

TRACES—In 2030, Artificial Intelligences Will Visit Museums?



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Within the SISCODE project, the science and society association *TRACES*, based in Paris, addresses the issue of making algorithms and artificial intelligence intelligible to their users. The project intends to raise awareness of algorithmic decision making in the citizen's daily life through co-creation activities involving research, education, civic right organisations and policymaking. Within general cultural activities in an art–science, provocative approach, the issue has been addressed through an inversion of perspective, by analysing people's relationship with AI when considering them as the target group of *TRACES*' cultural productions. By embedding AI as public of theatre plays and other cultural activities, *TRACES* develops a critical approach to increase the public awareness of the impact of algorithmic decision making in society, and support policymakers acting within this specific socio-technical controversy, clearly bound to remain a core issue in the years to come.

1 Algorithmic Decision Making for Cultural Activities

TRACES is a not for profit association acting at the crossroad between participatory science engagement and social inclusion. *TRACES* runs the activities of Espace des Sciences Pierre-Gilles de Gennes, the science-culture venue of ESPCI Paris and PSL Research University, a leading French research university covering a wide academic

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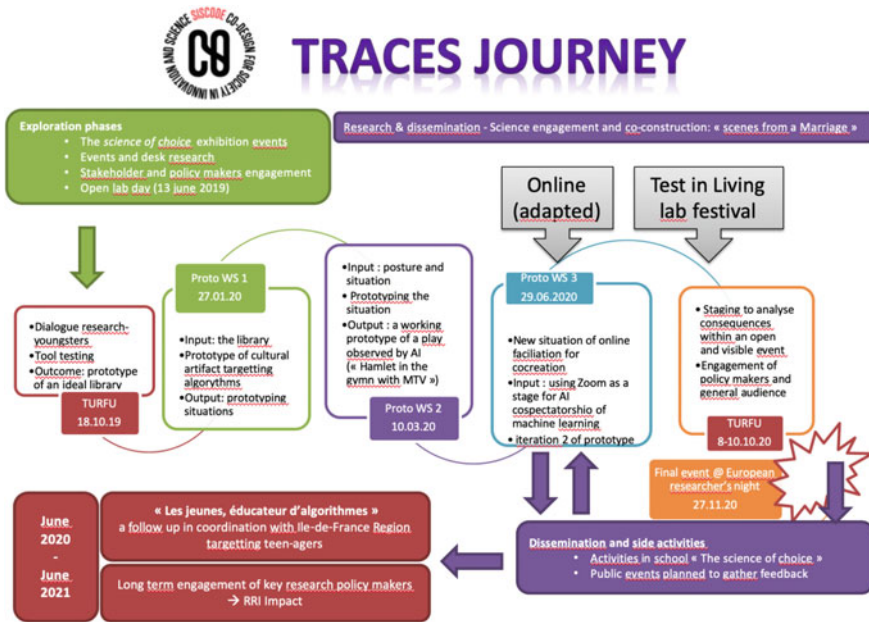


Fig. 1 TRACES’ co-creation journey

field, well-connected to national research bodies and with a strong innovation-oriented research policy. *TRACES* aims to create Living Lab spaces in which to reflect, experiment and innovate in the fields of science in society, science education and public communication of science.

TRACES’ journey addresses the issue of the “right to be informed” in automated decision processes using artificial intelligence in everyday life. How can the presence of AI-based supports that assist the professional or everyday life decisions become noticeable and readable for end users/citizens, so they can make informed choices in crucial aspects of their lives? As a science engagement organisation, *TRACES* identified a real need of including discussions on the topic in contexts and situations easily accessible by general audiences, such as in educational or cultural activities, and of influencing policymakers to treat the topic in a more original and empowering way.

An overview of *TRACES* co-creation journey is presented in the following scheme. At the core of the approach is the idea to use cultural and/or educational activities as co-creation opportunities (Fig. 1).

Details of the activities can be found at the dedicated website IA Spectatrice.¹

¹ www.ia-spectatrice.net [1].

2 Ecosystem, Context and Challenge Addressed

2.1 *External Context and Ecosystem*

The policymaking and scientific community dealing with AI have stressed the importance of transparency, intelligibility and accountability in the social acceptance of artificial intelligence. Society needs to increase its understanding and awareness of machine learning to engage in a democratic debate about the opportunities and risks of its development [2].

As in the case of GDPR, laws are enforced at European level, but until their values become shared and embedded in the general culture, they will not produce the desired effect and will remain out of the control of the lay citizen.

In the meantime, research on AI and machine learning is advancing at tremendous speed. Many valuable educational activities are being proposed, but tend to focus on equipping the public with basic knowledge about algorithms and artificial intelligence: this is a necessary, but not sufficient aspect. In fact, it neglects the issue of how AI is made visible and recognisable and how it is represented: we believe that these are essential aspects if we want to preserve a capacity to operate informed choices about AI.

2.2 *Organisational Background*

In the last 3 years *TRACES* has initiated several projects using Living Lab approaches, bringing together the science community and other actors from the arts, international cooperation, education, etc.

So far *TRACES'* approach of co-creation is based on the concept of developing public activities within the “grey zone”, where the frontier between knowledge production and knowledge dissemination is not well defined [3, 4]. That is, activities that satisfy at the same time the needs of the general public and the needs of the research and innovation community. The Living Lab approach is particularly suited for this idea. The aim is to combine dialogue approaches within public engagement initiatives, and Living Lab methodology and open innovation approaches, to provide meaningful explorations of science based, socially relevant issues. *TRACES* is adapting the usual methods of Living Labs (involving end users in the design/testing) and the classical process of co-creation, exploration, experimentation and evaluation, to events in which the general audience with a cultural interest/involvement in the issue can participate.

TRACES believes that one of the most interesting aspects of co-creation is the possibility to *satisfy at the same time independent agendas*. This is different from *aligning different agendas*, typical of a more classical form of collaboration. In this case, it means that it is aimed to collaboratively set up a situation that will potentially serve the needs of various participants in many, potentially very different ways.

TRACES proposes to identify these two modes as “collaborative” and “generative”.

In the “collaborative mode”, co-creation mainly consists in a process of alignment of different stakeholders toward a common goal, in order to collectively achieve a result or find a solution. The prototype in these cases is focused on the solution.

In the “generative mode”, co-creation is intended as a collectively generated opportunity to help different stakeholders to achieve autonomous goals. Prototyping here is used essentially as a collective exploration: not a solution in itself, but an opportunity and a facilitator to identify several independent solutions. It is thus clearly a radically prototyping-driven approach [5].

The indicators and values that can be used to assess these two modes of co-creation are obviously very different. In the case of “generative mode”, the attention focuses on the dynamics among the participants/stakeholders, while in the “collaborative mode” the focus lies on the capacity of the prototype to provide a solution to a specific problem.

The working hypothesis is that the “generative mode” is an appropriate approach in the context of Social Innovation and RRI, the area of exploration of SISCODE.

A second interesting action research question the team was able to address is the relationship between cultural activities and co-creation activities within public engagement and informal education venues such as a Science Centre or Museum.

In recent years an increasing interest of the public engagement community in the world of participation and co-creation, and vice-versa has been observed. Science Centers are integrating Fab Lab spaces and Living Lab approaches in their offer, citizen science activities are increasingly merging with science engagement activities, design thinking and discussion game methods are fertilising each other. This is a promising opportunity of renewal for science communication practices. However, co-construction activities and science culture/engagement activities do not necessarily share the same objectives, neither the same business model. Also, the combination of these two approaches could be influenced by their fashion effect, masking of differences and blurring the clarity of the political value of such activities.

During the entire journey it was aspired to keep the challenge at the border of these two worlds with a twofold objective: enriching the challenge itself by hybridising the two cultures, and exploring the common features and the diversities among them.

The attempt to keep on working at the frontier between cultural activities and co-creation, and possibly blurring this frontier, also strongly oriented the choices of the exploration.

2.3 The Specific Challenge

TRACES' challenge aims at raising the issue of intelligibility of AI, at a time where it has become pervasive of all human activities. How can people enforce their “right to be informed” in automated decision processes using algorithms in everyday life? How can the presence of AI-based support to professional or everyday life decisions

become noticeable and readable for end users/citizens so they can make informed choices in crucial aspects of their lives? How can we make people more conscious of automated decision processes/services/applications and of criteria used by algorithms? How can we make ethical issues explicit and understandable for the generic users?

A real need of including discussions on the topic in contexts and situations easily accessible by general audiences, such as in educational or cultural activities has been identified.

Starting from a rather traditional framing of the issue, the co-creation journey led to the identification of a non-explored angle, that is, shifting from AI as subject of cultural and educational activities or as tool for cultural and educational activities, to AI as a target group for educational or cultural products.

3 The Co-creation Journey

3.1 *Analysis of the Context*

After a preliminary analysis that led to the first statement of the general challenge, *TRACES* adopted an innovative approach for context analysis and reframing of the problem in line with the general principle of working at the frontiers between co-creation and cultural/public engagement activities. This consisted in setting up **an exhibition** to support participatory events and collect inputs from different publics and stakeholders [6].

Participants were involved at different levels: from fully committed, long term engagement participants, to “one shot” contributors who provided their input during a single event.

This phase allowed **the use of an exhibition and a series of public events as a tool for stakeholder analysis, context analysis, stakeholder engagement and idea reframing.**

The outcome of this phase was the precise framing of the problem, as well as the identification of the 5 main communities to be further involved and their most relevant representatives to engage: research, culture, art, civil right activists, policymakers.

3.2 *Reframing of the Problem*

It became soon apparent that most efforts to explore AI in people’s life revolved around two approaches: AI as *subject* of cultural and educational activities or AI as *tool for* cultural and educational activities. That is: *about* AI, or *using* AI. What was missing was cultural and educational activities *for* AI. In other words, it became clear

that it was essential to explore AI as a *target group for cultural and educational activities*.

After the idea was reframed, two workshops were organised at the Caen “Living Lab festival TURFU” involving scientists, facilitators, and two groups of 25 young people. *TRACES* wanted to ask this question to themselves and the young people in the audience: “since we now know that algorithms are listening to what we do, what do we want to tell them?” The answer took the form of an ideal library of books, films and series, paintings, political slogans and music. In itself an interesting exploration, this ideal library was then used as a boundary object to define the subsequent steps of the journey.

3.3 *Envisioning of Alternatives*

At this stage of the prototyping sequence it was decided to stabilise the co-design team, trying to have a group of people committed to move together until the end of the journey. A very fertile diversity of profiles joined in, and notably Axel Meunier, a PhD student at Goldsmith University (UK) and SciencePo Medialab (France), interested in SISCODE as field study for his doctoral theses on design. His participation was essential to frame the notion of co-spectatorship.

The first of this workshop held on 27th of January 2020 was devoted to exploring and characterising the real-life situation aimed to be described. By using an approach inspired by the service design blueprint [FS7], the team explored different potential bifurcations. This exploration led to define the focus and the prototype in the journey as “co-spectatorship of a theatre play involving AI and humans”.

3.4 *Development and Prototyping*

On March 10, a workshop was organised in a well-known theatre and cultural venue in Paris, la Maison des Métallos. Participants from various fields (art, engineering, scientific facilitation and communication, research) experienced a situation of co-spectatorship with artificial agents.

Axel Meunier described the workshop with these words: “We are trying to pay attention to the moments of suspension when machines that can hear and see cease to be tools. When we stop being users. When we become public together.”

In concrete terms, a short performance was staged, “*Hamlet in the Gym with MTV*”. In an extremely simple setting enriched with objects that can be found in a gym, an actor dictated the famous monologue of Hamlet to his smartphone. Each of the spectators decided to accompany an Artificial Intelligence to see this show. AI were not the unique spectators, nor were they the spectators’ “assistants” as they are normally conceived. They were literally brought to the show by the team, as one would have accompanied a child or a disabled person.

The AI participating in the show were the applications **SeeingAI**, **GoogleLens**, **Yolo**, **Camfind**, **Ava**, **Voice translator**, **Teachablemachine**, **Notes**, and **Robert de Barretin**, an artificial intelligence developed by the art collective DataDADA. Each of the AI, as each of their chaperons, reflected a different perception of the play: some apps just transcribed the text, others translated it in real time or were taking pictures of the show to recognise the objects, while different ones were suggesting shopping choices based on the actor outfit. Besides producing an extremely energetic and creative cacophony (AI don't know how to remain silent during a theatre performance...), the data generated were of extreme richness.

A preliminary analysis conducted by Axel Meunier showed many interesting features. For example, a fluid approach to gender, by privileging simple color codes with respect to evident anatomical characteristics (Google lens often “saw” a woman when the actor was lying on a pink mat, and a male when he was lying on a blue mat). Visual AIs perceived subtle differences that projected a stable situation—a guy on a yoga mat—in very different contexts, such as the world of fitness, or the world of fashion. Details appearing unimportant to their chaperone, were essential for the accompanied AI (e.g., details referring to shopping proposition). This is obvious, but at the same time it is a powerful way to clarify that AI is not there to assist us, but rather to pursue specific, autonomous tasks *while* assisting us.

The situation allowed an explosion of understanding of many non-trivial aspects concerning the relationship with AI. These insights that will inform and enrich each of the participants' professional practices, in many different ways.

It was then decided to organise a **co-creation workshop in which machine learning as a show would be questioned**.

By taking advantage of the artificial co-design team member Robert de Barattin, *TRACES* explored the impact of the presence of an artificial agent among the participants at a zoom meeting to test if people were able to influence Robert's behaviour in the meeting.

3.5 The Role of Policies and Policymaker Engagement

The objective is to produce a situation that has an impact through influence. Concerning policymakers, this means that their engagement in the co-creation process should have as effect to widen their understanding of the issue.

The Ile-de-France Region, the Town of Paris, and the university and research leaders were identified as the key policymakers.

Concerning the Ile-de-France Region, the strategy was very successful: the persons in charge of research and scientific culture participated in several events, expressed high appreciation for the approach, and enlarged their views on public perception of AI. This engagement led to the funding of a follow up of the SISCODE challenge, to involve high school students in the period October 2020–June 2021.

Concerning research policymakers, *TRACES* accepted the fact that the respective interests can be different, but still mutually enriching. In fact, it appears that in most

cases they accept participation in order to develop an effective outreach tool, rather than to explore the benefits of co-creation for deeper understanding of AI in the social sphere. In a sort of “Trojan horse” strategy, accepting this as a useful collaboration that may provide strong impact in the medium term.

4 Experimentation: Output, Transformations, Outcomes

4.1 *Final Concept*

The outcome of the exploration is a procedure to support an audience to engage with AI in a live cultural event, thus enabling to discover the way people can live this co-spectatorship.

In very simple terms, the procedure implies assuming a reverse role (identifying ourselves as chaperon for AI to a cultural event), observing a cultural event together with the AI, and analyse how the AI “perceives” the same event.

TRACES tested it in two specific situations (a theater play and a zoom meeting), and will finalise the procedure in 2 additional events: AI observing a science festival (Caen, 9–10 October 2021), AI observing the European Researchers Night (Paris, 29 November 2021) [1].

From the beginning of the project “sustainability” was intended as the continuous, long term change produced in engaged stakeholders. According to this approach, the *product* or the *idea* or the *prototype* do not need to be sustainable. It is their *impact* that needs to be sustainable.

For the specific case, the strategy to ensure **the situation proposed in the workshops is “rich & juicy” enough to produce a progressive change in the way workshop participants and other stakeholders conceive the issue of AI in culture and society**. The question then is: how do we measure this impact? What is the time span to observe? How to identify common indicators, since the impact on each stakeholder might be of very different types? How do we go beyond the purely anecdotal report of the reactions of the participants? How to spot if the participants were indeed influenced by the prototype in their subsequent choices, given that it will surely not be the only agent of change, but just one of several driving forces?

4.2 *Transformations Triggered and Outcomes*

TRACES as an organisation was deeply influenced by the project. First of all, a deeper understanding of the co-creation process was acquired. This helped to test new approaches, but also helped us make sense of already initiated but not fully understood practices. In other words, together with the introduction of new practices, the level of self-consciousness and reflexivity of the organisation was clearly enhanced.

Secondly, novel forms of collaboration were experienced with a wider variety of subjects, with a direct impact on the networking capacity of the organisation. Thirdly, new competences were acquired that are directly enhancing the credibility of the organisation, both concerning the content (AI in social context) and the form (co-creation). This is easily recognisable in success such as the funding of a continuation of the project at Regional level, or the participation in a EU project applying Living Lab methodology to open schooling (SALL) [7].

5 Lessons Learnt and Reflections

A number of critical as well as highly interesting issues have been identified throughout the experimentation.

At first, the journey offered many unexpected and extremely rewarding creative turns, from a quite standard first enunciation of the challenge to the emergence of a truly innovative and non-standard solution. The team considers this as a genuine proof of the power of co-creation.

Also, making the new approach comprehensible was a challenge in itself, both within the SISCODE consortium and with respect to some of the stakeholders. These difficulties allowed us to identify one of the critical issues on the different roles that a prototype can have in a co-creation process: proposing a terminology to clarify this—a generative mode (the one adopted by us) vs a collaborative mode.

Adopting the generative mode presents several difficulties in terms of clarity and concreteness of the outcome. On the other end, it allows to treat each stakeholder differently in terms of the impact and the change generated. This poses tricky but interesting questions to the SISCODE exploration of co-creation.

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