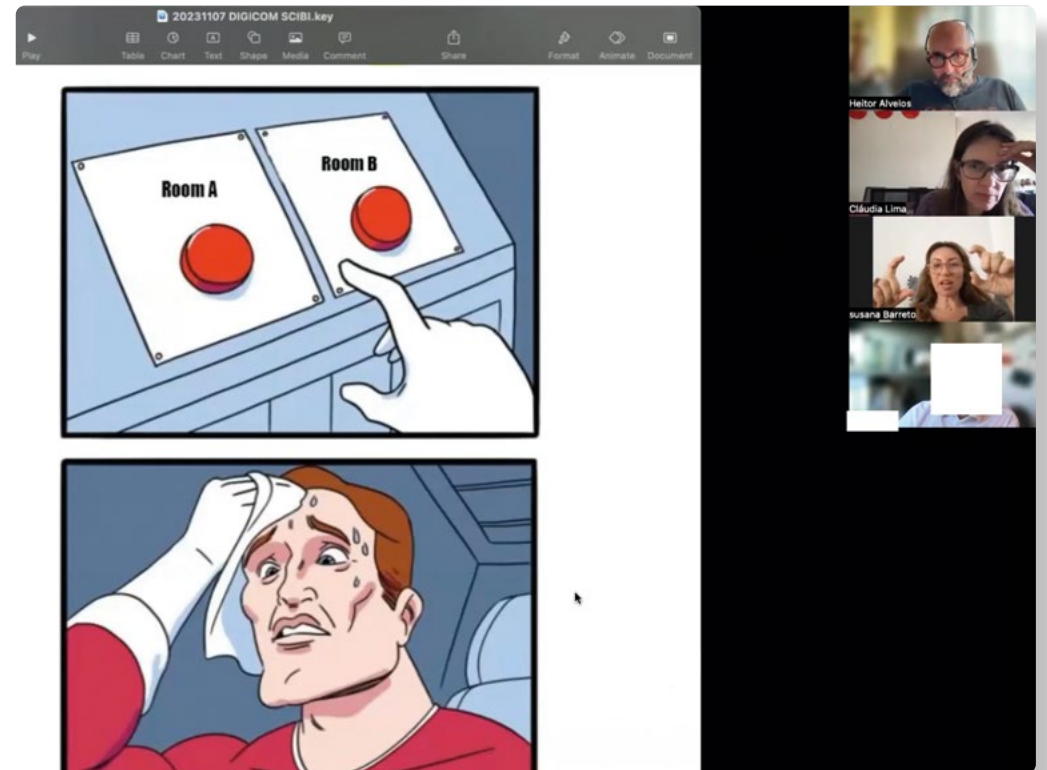




INTERVIEWS

Between March 2023 and February 2024, a range of individual interviews were conducted in order to gather, substantiate and validate the premises of the project. Interviewees included statistics experts, anti-vaxxers, conspiracy theorists, sports managers, health carers, television anchors, health researchers, neuropsychologists, behavioral economists and hospital equipment resellers. All but one requested anonymity.

- 2023/03/13 – ZOOM
Marta Coelho
Professor of Biotechnology.
- 2023/03/16 – IN PERSON
Fernando Barbosa
Researcher in Neurophysiology.
- 2023/03/29 – IN PERSON
AC (anonymity requested)
Vaccine skeptic and subscriber of various conspiracy theories.
- 2023/04/19 – IN PERSON
JA (anonymity requested)
Sports manager, vaccine skeptic.
- 2023/05/05 – IN PERSON
RP (anonymity requested)
Health professional, vaccine skeptic.
- 2023/05/12 – IN PERSON
JC (anonymity requested)
Believer in a range of conspiracy theories.
- 2023/06/07 – IN PERSON
RL (anonymity requested)
Telecommunications engineer, performed a critical inventory of covid-related information errors in mainstream media.
- 2024/02/12 – ZOOM
LG (anonymity requested)
Researcher of Immunology.
- 2024/02/15 – ZOOM
Daniel Catalão
State TV journalist and presenter.







DATA COMICS WORKSHOP

In February and March 2024, a three-session workshop was conducted with with MA Illustration, Edition and Publishing students, at the *Faculty of Fine Arts, University of Porto*. It culminated in the creation of infographics templates towards health information and pedagogy of complex data for the general public.

USING DATA COMICS TO COMMUNICATE COMPLEX PANDEMIC-RELATED INFORMATION

A Pilot Workshop With Illustration Students

ABSTRACT

This article details and analyzes a workshop conducted with MA students in Illustration, Publishing and Printmaking at the University of Porto, Portugal. It explored the articulation of narrative illustration and science communication to render complex, COVID-19-related information accessible to a broader public. The workshop began with a presentation of relevant theories and methodologies in science communication. Students were then invited to respond to three COVID-related briefings on media communication inconsistencies: "Oscillations of the pandemic peak", "On Tuesdays the cases rise!" and "Bad maths!" Methodologically, participants followed a process of ideation, sketching, and refinement: unpacking statistics and public health messaging, and weaving data-driven insights, creative expression, and visual storytelling. The convergence of data and illustration facilitated nuanced interpretations of the pandemic, particularly in respect to the presentation of complex data as a sequential narrative, rather than a single image or chart. The resulting data comics pointed towards an added potential for engaging and informing broader audiences with complex public health information. Six of the workshop outcomes were presented as part of the exhibition "o_U: an exhibition of meme symptoms and side effects", in Porto, Portugal, in March 2024. As a space geared towards a younger clientele, the host venue provided an appropriate context for performing an external validation of the workshop outcomes. The workshop and exhibition are part of the ongoing exploratory project "An Infodemic of Disorientation: communication design as mediator between scientific knowledge and cognitive bias" (FCT 2022.08322.PTDC, 2023-24).

KEYWORDS

- Data Comics;
- Design Workshops;
- Health Misinformation.

INTRODUCTION

The rapid rise of social media (Ortiz-Sánchez, 2020) has greatly intensified scientific distrust and the spread of misinformation worldwide, largely due to the formation of echo chambers (Raballo et al., 2022). This issue is worsened by the ease with which subjective, biased, unreliable, unverified, or intentionally misleading information can be shared, alongside the appealing and addictive nature of simplified, overarching narratives.

These simplified narratives often clash with the complex information presented by health sciences, which requires expertise not common among the general public.

Significant efforts are made to translate intricate health knowledge into concepts and language that the general public can understand, forming the basis for targeted health policies. However, health researchers and authorities typically communicate using facts, infographics, statistics, and logic, while much of the population now prefers image deconstruction, humor, rumors, and personal anecdotes (Kostadinovska-Stojchevska & Shalevska, 2018).

DiResta (2023) highlights the necessity of adapting communication strategies to the evolving landscape, asserting: "Institutional communicators and public health entities fail to grasp that the methods of communication have evolved [...]; they must recognize the influence of storytelling." This insight is central to the current research, showing how a single report of a vaccine-related adverse reaction can skew public perception of statistical evidence showing such events are rare.

Moreover, psychologists and cognitive neuroscientists have shown that cognitive processes are not purely fact-based; Goel (2022) explains this as "The reasoning mind recruits the instinctive mind" (p. 155). This suggests that health authorities and policymakers must consider subjective elements in their public interactions. While emotions like gratitude towards healthcare workers and fear of mortality are used in public health campaigns, these typically adhere to traditional authoritative discourse.

Building on these observations, this ongoing research investigates various hypotheses for combating online disinformation and distrust in health policies. This includes leveraging social network aesthetics and semantics within authoritative communication. Communication Design can help by equipping students and professionals with the technical and semiotic skills needed for effective communication. Age is also a factor, as the rapid change in online semantics can render trends outdated almost overnight. Therefore, involving younger consultants in health-related content communication and behavioral pedagogy is vital.

Workshops and pedagogical practices with undergraduate design students have proven ideal for exploring online communication prototypes. In the framework of this project, various initiatives have been developed in this context at universities in the north and south of Portugal (see Alvelos et al., 2024). The initial strategy involved creating health-related memes to test the influence of humor, but these often-lost informational value in the irony. Subsequent exercises

included infographics and printed media, but the gap between factual information and interpretation persisted.

Considering these challenges, the next set of sessions explored the potential of the data comics format to communicate complex scientific content through accessible visuals and

playful aesthetics. Data Comics, familiar to younger generations, were tested as tools to promote genuine knowledge-seeking behavior. They may also lower the anticipated formality of authoritative discourse, facilitating better cognitive and behavioral engagement.

THE DATA COMICS WORKSHOPS

A workshop with three sessions was organized for Master's students in Illustration, Editing, and Print (MIEP) at the Faculty of Fine Arts, University of Porto. Held over three sessions between February and March 2024, the workshop aimed to foster a multifaceted understanding of the COVID-19 pandemic through data comics. They were conducted as an extracurricular activity, engaging six volunteer MIEP students.

From this initiative, six "data comics" were produced to test the feasibility of design and illustration in translating complex information into accessible forms for the general public. These comics served as a counterpoint to the proliferation of statistical graphics, which, while perceived as absolutely accurate, are often unreadable to significant portions of the audience.

SESSION STRUCTURE

Initial Session: The overarching project and previously developed outputs were introduced. For tangible outcomes, 3 case studies were selected of situations communicated and disseminated by the mainstream media that reflect inconsistencies and misinformation — "Oscillations of the Pandemic Peak", "On Tuesdays the Cases Increase", and "Bad Maths" (on this see Lima, Barreto & Alvelos, 2024). These case studies involved proper data analysis techniques and the identification of evolving patterns, information inconsistencies in mainstream media, differing interpretations of statistical data, and the balance between both Data Comics and Infographics. Focusing on key theories and methodologies in effective information conveyance and the importance of visual storytelling in public health communication, authors such as Lima (2011), Bertin (2011), Tufte (1983) and Wurman (2000) were presented at this stage that revealed the underlying visual elements that better tackle the challenges of representing information and data.

Furthermore, a set of bibliographic references were recommended, with regards to a more comprehensible connection on the potentials of storytelling in both information and data visualization (Gershon & Page, 2001; Kosara & Mackinlay,

2013; Segel & Heer, 2010) as natural consequence for combining rigor with a narrative form. Finally, Data Comics were presented as an implicit process that combines an engaging medium with quantitative data in a sequential manner. Bach et al (2017) describes the need for this format as we rely more on data to understand the world.

In the time that remained, possible conceptual and technical approaches to the project were also discussed.

Subsequent Sessions: The subsequent two sessions were devoted to practical developments of the Data Comics, including structuring the story to be told and the hierarchy of information, experimenting with different types of illustration and charts to be included. Participants developed prototypes, encompassing narrative structures, chart selection, and stylistic preferences. While the second session was more experimental, with moments of brainstorming, the final session centered on finalizing Data Comics prototypes, addressing minor corrections, discussing outcomes, and preparing poster-sized final layouts for printing.

STUDENT ENGAGEMENT AND PROCESS

Engaging students in this extracurricular project was challenging, as they were involved in their personal research projects the workshop took place during academic term time. However, the value of the workshop lay in equipping them with tools to develop illustrated narratives to communicate science, broadening their academic output possibilities. MIEP's curriculum plan does not provide for the infographics and data comics in its structure, which allows it to gauge a more added value to add value to it. After the Workshop, the inclusion of infographics associated with the different territories of the illustration will be discussed.

Challenges: The biggest challenge was transforming statistical data into visual narratives. Students initially focused on combining storytelling with infographics. The process involved ideation, sketching, and refinement, using freehand drawing techniques, mostly on paper, then digitally refined using Procreate on the iPad and Adobe Photoshop. **Main Concepts:** The goal was to merge data-driven insights with artistic expression.

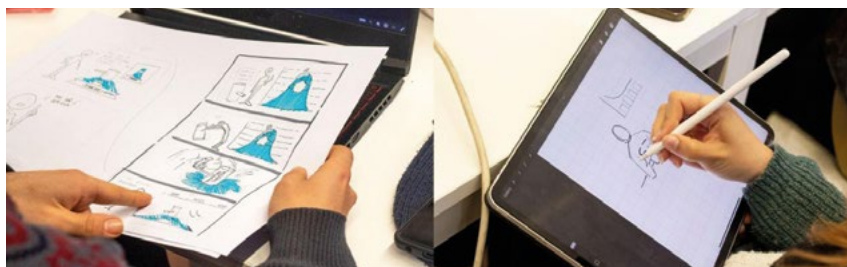


Fig. 01: Images taken at the workshop - creative process, 2024 Source: Cláudia Lima

CASE STUDY SELECTION

Three case studies of media misinformation in Portugal during the pandemic were selected from a larger pool to potentially highlight subsequent phenomena of disinformation. These case studies were chosen as sources for a workshop briefing, focusing on information inconsistencies in mainstream media, differing interpretations of statistical data by television anchors, and the imbalance between pedagogical and sensationalist rhetoric. These specific phenomena were used as templates for developing Data Comics prototypes.

OSCILLATIONS OF THE PANDEMIC PEAK

This case study dates to the early days of the pandemic when there were numerous predictions about the peak of infections. It was widely publicized that without intervention, the number of cases would rise exponentially, leading to a peak after which the number of infections would decline. The concept of "flattening the curve" was introduced, emphasizing the need to spread out the number of infections over a longer period to prevent healthcare systems from becoming overwhelmed.

The media often failed to adequately explain that the goal was not just to delay the peak but to significantly reduce the number of infections through lockdowns and other measures. This misunderstanding was evident in the conflicting statements from health authorities. For example, on March 27, 2020, Graça Freitas, the Director-General of Health, mentioned that the peak would be delayed until May and would manifest as a "plateau of a few weeks" (TVI Notícias, 2020a). This message was confirmed by the Health Minister, Marta Temido (TVI Notícias, 2020b).

Despite these forecasts, on April 2, 2020, the President of Portugal announced that the peak had been delayed (Carmo, 2020), while Freitas reiterated the uncertainty about the peak's timing a day later (Malta, 2020). These statements, often accompanied by animated graphs showing the expected curve, reinforced the assumption that the number of cases would remain the same regardless of containment measures.

However, pulmonologist Filipe Froes clarified in an interview with RTP (2020) that the goal was to "crush the curve," not just flatten it, stressing the importance of strict adherence to social distancing to reduce the number of infections. Ultimately, the peak of the pandemic occurred at the end of March, as reported on April 8, 2020 (Maia & Ferreira, 2020).

ON TUESDAYS THE CASES RISE!

This case study examines a pattern observed in the reporting of COVID-19 cases, where a noticeable increase in cases was reported at the beginning of the week, particularly on Tuesdays. This pattern was due to the flow of testing and clinical analysis, which slowed down over the weekends and led to a backlog of cases being reported on Mondays and Tuesdays.

Television news programs often highlighted this sharp increase in cases without explaining that it was a result of the reporting cycle rather than a real surge in infections. Accurate analysis would require comparing the number of cases with the same day of the previous week or the total number of cases in consecutive weeks. However, this context was frequently missing from media reports, leading to public confusion. Daily reports from the DGS included charts that provided a more reliable analysis of trends, but these were often ignored by the media, which preferred to create their own, less informative charts (see figure 2).



Fig. 02: Graph presented on TVI's *Jornal das 8* broadcast on February 3, 2021 at 8.16pm. The reporter remarked on the increase in cases (based on the previous day), stating that 'we still do not have a defined trend' (TVI and Carvalho 2021)

BAD MATHS!

The third case, "Bad Maths!", focused on the misinterpretation and misreporting of statistical data by the media. Often, statistical errors and misrepresentations in the data presented by television anchors led to misunderstandings about the actual state of the pandemic. This case study highlighted the need for better statistical literacy among media personnel and clearer communication from health authorities to avoid spreading misinformation.

SUMMARY

These three case studies were used to develop Data Comics prototypes, aiming to translate complex information into accessible and engaging formats for the general public. The selected case studies not only provided real-world examples of misinformation but also served as a basis for exploring how visual storytelling and design can improve the communication of scientific information during a health crisis.

EXAMPLES OF STUDENT WORK



Fig. 03: *Teia de Mentiras* (Web of Lies), António Amaro, 2024

António Amaro

The subject "On Tuesdays the cases rise!" was addressed by António with the creation of a poster inspired by comic book imagery, using typography to simulate a comic book cover and calligraphic text in speech bubbles. He resorted to vibrant colors in a strategy of simulating vintage comic books.



Fig. 04: Achatar a Curva (Flatten the Curve), Guilherme Festas, 2024

Guilherme Festas

For the subject "Oscillations of the pandemic peak", Guilherme designed assertive panels with strong, contrasting colors, using symbolic iconography like Zé Povinho, an homage to the caricature created in 1875 by Portuguese artist Rafael Bordalo Pinheiro, to create empathy and engage viewers.

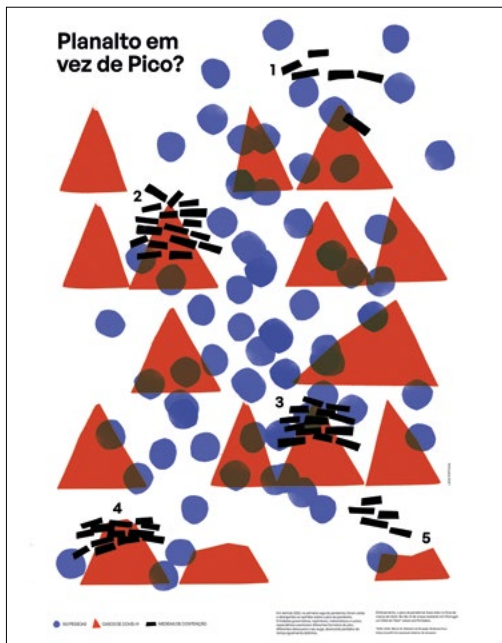


Fig. 05: Planalto em vez de Pico? (Plateaux instead of Peak?), Luísa Portugal, 2024

Luísa Portugal

Opting for the subject "Oscillations of the Pandemic Peak", Luísa used a more abstract and modernist composition, anchoring the image in a caption to decode graphic forms.

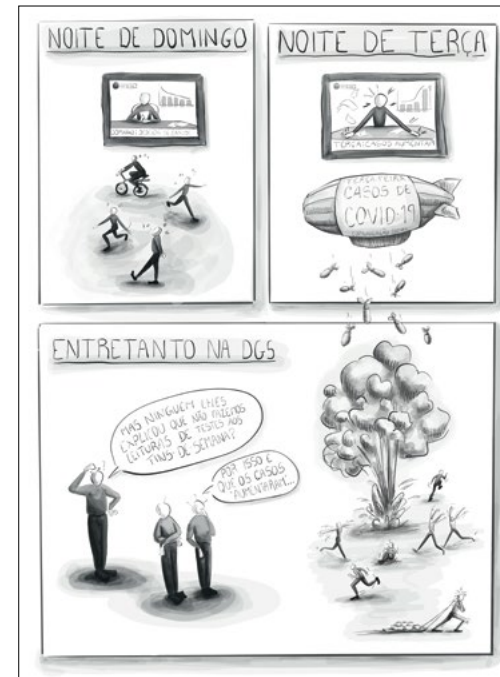


Fig. 06: "On Tuesdays the cases rise!", Luísa Silva, 2024

Luísa Silva

For "On Tuesdays the cases rise!", Luísa used a simple narrative in three panels, effectively conveying information with minimal ambiguity.



Fig. 07: Às terças os casos aumentam (On Tuesdays the cases rise!), Marta Carrelhas, 2024

Marta Carrelhas

Also for "On Tuesdays the Cases Increase", Marta created a conventional sequential narrative without panel frames, emphasizing manual drawing and fluid line work.



Fig. 08: *À terça os casos aumentam* (On Tuesdays the cases rise!), Sara Duarte, 2024

Sara Duarte

Again for "On Tuesdays the cases rise!" subject, Sara designed a poster with expressive composition and character prominence, blending elements for clear linear reading.

VALIDATION AND FEEDBACK

Once the workshop was over, a discussion was held based on the following questions:

- What were the main challenges faced while developing the Data Comic?
- What data sources were used for COVID-19 communication information?
- What was the process like for transforming quantitative data into a visual narrative?
- Does the contribution clearly communicate information about COVID-19 communication?
- What visual elements are most effective in conveying the message of your poster?
- Are Data Comics an effective tool for science communication?

IN SUMMARY OF STUDENT RESPONSES:

- The responses were unanimous in considering as the main challenge the creation of a clear visual narrative that accurately translated COVID-19 data while being engaging and appealing.
- The participants used mainly the official website of the Direção Geral de Saúde (Directorate-General for Health) for research.
- The process involved selecting data to be included in the narrative and defining visual elements that could symbolize the data and the reality at the time.
- Data Comics were considered effective tools for science communication, as they create empathy and help the population relate better to the information presented. charts that provided a more reliable analysis of trends, but these were often ignored by the media, which preferred to create their own, less informative charts (see figure 2).

OUTPUTS AND PUBLIC EXHIBITION

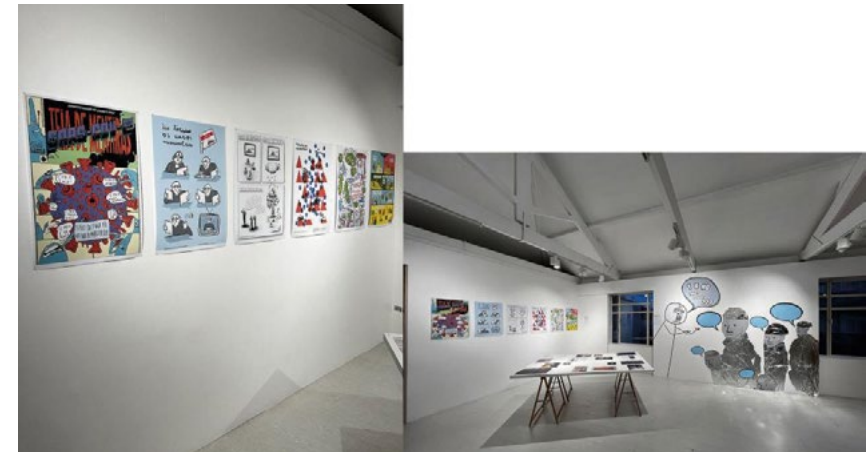


Fig. 09: View from the exhibition "o_U: an exhibition of meme symptoms and side effects", 2024

A public exhibition titled "o_U: an exhibition of meme symptoms and side effects" was held at Maus Hábitos gallery, in Porto, Portugal, between the 7th and 31st of March 2024. This exhibition tested the viability of online-offline support in the subjective approach to public health policies, particularly in the face of growing misinformation phenomena. It explored possibilities of merging formal rhetoric with expressive content circulation and included the aforementioned student work along with various other pieces of diverse provenance along the overarching project.

Following the exhibition, a second instance of validation involving external analysis and feedback was conducted on May 25, 2024. This instance, a focus group, consisted of four individuals with no prior exposure to the project: two young participants aged 11 and 13, a communication sciences undergraduate student, and a preparatory schoolteacher. The outputs were presented, and the participants were prompted with various questions, such as how they read each Data Comic, whether they considered the message to be effective, the credibility of such media and their preferences in communicating health-related information. The session lasted two hours and was led by five project researchers.

The six outcomes of the workshop were presented in printed form. Of the three issues addressed, the one with three prototypes was the most discussed: the widely disseminated, equivocal news piece that argued COVID-19 surged on Tuesdays (Figures 6, 7 8). Of the three outputs, the most formally neutral, detailed, and informative was chosen as the most effective (Figure 6): to an extent, this preference contradicts the expectation that a subjective component could initiate a process of trust; however, aesthetic components were acknowledged as potentially decisive in involving demographics whose tastes might coincide.

Overall Data comics were acknowledged as a format with clear advantages and adding a storytelling component, seemed attractive by all present.

Some considerations emerged throughout the session that pointed towards future exploratory developments, such as:

- The need to customize content and aesthetics according to age groups and distinct demographics, contextual customization might be key as well.
- Humor and irony should be employed with caution, as they could easily be the root cause of equivocate, even opposite, interpretations - and consequently, further instances of misinformation.
- The contextual vocation of each print-out was addressed: two were acknowledged as potentially more effective in a health center waiting room (see Figures 4 and 6), whereas one was deemed as potentially more effective as an outdoor ad (see Figure 5); one prototype, whose aesthetic clearly mimics a comic book cover (see Figure 3), was regarded as a potential starting point for the actual production of a comic book - or at the very least a conversation starter in a classroom environment, employing aesthetics compatible with young students' own interests.
- The potential for articulation with online and cultural trends at a given moment was equally noted; given contemporary culture's current accelerated pace, there would be a need for a constant renovation of semantic and semiotic repertoires in content production, through consultation with specialized segments of the population.



Fig. 10: Poster of the exhibition, “o_U: an exhibition of meme symptoms and side effects”, 2024



Fig. 11: Image taken at the focus group, 2024. Source: Cláudia Lima

CONCLUSION

The results of the workshops were satisfactory, prompting the integration of Data Comics development into the curriculum for the Master's program in Illustration, Editing, and Print. This addition is seen as a valuable enhancement, providing students with the ability to visualize information, which is a critical tool for strategic research opportunities.

Data comics have revealed significant promise as a design format towards improving the communication of scientific information and supporting behavioral pedagogy. Positive feedback emerged from the creative workshops with design and illustration students, as well as from the initial validation by the focus group that included young social media users and education professionals. Despite these encouraging early outcomes, further prototypes must be developed and subjected to additional validation. The present conclusions are preliminary, as they are based on six prototypes, each addressing only a portion of the wide range of possibilities that data comics may come to offer.

Future validation should involve larger and more diverse groups of participants in order to ensure comprehensive feedback. This includes considering different age ranges and literacy levels. Additionally, the settings for presenting these prototypes should be diversified in order to assess their effectiveness in different real-world contexts. For instance, presenting data comics in health centers and train station platforms, as suggested by a participant in one of the validation sessions, could provide valuable insights into their applicability and impact.

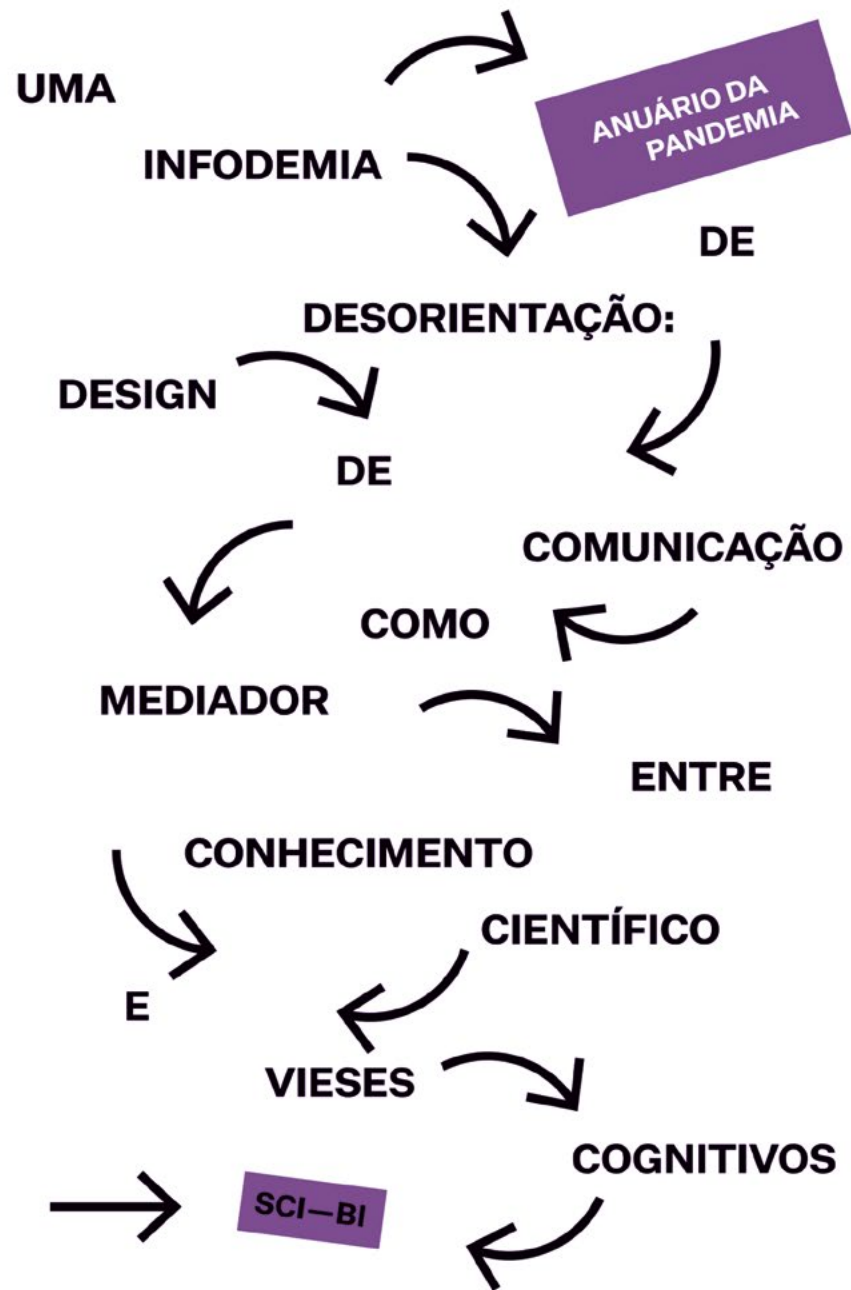
Expanding the scope of validation will help refine the design and application of data comics, ensuring they effectively bridge the gap between complex scientific information and public understanding. This approach not only enhances the educational experience for design students: it contributes to the broader and increasingly urgent goal of improving public health communication and combating misinformation.

REFERENCES

- Alvelos, H., Pereira, J.B., Chatterjee, A., Barreto, S., Veiga, P.A., Lima, C., & Penedos-Santiago (2024). *When in Memeland, Speak in Memes: Contributions of Design Towards the Betterment of Online Behavior Regarding Public Health*. In: Martins, N., Brandão, D. (eds) *Advances in Design and Digital Communication IV. DIGICOM 2023*. Springer Series in Design and Innovation, vol 35. Springer, Cham. https://doi.org/10.1007/978-3-031-47281-7_39
- Bach, B., Stefaner, D., Boy, J., Drucker, S., Bartram, L., Wood, J., Ciuccarelli, P., Engelhardt, Y., Köppen, U., & Tversky, B. (2018). *Narrative Design Patterns for Data-Driven Storytelling*. In N. Riche, C. Hurter, N. Diakopoulos, & S. Carpendale (Eds.), *Data-Driven Storytelling* (pp. 107-133). CRC Press (Taylor & Francis). <https://doi.org/10.1201/9781315281575-5>
- Bertin, J. (2011). *Semiology of Graphics: Diagrams, Networks, Maps*. ERSI Press.
- Carmo, C. (2020, April 2). "Ganhámos a primeira batalha." Marcelo enumera quatro fases do combate na saúde. *TSF Rádio Notícias*. Retrieved from <https://www.tsf.pt/portugal/politica/ganhamos-a-primeira-batalha-marcelo-enumera-quatro-fases-do-combate-na-saude-12024084.html>

- DiResta, R. (2023, 18 May). 154: The Truth Wars [Audio podcast episode]. In *Conspirituality*. Conspirituality podcast. <https://www.conspirituality.net/episodes/154-the-truth-wars-renee-diresta>
- Gershon, N.; Page, W. (2001). *What storytelling can do for information visualization*. *Commun. ACM*, 44(8): 31–37.
- Goel, V. (2022). *Reason and Less: Pursuing Food, Sex, and Politics*. Cambridge, MA: MIT Press.
- Kosara, R. and Mackinlay, J. "Storytelling: The Next Step for Visualization," in *Computer*, vol. 46, no. 5, pp. 44–50, May 2013, doi: 10.1109/MC.2013.36
- Kostadinovska-Stojchevska, Biserka & Shalevska, Elena (2018). *Internet Memes and their Socio-Linguistic Features*. *European Journal of Literature, Language and Linguistics Studies*, 2(4). <https://doi.org/10.5281/zenodo.1460989>
- Lima, C., Barreto, S., & Alvelos, H. (2024). *Traversing the Infodemic: Analyzing Communication Practices and Strategies in Portuguese Media During and After the Covid-19 Pandemic*. *Book of Abstracts of Design4Health 2024 Conference*. Sheffield.
- Lima, M. (2011). *Visual Complexity, Mapping Patterns of Information*. Princeton Architectural Press.
- Maia, A., & Ferreira, R. (2020, April 8). *Covid-19: o pico em Portugal já pode ter passado. E isso não traz só boas notícias*. *Publico*. Retrieved from <https://www.publico.pt/2020/04/08/sociedade/noticia/covid19-pico-ja-passado-nao-traz-so-boas-noticias-1911432>
- Malta, J. C. (2020, April 3). *Pico de Covid-19 em abril ou maio? Se cumprissemos todas as medidas "seria em duas a três semanas"*. *Renasceça*. Retrieved from <https://rr.sapo.pt/especial/pais/2020/04/03/pico-de-covid-19-em-abril-ou-maio-se-cumprissemos-todas-as-medidas-seria-em-duas-a-tres-semanas/187778/> (accessed on September 28, 2023)
- Ortiz-Sánchez, E.; Velando-Soriano, A.; Pradas-Hernández, L.; Vargas-Román, K.; Gómez-Urquiza, J.L.; Cañadas-De la Fuente, G.A.; Albendín-García, L. *Analysis of the Anti-Vaccine Movement in Social Networks: A Systematic Review*. *Int. J. Environ. Res. Public Health*, 17, 5394 (2020). <https://doi.org/10.3390/ijerph17155394>
- Raballo, A., Poletti, M., & Preti, A. (2022). *Vaccine Hesitancy, Anti-Vax, COVID-Conspiracy: From Subcultural Convergence to Public Health and Bioethical Problems*. *Frontiers in Public Health*, 10, 877490. <https://doi.org/10.3389/fpubh.2022.877490>
- Segel, E. and Heer, J. "Narrative Visualization: Telling Stories with Data," in *IEEE Transactions on Visualization and Computer Graphics*, vol. 16, no. 6, pp. 1139–1148, Nov.-Dec. 2010, doi:10.1109/TVCG.2010.179
- SNS — Serviço Nacional de Saúde (2020). *Direção-Geral da Saúde*. Retrieved from <https://www.sns.gov.pt/entidades-de-saude/direcao-geral-da-saude/> (accessed on September 12, 2023)
- Tufte, E. (1983). *The visual display of quantitative information*. Graphics Press LLC.
- TVI Notícias (2020a, March 27). *Covid-19: "Pico será diferido para mais tarde, nunca antes do mês de maio"*. *TVI Notícias*. Retrieved from <https://tvi.iol.pt/noticias/videos/covid-19-pico-sera-diferido-para-mais-tarde-nunca-antes-do-mes-de-maio/5e7dfe00cf2d5f7c67b8989> (accessed on September 28, 2023)
- TVI Notícias (2020b, March 28). *"Incidência máxima da infeção estará adiada para o final de maio"*. *TVI Notícias*. Retrieved from <https://tvi.iol.pt/noticias/videos/incidencia-maxima-da-infecao-estara-adiada-para-o-final-de-maio/5e7f4be40cf2f02ca42e7375> (accessed on September 28, 2023)
- TVI & José Alberto Carvalho. (2021). *Jornal das 8*. Aired on February 3, 2021.
- Wurman, R. S. (2000). *Information Anxiety 2* (2^o ed.). Que.

JÚLIO DOLBETH
CLÁUDIA RAQUEL LIMA
MARTA FERNANDES
HEITOR ALVELOS

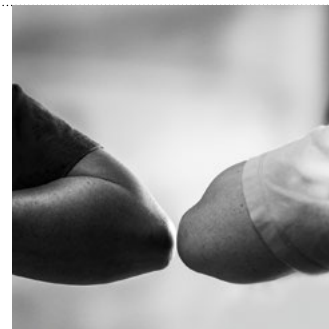
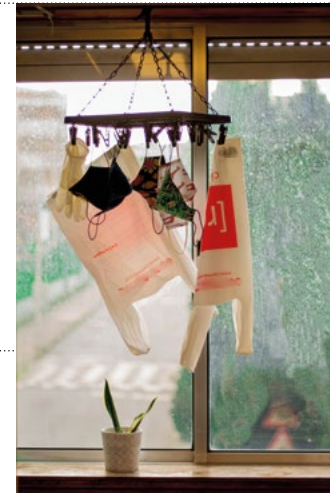
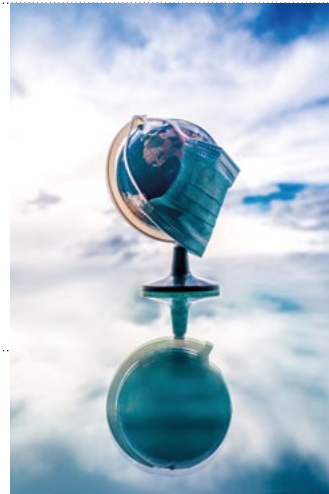


O ESTUDO DE CASO DE PORTUGAL ANTES, DURANTE E APÓS A PANDEMIA

MDI WORKSHOP PANDEMIC YEARBOOK

In February 2024, students from the Master's Degree in Image Design (MDI) at the *Faculty of Fine Arts, University of Porto* took part in a photographic workshop with the aim of creating a photograph that synthesised and conveyed their individual experiences during the lockdown. 'Pandemic Yearbook' is the title of the publication that brings together the documentary and evocative photographs taken by the participants. The publication was developed and produced by the following students from the MDI Project Curricular Unit: André Soares, António Venda Lopes, Ariana Rossel, Filipe Afonso, Guilherme Pinto, Jaime Pena, Joana Almeida, José Tulio, Júlia Menezes, Maria A. Torres, Mariane Rubinato, Mário Castro, Mayana Alvarenga, Paula Kawakami and Pedro Campos.





Mario_Castro.jpg

Ariana_Rossel.jpg

André_Santos.jpg

Júlia_Menezes.jpg

Pedro_Campos.jpg

Paula_Kawakami.jpg

Filipe_Afonso.jpg

Mayana_Alvarenga.jpg
Guilherme_Pinto.jpg

Mariane_Rubinato.jpg

Maria_Torres.jpg
Jose_Tulio.jpg

Jaime_Pena.jpg

Joana_Almeida.jpg
António_Venda_Lopes.jpg

JOSÉ CARNEIRO



DESIGN AGAINST DISFORMATION EXHIBITION

In April-May 2024, an exhibition was held at UPTEC Baixa, the creative industries site of the U.Porto business incubator. A more sensorial approach involving projections and 3-D effects, the exhibition grew progressively to incorporate pieces produced by the visitors throughout.

DESIGNING AGAINST DISINFORMATION

*Exhibition for the project
"An Infodemic of Disorientation"*

In the present exhibition, SCI-BI Team invites us to consider one of the greatest challenges that scientific knowledge faces today: the dissolution of objective knowledge through ideological agendas and mediations that shape reality based on ideological agendas and individual subjectivities.

This challenge is accentuated by the fact that scientific and political authorities have been intensifying their rhetoric according to an increasingly ineffective model of factual communication.

We posit that Communication Design can and should propose alternative ways of approaching scientific knowledge, in order to build dialogues with those who doubt it: because only by learning and employing the language of the "other" can we hope to reach them.

22.04

WORKSHOP 17H00

EXPOSITION 16H30

TALK 02.05 17H00

22.04 -10.05

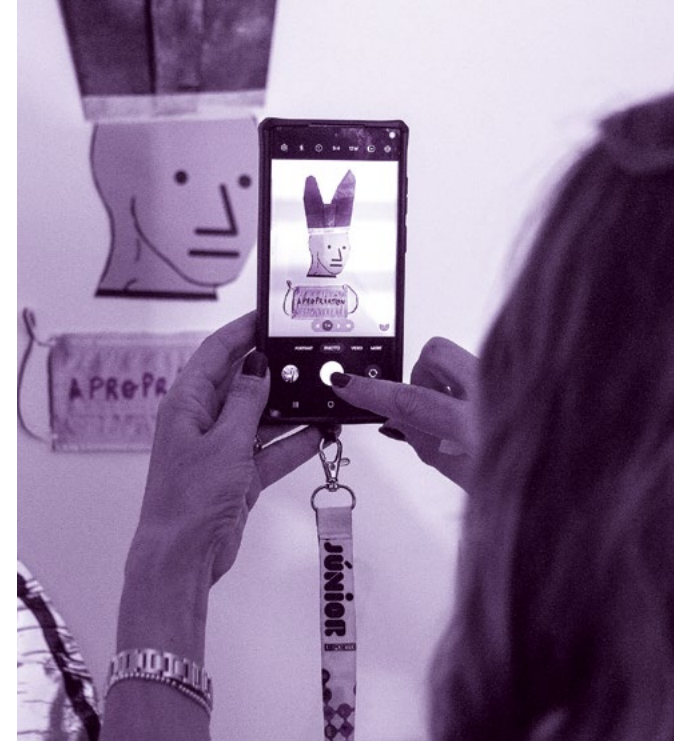
UPTEC

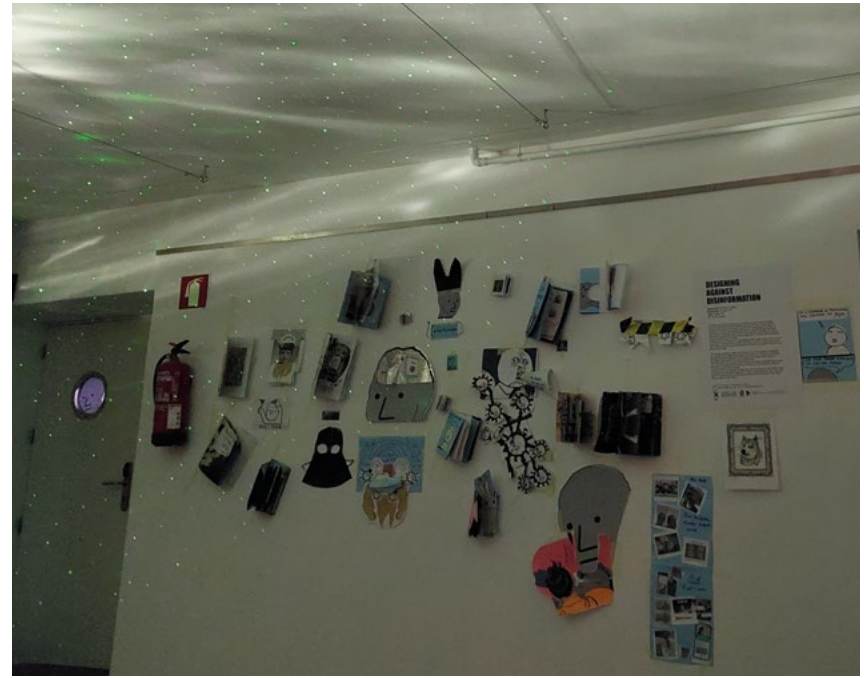
ALL THE SCIENCE

FCT

Fundação para a Ciência e a Tecnologia

DESIGNING AGAINST DISINFORMATION @UPTEC BAIXA



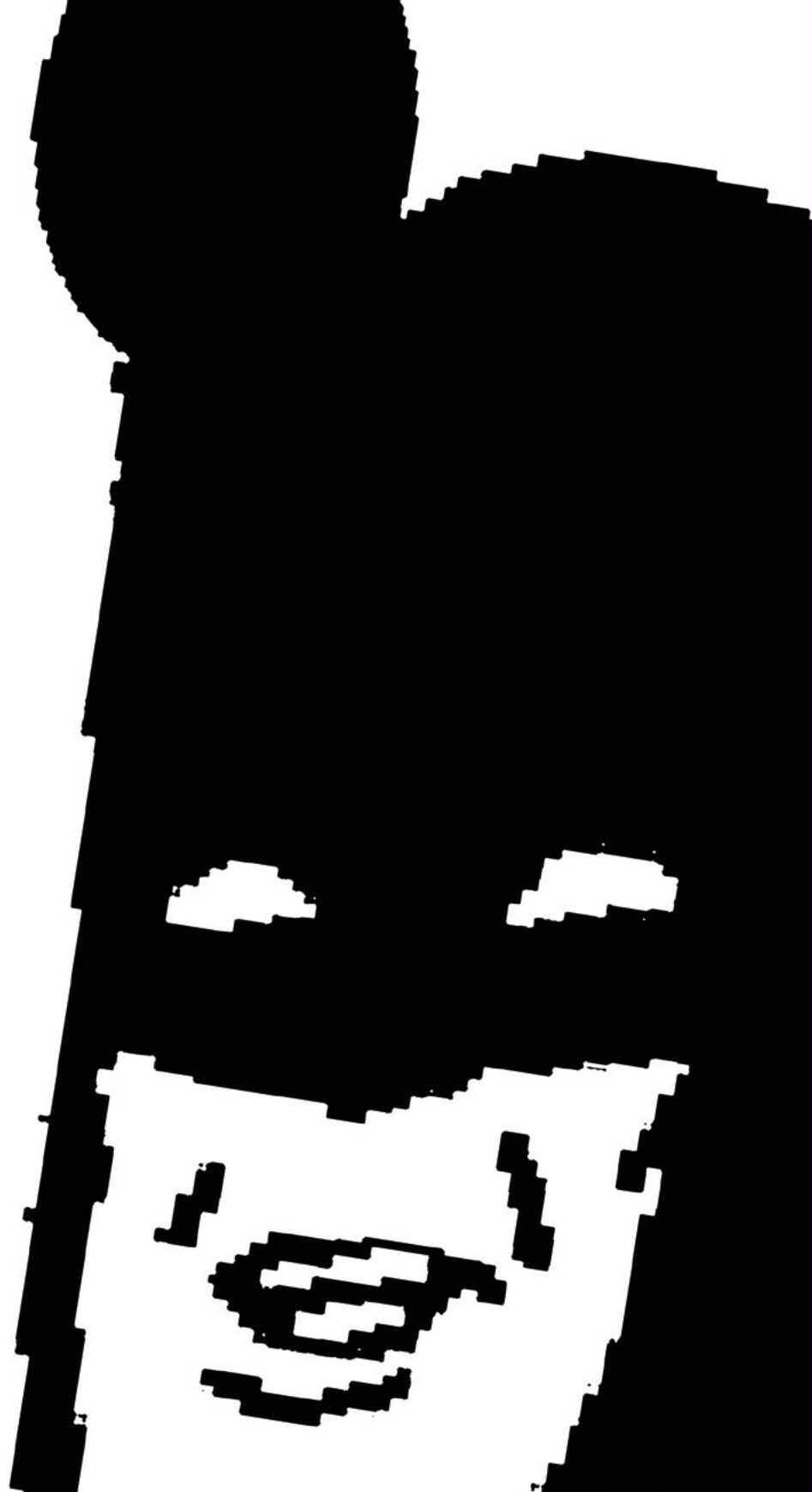




$$V = \frac{1}{3} \pi r^2 h$$



OOOH, QUANTIC S^WPT
OR SOMETHING



O_U AN EXHIBITION OF MEME SYMPTOMS AND SIDE EFFECTS

In March 2024, an exhibition of a range of project outputs was held at Maus Hábitos, a cultural venue in downtown Porto. The aim was to gather feedback from broader crowds associated with cosmopolitan culture.

0_U

An exhibition of meme symptoms and side effects

'o_U: an exhibition of meme symptoms and side effects' é uma exposição integrada no projeto exploratório FCT 'Uma Infodemia de Desorientação: design de comunicação como mediador entre conhecimento científico e vieses cognitivos' (ID+_LUME, 2022-24).

A exposição testa a viabilidade de suportes online_offline na abordagem subjectiva de políticas públicas de saúde, nomeadamente face a crescentes fenómenos de desinformação. Explora-se possibilidades de diluição e aproximação entre retórica formal e circulação expressiva de conteúdos, através de peças expostas:

- **Y U No Trust Science?** é a extensão material de conversas online que colocam regularmente em confronto defensores do conhecimento científico e subscritores de ideologias obscuras, terapias alternativas e teorias conspirativas; os balões em branco das personagens protegidas dos "efeitos 5-G" estão prontos a receber contributos dos visitantes.
- **Consuming Confinement** recorda o pânico eufórico que se instalou antes e durante a pandemia COVID-19, nomeadamente nos momentos de confinamento obrigatório, as corridas ao supermercado para encher a despensa de "bens essenciais", dando entretanto lugar às entregas em casa de compras online. Como alguém disse algures, "there was no confinement: there were only rich people hiding while poor people brought them things". No final de contas, a retórica também foi, e é, um produto embalável, um conjunto de slogans que se digere por omnipresença, tal como as marcas.
- **A Cute Kitten Dies** é uma selecção de memes produzidos no âmbito do projecto via imgflip: impressos como bandeiras, assinalam a gradual dissolução da linearidade de políticas de saúde num fenómeno crescente de alucinação online com forte componente ideológica. Perguntamos se o humor poderá contribuir para a desmontagem destes estranhos debates situados entre o fluxo de consciência e a compulsão pavloviana de derivar prazer através do confronto.
- **Sobem à Terça** é uma série de seis "data comics" produzidos em ambiente de workshop curricular, testando a viabilidade de o design e a ilustração traduzirem informação complexa de formas acessíveis ao público em geral. Trata-se de um contraponto à crescente profusão de gráficos estatísticos, os quais, alimentando-se da percepção de rigor absoluto, representam parcialmente as realidades e são frequentemente ilegíveis por sectores consideráveis das audiências. Os "data comics" foram desenvolvidos por estudantes do Mestrado em Ilustração, Edição e Impressão da FBAUP: António Amaro, Marta Carrelhas, Luísa Silva, Luísa Portugal, Sara Duarte e Guilherme Festas.

HEITOR ALVELOS
SUSANA BARRETO
JÚLIO DOLBETH
MARTA FERNANDES
CLÁUDIA RAQUEL LIMA
JOSÉ CARNEIRO
RUI VITORINO SANTOS
ELIANA PENEDOS-SANTIAGO

Maus Hábitos - Espaço de Intervenção Cultural
 SALA DE EXPOSIÇÕES | EXHIBITION ROOM
 Rua Passos Manuel 178
 4ºAndar/4th Floor

DOI 10.54499/2022.08322.PTDC
 saccoazul.org

Saco Azul

Inauguração/Opening 07.03 - 18h30

07.03—31.03



Sci-Bi
**o_U: an exhibition of
 meme symptoms
 and side effects**

Ciclo ISM - Impacto Social Mínimo

PARCEIROS:

U PORTO | IDCA | ESCOLA SUPERIOR DE DESIGN | UN | CIAC | fct | D | UPTEC | SCI-BI

APPOC | bh









FANZINES WORKSHOP

In April 2024, a hands-on workshop was held at UPTec Baixa, exploring the fanzine as a medium for conveying scientific knowledge and behaviour. With a rich history as a counter-cultural medium, the fanzine might congregate and activate what is otherwise a degree of hermeticism present in online media. Furthermore, outcomes from the Data Comics workshop already pointed out in this direction. The workshop benefited from the spontaneous visit of an international network of business-related stakeholders: once briefed, a significant number of these accepted the challenge to participate in the production of fanzines. The following pages include samples of the outcomes.

DESIGNING AGAINST DISINFORMATION

*Workshop for the project
"An Infodemic of Disorientation"*

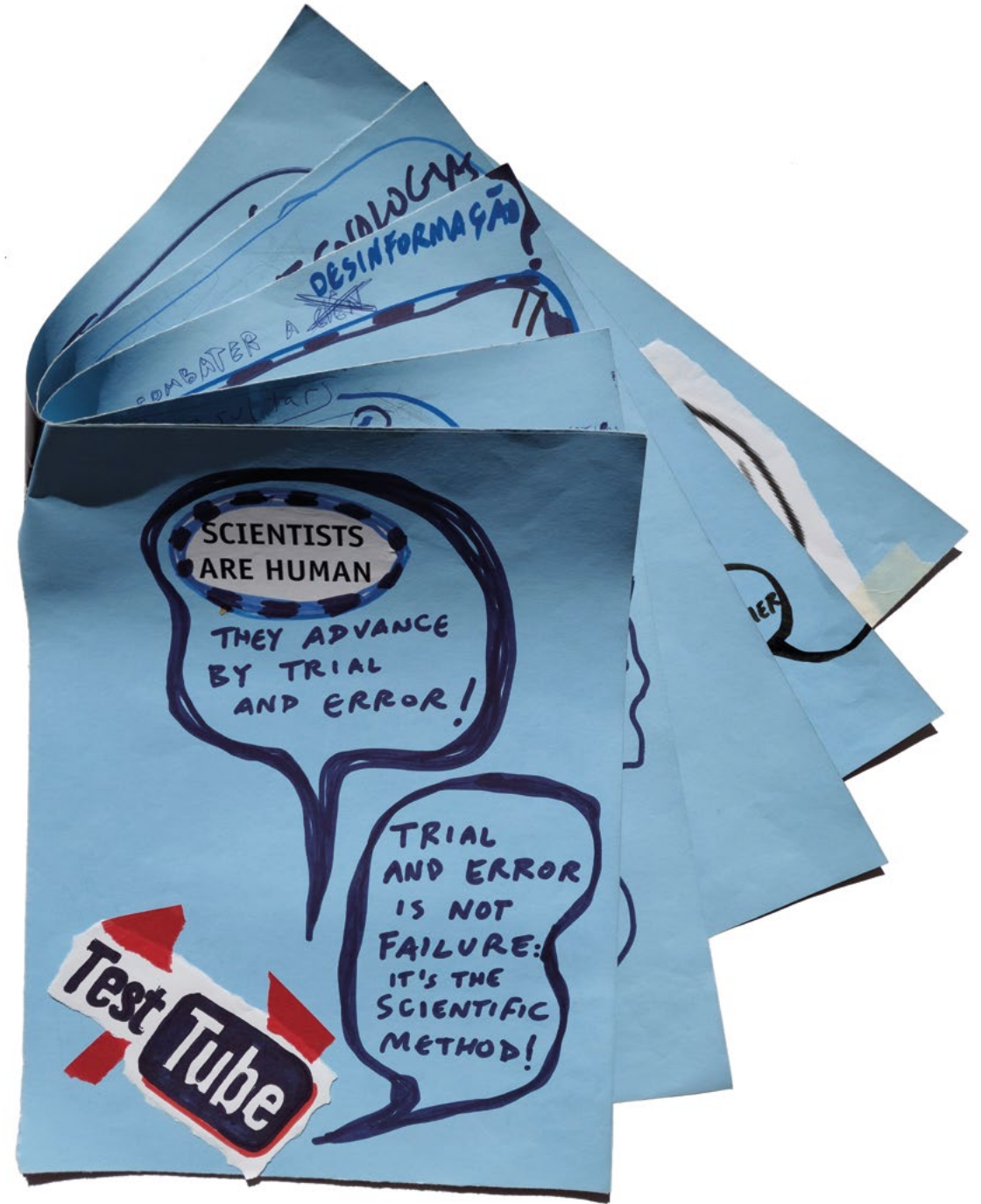
Production of fanzines to combat disinformation, using remnants from three previous exhibitions of the Sci-Bi project as source material.

This workshop invites us to consider one of the greatest challenges that scientific knowledge faces today: the dissolution of objective knowledge through ideological agendas and mediations that shape reality based on ideological agendas and individual subjectivities.

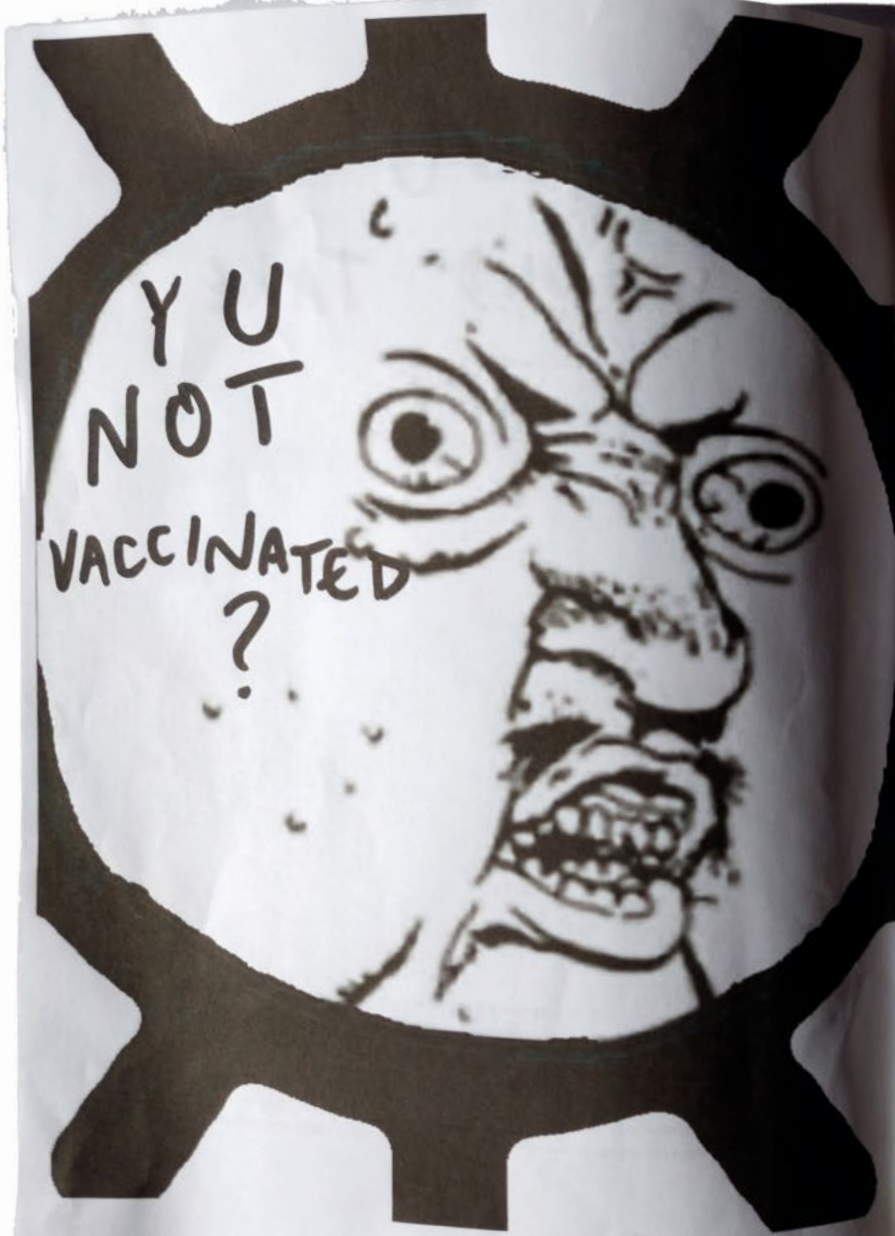
This challenge is accentuated by the fact that scientific and political authorities have been intensifying their rhetoric according to an increasingly ineffective model of factual communication.

We posit that Communication Design can and should propose alternative ways of approaching scientific knowledge, in order to build dialogues with those who doubt it: because only by learning and employing the language of the "other" can we hope to reach them.













Artigo 7.º

Regime excepcional em aquisição de serviços

A celebração de contratos de aquisição de serviços por parte dos órgãos, organismos, serviços e demais entidades, incluindo o setor público empresarial, do Ministério da Saúde, da DGRSP, do INMLCF, I. P., do HFAR, do LMPQF e do IASFA, I. P., é autorizada pelo dirigente máximo ou órgão máximo de gestão, sendo posteriormente comunicada aos membros do Governo responsáveis pelas áreas da saúde e da justiça, respetivamente.

Artigo 8.º

Extensão do âmbito de aplicação do Decreto-Lei n.º 62/79, de 30 de março

É aplicável, com as necessárias adaptações, o regime previsto no artigo 9.º do Decreto-Lei n.º 62/79, de 30 de março, na sua redação atual, aos profissionais do setor da saúde diretamente envolvidos no diagnóstico e resposta laboratorial especializada, rápida e integrada, em situações de casos, surtos e outras emergências de saúde pública nas situações referentes à epidemia SARS-CoV-2 que possam constituir um risco para a saúde pública, tendo em vista assegurar a capacidade de resposta rápida e atempada a tais situações bem como a disponibilidade permanente dos trabalhadores.

CAPÍTULO IV

Suspensão de atividade letivas e não letivas

Artigo 9.º

Suspensão de atividade letivas e não letivas e formativas

- 1 — Ficam suspensas as atividades letivas e não letivas e formativas com presença de estudantes em estabelecimentos de ensino públicos, particulares e cooperativos e do setor social e solidário de educação pré-escolar, básica, secundária e superior e em equipamentos sociais de apoio à primeira infância ou deficiência, bem como nos centros de formação de gestão direta ou participada da rede do Instituto do Emprego e Formação Profissional, I. P.
- 2 — Ficam igualmente suspensas as atividades de apoio social desenvolvidas em Centro de Atividades Ocupacionais, Centro de Dia e Centro de Atividades de Tempos Livres.
- 3 — A suspensão prevista nos números anteriores inicia-se no dia 16 de março de 2020 e é reavaliada no dia 9 de abril de 2020, podendo ser prorrogada após reavaliação.
- 4 — Os agrupamentos de escolas e escolas não agrupadas da rede pública de ensino e os estabelecimentos particulares, cooperativos e do setor social e solidário com financiamento público adotam as medidas necessárias para a prestação de apoios alimentares a alunos beneficiários do escalão A da ação social escolar e, sempre que necessário, as medidas de apoio aos alunos das unidades especializadas que foram integradas nos centros de apoio à aprendizagem e cuja permanência na escola seja considerada indispensável.
- 5 — Sem prejuízo da aplicação do disposto nos números anteriores aos equipamentos sociais da área da deficiência, designadamente das respostas de Centros de Atividades Ocupacionais e das Equipas Locais de Intervenção Precoce, estes equipamentos devem assegurar apoio alimentar aos seus utentes em situação de carência económica.
- 6 — Na formação profissional obrigatória ou certificada, nomeadamente a referente ao acesso e exercício profissionais, a atividade formativa presencial pode ser excepcionalmente substituída por formação à distância, quando tal for possível e estiverem reunidas condições para o efeito, com as devidas adaptações e flexibilização dos respetivos requisitos, mediante autorização da entidade competente.
- 7 — Ficam excecionadas do disposto no n.º 1 as respostas de Lar Residencial e Residência Autónoma.





INFORMAÇÃO VA
VACCINATION INFO

DOENÇA OU AGENTE / DISEASE
COVID-19

PRODUTO MÉDICO VACINAL / VACCINE
Comirnaty

TITULAR DA AUTORIZAÇÃO DE INTRODUÇÃO
VACCINE MARKETING AUTHORISATION HOLDER
BioNTech Manufacturing GmbH

NÚMERO DA DOSE ADMINISTRADA E NÚMERO TOTAL
NUMBER IN A SERIES OF VACCINATIONS / DOSES ADMIN
2/2

DATA DE VACINAÇÃO / DATE OF VACCINATION

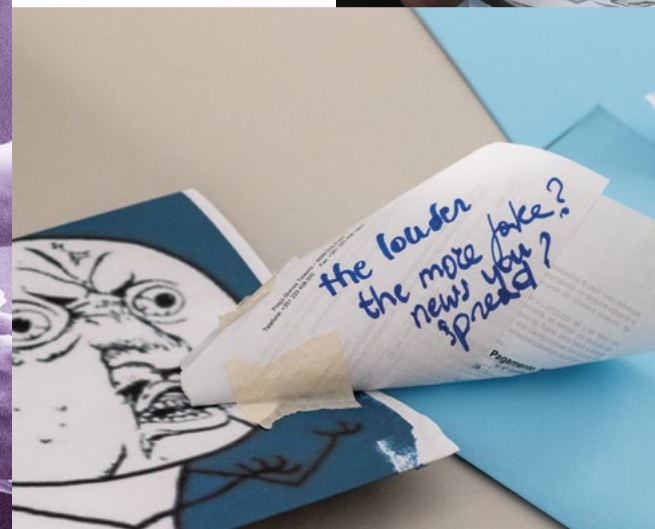
METADADOS DO CERTIFICADO
CERTIFICATE METADATA

ENTIDADE EMISSORA / CERTIFICATE ISSUER
Ministério da Saúde

IDENTIFICADOR ÚNICO DO CERTIFICADO (UNCI) / UNIQUE CERTIFICATE

Para mais informação consulte <https://recopen.europa>

FOR FACTS
SEARCHING
THE



**HEITOR ALVELOS
SUSANA BARRETO
JÚLIO DOLBETH
JOSÉ CARNEIRO
RUI VITORINO SANTOS**

OS DILEMAS QUOTIDIANOS DOS CIENTISTAS EXPOSIÇÃO

@ i3s

12 JULHO
- SETEMBRO
2024



SCI-BI fct
10.54499/
2022.08322.
PTDC
Fundação
para a Ciência
e a Tecnologia

i3s
UPTEC
UNIVERSIDADE DE PORTO
FACULDADE DE CIÊNCIAS
UNIVERSIDADE DE PORTO
FACULDADE DE CIÊNCIAS
RESEARCH
INSTITUTE FOR
DESIGN, MEDIA
AND CULTURE

THE DAILY STRUGGLES OF SCIENTISTS

In July 2024, an exhibition was held at i3s, Research Institute in Innovation and Health. It presented a single meme unpacked by a multitude of local researchers, in order to reflect their own dilemmas. The aim was to build bridges between the austere semblance of scientific communication, and the seemingly playful looks of online culture. The following pages include samples of the outcomes.

OS DILEMAS QUOTIDIANOS DOS CIENTISTAS

A Design Approach in Higher Education.

Esta exposição exprime visualmente duas sessões nas quais investigadores do i3s foram convidados a inscrever dilemas que enfrentam no seu quotidiano profissional. O uso do meme “Two Buttons”, muito popular nas redes sociais, serviu como âncora visual e metafórica constante, percorrendo todas as reflexões individuais.

Procuramos deste modo ensaiar intuitivamente uma futura articulação entre retóricas formais de comunicação científica, e estéticas reconhecíveis / testemunhos acessíveis; espera-se que esta “humanização do investigador” venha a beneficiar públicos e pacientes hoje pouco receptivos aos modos habituais de fazer e falar de ciência, ao ponto de a rejeitarem em favor de discursos e fenómenos de pseudociência e anti-ciência, crescentemente hostis e preocupantes.

Coordenação e concepção: Heitor Alvelos

Produção: Susana Barreto, Rui Vitorino Santos, Eliana Penedos-Santiago

Coordenação dos focus groups: Marta Fernandes

Coordenação i3s: Anabela Nunes, Júlio Borlido Santos

Coordenação UPTEC: André Forte

Design Gráfico: Heitor Alvelos

Uma produção LUME - Unexpected Media Lab

@ ID+, Instituto de Investigação em Design, Media e Cultura



① Usar ou não animais em testes
pré-clínicos.

Tomar um(a)
medicamento(s) que não
foi testado(s)
em animais

Tomar um
medicamento
a spite de não
ter sido em animais

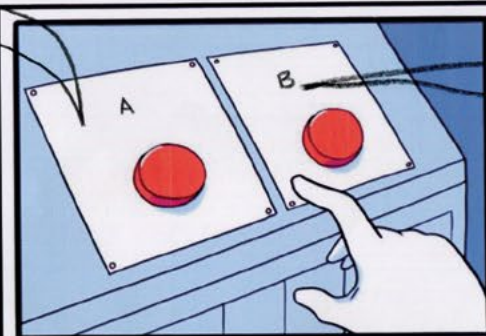


Provar um resultado que pode ser usado para o bem
mas também para o mal



A - Falar abertamente sobre Experimentação animal para o público em geral

B - Continuar a encostar o uso de animais na ciência como um assunto tabu.



JAKE-CLARK-TUMBLR

1) apresentar resultados em gráfico ~~sem~~ com bandas sem pontos experimentais (que aparente maior diferença entre os resultados)

2) apresentar resultados gráficos com todos os pontos experimentais que revelam dispersão e variabilidade inerente às amostras / experiências.



JAKE-CLARK-TUMBLR

O conhecimento é criado e validado pela comunidade científica e clínica

Os doentes escolhem porque podem, ignorar esse conhecimento científico.



EDUCAÇÃO / EMPREGO
CONHECIMENTO / RISCO FINANCEIROS
POBRES / (CUSTOS AUMENTADOS)
RICHES / (CUSTOS DA SUA APLICABILIDADE
CITADIADE
(= diminuição de diversidade)



A. Não colocar referências a estudos anteriores

B. ~~Esses~~ referenciar ~~de~~ estudos que usam "prisioneiros" como cobaias (estudos com práticas éticas ~~para~~ questionáveis)



Comunicar com o público em geral com certeza ou anunciando as permanentes dúvidas



Como lidar com um resultado negativo?

- ① Repetir infinitamente e ser bicas ...
- ② Aceitar que a nossa hipótese não está certa ...



Usar IA ou não usar IA



DESIGNING TOWARDS A RECONCILIATION BETWEEN TRADITIONAL AND ONLINE MEDIA

The present article proposes a reconsideration of the translation of complex, health-related information to broader publics in light of recent developments in design and digital media. The core case study is the COVID-19 pandemic in Portugal, both in its official televised coverage, and the simultaneous, chaotic content in online social media: we argue for a dynamic, reciprocal activation of these two contexts, bridging a chasm that might currently be perversely contributive to the exponential rise in disinformation.

The article primarily focuses on a series of exploratory workshops with BA Design students from five Portuguese universities and Arts/Media conference delegates, involving both formal design skills and aesthetic/semantic online dexterity. This was done in the context of the research project SCI-Bi, whose aims include testing online channels and semantics towards a more reliable health policy adoption.

The workshop briefings were substantiated by ongoing interviews with science skeptics, television presenters and statisticians, the analysis of news coverage by Portuguese mainstream media, and empirical knowledge of social media by the research team.

The common hypothesis was that complex health-related information normally disseminated via official channels can incorporate the presence of crucial subjective elements in the cognitive process - i.e, the fact that untangling disinformation is largely ineffective if it occurs strictly through logical, fact-based refutation.

The workshops thus explored possibilities for reliable health crisis-related information and behavioral policies in online social media. Participants were invited to produce memes, reels, data comics and infographics, as well as reverting their outcomes to physical outputs. During the workshops, moments of reflection and debate addressed the efficacy of communication practices, contradictory information in televised news, and instances of incorrect interpretation of statistical data.

The outcomes were diverse, partly according to the media employed in each workshop and the respective graphic and conceptual languages (meme, reels, data comic, infographic); the stage of the research project and level of information collected was equally a factor.

The first workshop, carried out at an initial stage of the research, and involved the development of memes and reels. The outputs were largely intuitive, and were generally critical of the situations that occurred during the pandemic, exploiting stylistic resources such as irony, parody, satire and hyperbole, very much in line with the pervasive graphic languages of social media.

The infographics workshop, held at a later stage, proposed to translate complex data into accessible graphics, and was informed by statistical data and information obtained from prior interviews. Various students remained critical, parodying observed instances of disinformation, while others sought to clarify key aspects linked to safe behaviour and forms of prevention. The approach was informative and didactic (Figure 1).

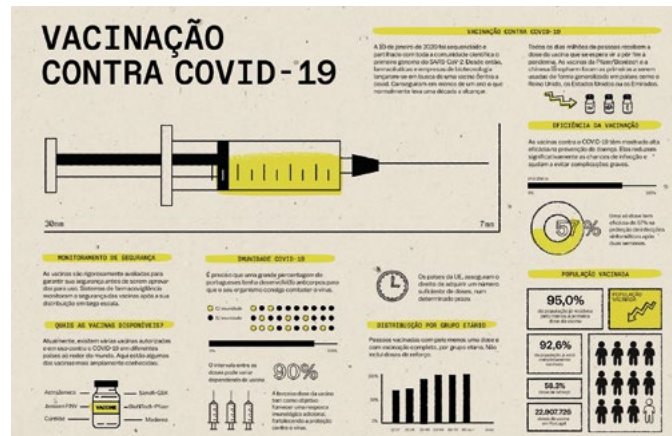


Fig. 01 Informative infographic on Covid-19 vaccination by Patricia Ramos, 2023.

The workshop on data comics was carried out one year into the project, and gathered information regarding the analysis of news content by Portuguese mainstream media during the pandemic. The workshop focused specifically on news content disseminated unclearly or inaccurately, essentially due to an incorrect translation of data. The workshop thus took on a more pedagogical approach to data comics, prioritising presentation and clarification of the correct ways of reading and interpreting statistical data and graphics.

During workshop discussions, it became evident that even though scientific sources and governmental communication often employ visual insights, mainly data infographics, a generic translation, as well as a strictly quantitative discourse devoid of context, were often met with various forms of undesired dissociation from official news and information channels.

Overall, the workshops pointed towards a pressing need for an increase in levels of media and content literacy, showcasing consequences of frequent quantitative generalisation.

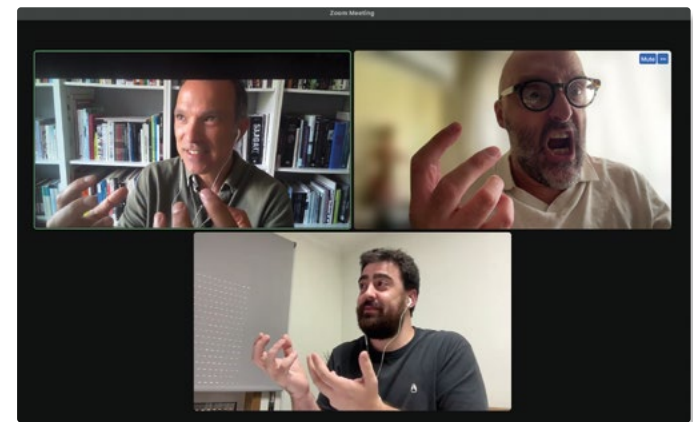
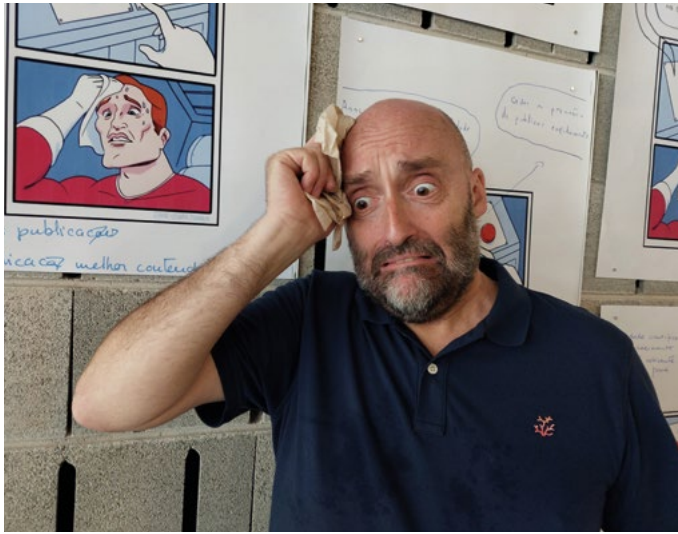
Although calls for data humanism are not new, they were seldom applied during the pandemic, highlighting a frequent absence of design input in the visual culture that populates news media. This converges with an apparent disinterest or inability to integrate rapidly shifting aesthetics and semantics of online media, with potential societal implications. The outcomes of the various workshops ultimately intend to contribute to overcoming this mutual alienation.

MARTA FERNANDES
HEITOR ALVELOS
CLÁUDIA RAQUEL LIMA



SELFIE MUSEUM

The Sci-bi team self-documented throughout the project, as an exercise of self-ethnography regarding the components and assets of individual protagonism in online culture, particularly when it comes to humanising health-related phenomena. The following pages include samples of the outcomes.





DAD FOCUS GROUP

In May 2024, a think-tank took place at UPTEC Baixa. Gathering team members, advanced PhD Design students and UPTEC business representatives, it served as a late stage overall debriefing of the project towards emerging conclusions.

DESIGNING AGAINST DISINFORMATION

*A Conversation around the project
"An Infodemic of Disorientation"*

A Conversation assessing and summarising the exhibition and associated workshop outcomes.

This conversation invites us to consider one of the greatest challenges that scientific knowledge faces today: the dissolution of objective knowledge through ideological agendas and mediations that shape reality based on ideological agendas and individual subjectivities.

This challenge is accentuated by the fact that scientific and political authorities have been intensifying their rhetoric according to an increasingly ineffective model of factual communication.

We posit that Communication Design can and should propose alternative ways of approaching scientific knowledge, in order to build dialogues with those who doubt it: because only by learning and employing the language of the "other" can we hope to reach them.



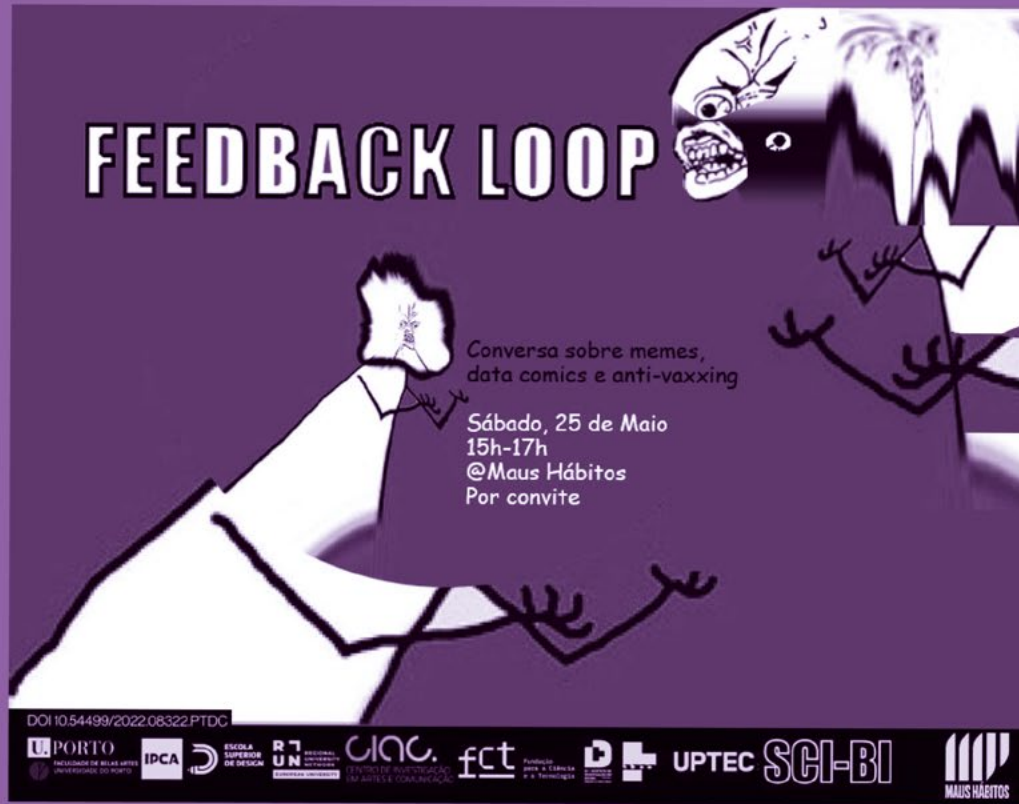
Liberdade para a Informação Científica!!!



DESIGNING AGAINST DISINFORMATION

Text block under the heading 'DESIGNING AGAINST DISINFORMATION', containing several lines of small text and a small logo at the bottom.





FEEDBACK LOOP FOCUS GROUP

In May 2024, a focus group took place at Maus Hábitos, with the aim of validating a range of project outputs. Feedback was gathered from youngsters (with parents' permission), communication BA students, and secondary school staff with extensive experience of teaching younger age groups.

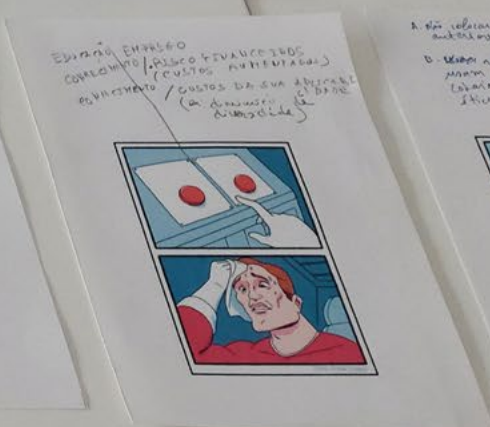
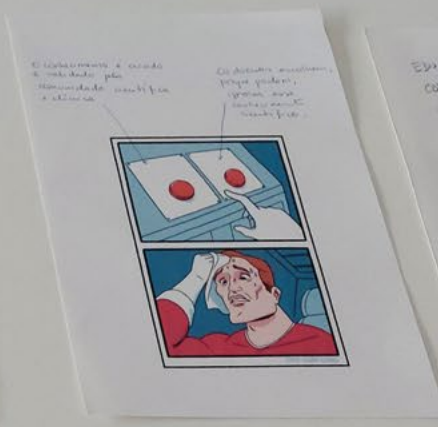
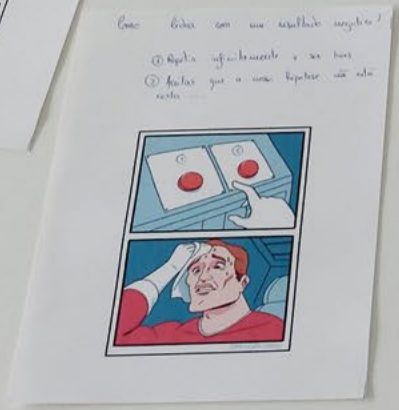
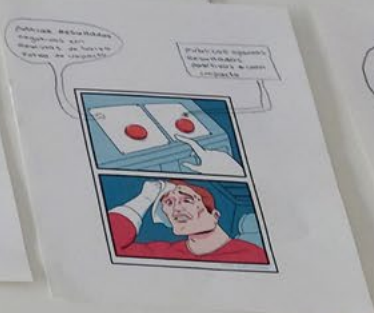
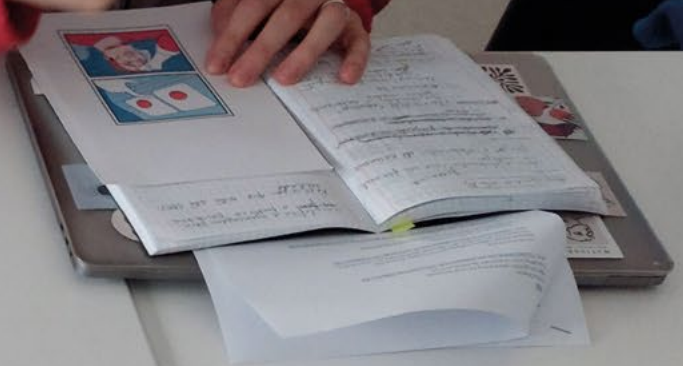
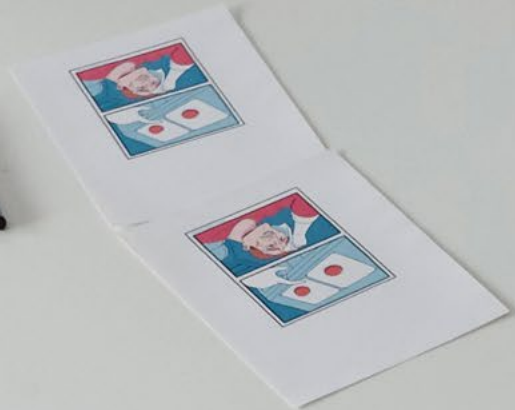




FOCUS GROUP I3S

In June 2024, a two-session focus group was held at i3s, Research Institute in Innovation and Health. By coming into unmediated contact with health researchers, the aim was to gather narratives that may humanise their work.







ASSOCIATED STUDIES

Masters and PhD theses contributing to the topic.

- 
1. Giuliana Almasio (2023).

**O MEDO DA MORTE NA
SELFIE PANDÊMICA: UM
ESTUDO FENOMENOLÓGICO
DE SÍMBOLOS E SINTOMAS**

Master's Thesis, University of Porto, Portugal
<https://hdl.handle.net/10216/156038>

2. Maria Isabel Felgueiras e Sousa Quaresma Marques (2023).

**A VULNERABILIDADE DA
VERDADE: O JOGO CRÍTICO
PARA A SENSIBILIZAÇÃO
DA PROLIFERAÇÃO DA
DESINFORMAÇÃO NO
MEIO MEDIÁTICO SOCIAL**

Master's Thesis, University of Porto, Portugal
<https://hdl.handle.net/10216/155535>

3. Santiago Luiz Gonçalves Mourão (2024).

**O DESIGN COMO AGENTE
DE COMUNICABILIDADE DO
CONHECIMENTO CIENTÍFICO:
ABORDAGENS EMPÍRICAS
PARA UMA MEDIAÇÃO
ENTRE LITERACIA VISUAL
E LITERACIA CIENTÍFICA**

PhD Thesis, University of Porto, Portugal



TYPOLOGIES CHART

This chart summarises the various motivations and factors at work in a range of disinformation-related occurrences. By unpacking this complex phenomenon into tangible instances, Design may contribute to their resolution through customised, more effective approaches.

The Typology Chart is inevitably a work in progress: it distills the conclusions of a regular series of team meetings throughout the project, but given the nature of the researched phenomena as well as the speed of technological development and corresponding impact, it faces the constant risk of obsolescence. For this reason, we have decided not to "freeze" a particular version of the chart in the present book, opting instead for a regularly updated online version. The chart can be found at the following URL:

<https://scibi.fba.up.pt/conclusions-and-recommendations/typologies-chart>

Disinformation Threats Amid Hurricane Harassment and Death Meteorologists Face

Weather experts say the spiraling falsehoods, especially claims that the government is creating or controlling storms, have gotten out of hand.

A report summarising the project's conclusions, with proposed relevance to the work of designers, researchers, entrepreneurs, educators and health authorities. [Download it here.](#)

POSITION PAPER

THE DUTY TO FOLLOW UP

A Position Paper on Design Against Disinformation

Drafted by Heitor Alvelos, 2024

To be continued in collaborative mode

This project has worn its “exploratory” tag firmly at its core – out of necessity, but primarily because this exploratory condition was inevitable. As we attempted the unpacking of the current, increasingly complex and pervasive phenomenon of disinformation, our awareness of that complexity could only hope to stay afloat in face of the sheer speed and magnitude of the changes and repercussions. As a prime example of this vertiginous challenge, we once again recall how, at the time of the project’s funding bid in early 2022, ChatGPT was still over six months away from entering our general vocabulary; and yet, we are already prone to forget how the World was before all this artificial intelligence (AI) ubiquity and its constant promise of efficiency beyond comprehension. How has it all become so rooted, so apparently *essential*, in a mere blink of an eye?

Now, let’s acknowledge the exponential issues that have only grown in proportion and intricacy since the present project’s starting point, two and a half years ago as of late 2024. The pandemic was, and is, a core case study that focused and grounded key shifting contemporary narratives and epistemologies... However, in these four and a half years since the advent of the global health crisis and its tectonic transformations of our *habitus*, the phenomenon of disinformation has not only expanded in scale: it has fundamentally branched out into ideological weaponization. If Covid-19 rendered the erosion in scientific trust tangible, and if we can empirically point towards online social media, self-publishing and monetisation as significant contributors to that erosion, what we have witnessed in the meantime feels like a turbo-powered version of what, back in early 2020, could have been taken for a fairly transitory, or at least readily contained, circumstantial nuisance.

Granted, a series of ontological issues, mainly from psychology and neuro-cognition, had already been identified: the doubling down syndrome, the retroactive illusion of logic, the decisive appeal of a sense of belonging and the allure of tribalism, to name a few. Add to this the powerful digital design tools readily available to most, and just about anyone is now able to mimic a semblance of authority and credibility. A prime example of this: various sets of online disinformation channels mimic the design of specific, well-trusted newspapers in order to induce the reader into believing they have read the news at the original source. This is taking place as a political device for spreading false rumours upon opponents, just as AI video software is now able to put literally any word in anyone’s mouth in a matter of minutes. In face of this, *what* exactly can be trusted beyond a constant, exhausting exercise in media micro-scrutiny?

However, what has been revealing itself in the last two years is of a whole unforeseen nature: fuelled by unregulated, self-learning yet often hallucinatory AI, a rise of extremist ideologies with an ethos of immunity/impunity when it comes to fact-checking, and a zeitgeist with tolerance for neither the ambivalent, nor the slow to substantiate, nor trial and error methodology: disinformation is now acquiring the semblance of an *existential* threat. Add to this mix the equally subjective and ideological dilemmas of “common good” versus “self-preservation” (humans as one living ecosystem versus “my body, my rules”, one of the mottos of anti-vaxxers), and it may well be the consensual fabric of reality, perception and logic that may be at stake here.

The original case study of the project, Portugal, was proposed on the basis of its geographic and semantic proximity; despite an overall success in implementing pandemic-related measures (confinement, vaccination, mask-wearing) based on the authority of scientific knowledge reverting into public policy and behavioral pedagogy (the Portuguese population largely complied with higher directives), our premise was that there remained a substantial post-pandemic debriefing to be performed in regards to health-related communication and measures: so much had happened intuitively, tentatively, that, in hindsight and based on the collective experience of Covid-19, could be promptly, better implemented in face of a future health crisis. One could only speculate, and speculation is, of course, far from prediction: what we objectively could not foresee, and yet might have had a hunch, was that the crisis in scientific trust would itself keep multiplying like a virus, forging perplexing mutations and alliances between new agers and eugenics, alternative therapies and extremism, certain world leaders and unrestrained ambitions beyond accountability.

So here we are, at the tail end of an exploratory inquiry into an ever-growing phenomenon that will certainly not subside in the foreseeable future. An original ambition of the project, and a slightly naive one at that, was to neatly issue a set of recommendations on how Design could “fix” the diagnosed problem, namely by diluting the chasm between formal, authoritative communication, and the hall of mirrors of social media semantics. But how can a problem be “fixed” among such an intrinsic degree of volatility? The memes we duly employed and tested have now aged, the hypothesis that humor could hold a key to a more benevolent pedagogy fact-checking was steadily disproven, and a significant number of the students involved in the project could not come to terms with revisiting the topic of Covid-19 in a post-Covid-19 era.

And yet we made progress and drew conclusions, however empirical and preliminary. The following are a set of pointers, distilled and systematized throughout the project’s various actions and outputs, addressed and dissected in workshops, think-tanks and interviews. They can be regarded as starting points towards a longer endeavor, one that will need to continue as long as scientific mistrust persists.

Ten contributions of Communication Design towards a Renewed Trust in Scientific Knowledge:

1. Scientific methods may be incorporated in higher education communication design curricula, providing design students with an added sense of duty towards knowledge dissemination.
2. Authorities that rely on scientific knowledge in order to produce and implement public policies may permanently consult with a range of segments of the population in order to continuously update its semantics and employed media. A broad demographic spectrum of representatives could constitute a board of consultants for this end.
3. Communication design must strengthen its multi-disciplinary ties, so that one of its core R&D and pedagogical expertise becomes the accessible communication of scientific knowledge - both content- and context-wise.
4. Inversely, Communication Design may act as a pedagogue for scientists and health authorities to become more effective at their own, autonomous communication skills.
5. Designers and design researchers may be involved in multi-disciplinary task forces towards an inclusion of subjective components into fact-based information as a means of persuasion and overcoming cognitive resistance.
6. Younger demographics, particularly design students, may act as advisers on emerging trends and aesthetics (and, inversely, trend and aesthetic obsolescence) that will ensure online communication of knowledge and behavioural pedagogy remain relevant and appealing at a given moment.
7. Health and Science-related authorities need to actively pursue “science ambassadors”: opinion-makers and influencers that are ready to attest to scientific credibility with an appreciative public, more prone to charisma-driven cognition.
8. Design may contribute with devices and approaches to knowledge reliability that stem from its own repertoire and expertise: branding, metaphors, slogans, storytelling, playfulness, gamification.
9. In a culture of consumerism, science-compliant behavior may include a component of consumption. Buying a mask may be a fashion statement; being vaccinated may be regarded as a status symbol to be celebrated.
10. Exploratory design workshops may be conducted, bringing together opposite segments of the “scientific trust” spectrum, in order to engage in dialogues through *making*, rather than rhetoric.

These ten contributions intend to be a summary and a starting point. As the phenomenon evolves in scope and complexity, we propose to maintain a collaborative, online forum, white paper and set of resources as a means to keep design’s finger on its pulse. This permanently ongoing conversation, primarily geared at designers, researchers and policy-makers, begins at https://tiny.cc/sci_bi, and editing permissions may be granted upon request.

It has been a difficult topic to unpack, but the conversation on the *duty* of communication design to play a role in scientific trust has now been started. Sci-Bi thus continues.

An online, collaborative version of this paper can be found at https://tiny.cc/sci_bi



Book Editors

Heitor Alvelos
José Carneiro
Rui Vitorino Santos

Project Coordination

Heitor Alvelos, *Lead researcher, ID+ University of Porto*
Susana Barreto, *Co-Lead researcher, ID+ University of Porto*

Researchers

Cláudia Raquel Lima, *ID+ Lusófona University*
Eliana Penedos-Santiago, *ID+ University of Porto*
Fátima São Simão, *FEP, University of Porto*
Jorge Brandão Pereira, *ID+ Polytechnic University of Cávado and Ave*
José Carneiro, *ID+ University of Porto*
Júlio Dolbeth, *ID+ University of Porto*
Marta Fernandes, *ID+ Polytechnic University of Porto*
Nuno Martins, *ID+ Polytechnic University of Cávado and Ave*
Pedro Alves da Veiga, *CIAC Universidade Aberta*
Rui Vitorino Santos, *ID+ University of Porto*
Sónia Vieira, *Alasala College of Architecture and Design, Saudi Arabia*

Additional Research

Abhishek Chatterjee, *ID+*

Executive Coordination

Álvaro Ferreira, *ID+*

Board of Consultants

Fernando Barbosa, *Laboratório de Neuropsicofisiologia, FPCEUP*
Marta Coelho, *London School of Economics, UK*
Patricia Aufderheide, *American University, USA*
Rita Espanha, *ISCTE – Instituto Universitário de Lisboa*

Output Facilitators

Anabela Nunes, *i3s*
André Forte, *UPTec*
Daniel Ramos Pires, *Maus Hábitos*
Júlio Borlido Santos, *i3s*

Book Design

Bruno Barros

Web Design

Rafael Gonçalves

Website

<https://scibi.fba.up.pt>

Book PDF

<https://scibi.fba.up.pt/scibi.pdf>

Printed and Bound

Forward Lda

ISBN

Paperback
978-989-53056-5-0
PDF
978-989-53056-6-7

SCI-BI

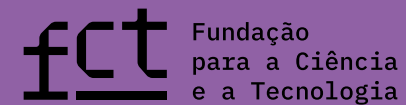
An Infodemic of Disorientation: Communication design as mediator between scientific knowledge and cognitive bias

Summary

Recent years have seen the emergence of two particular challenges to scientific knowledge and application. In both instances, communication design may be underperforming in its potential for contribution: 1. The exponential rise of social media has potentiated an equally exponential range of phenomena such as fake news, pseudo-science and superstition; as seductive, de-centralised, continuously reconfiguring webs, their longevity and adaptability far surpass that of rigorous knowledge. 2. The pandemic and corresponding public policies (confinement and vaccination in particular) seem to have further eroded the already precarious, aforementioned scenario. A range of misinformation channels and content have reached significant sectors of the population, just as media portrayal of the health crisis was largely reduced to statistical extrapolations, and a largely hermetic, prescriptive discourse often lacking in accessibility. Despite current decreases in pandemic levels, issues of mistrust remain and will likely retain an impact in future instances, health-related or otherwise. The above issues have been addressed both through increased technological sophistication of digital tools, and the adoption of logical discourse; however, both seem to have fallen short in tackling the scale and complexity of the phenomena of misinformation.

Total Approved Budget

47.398,83 EUR



Project 2022.08322.PTDC funded by national funds through the FCT – Fundação para a Ciência e a Tecnologia, I.P.

DOI 10.54499/2022.08322.PTDC



2022—24



**COMMUNICATION DESIGN AS MEDIATOR BETWEEN SCIENTIFIC
KNOWLEDGE AND COGNITIVE BIAS. THE CASE STUDY OF PORTUGAL
BEFORE, DURING, AND AFTER THE PANDEMIC.**

An exploratory project by the Unexpected Media Lab @ ID+, research Institute for Design, Media and Culture

2022-24



fct Fundação
para a Ciência
e a Tecnologia

Project 2022.08322.PTDC funded by national
funds through the FCT – Fundação para a
Ciência e a Tecnologia, I.P.

DOI 10.54499/2022.08322.PTDC

SCI-BI



ID+ RESEARCH
INSTITUTE FOR
DESIGN, MEDIA
AND CULTURE
PORTUGAL



U.PORTO
FACULDADE DE BELAS ARTES
UNIVERSIDADE DO PORTO

IPCA POLITÉCNICO
DO CAVADO
E DO AVE

P.PORTO

**UNIVERSIDADE
LUSÓFONA**

CIAC
CENTRO DE INVESTIGAÇÃO
EM ARTES E COMUNICAÇÃO