

Sensitive Readings of Science

A Guide to Research
Outreach

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ECODOC

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ECODOC

ECODOC is an applied research project that studies methods for making scientific knowledge accessible in ways that foster the sensitive expression of individual and collective concerns, with the aim of informing decision-making in the context of transition and adaptation.

The project is funded by the University of Bordeaux, through its ACT and SUNSET programs, and by URFIST Bordeaux. ECODOC is led by a steering committee composed of one representative from each partner: University of Bordeaux, Culture Department, Documentation Directorate, Biogeco, INRAE, Inria, Emile Durkheim Center, City of Floirac, City of Arès, Villa Valmont, Street Def Records.

Project Leader: **Raphaëlle BATS**
Project Manager: **Mathilde GARNIER**

Preface

Environmental and societal transitions are major challenges that will, in the short or long term, profoundly alter citizens' daily lives. Scientific curiosity is essential, beginning with a foundation in scientific literacy and drawing on the scientific method itself, to empower citizens to become active participants in shaping their own futures. The dialogue between science and society therefore carries a real stake in the inclusion and democratization of knowledge, particularly among younger generations whose appetite for science is currently being questioned. It must equip them with a critical perspective toward false theories and baseless claims of all kinds that saturate our social media.

Our universities and their researchers thus bear a special responsibility to produce and disseminate the body of knowledge that enables the public to understand its environment and its evolving context amid social, political, and ecological transitions, and to engage in the open debates our society must foster—guided by science, its rigorous methods, and its academic legitimacy. This expertise must consolidate data, assess the current state of affairs, propose scenarios for future developments, and develop methodologies and processes that policymakers and public authorities must adopt to shape their policies.

In this context, the guide presented here is intended as a tool for our scientific community to guide our colleagues in their outreach efforts and, more broadly, in Science & Society dialogue, an endeavor for which they are generally not prepared by their academic training. This guide is also intended for science and cultural communicators.

The approach chosen within the framework of the underlying ECODOC project focuses on the promotion of research data/objects and associated media productions.

This guide addresses very concrete aspects of the process, beginning with the documentation dossier, and then aims for media appropriation through new, original formats. Some originate from the Art & Sciences field, such as slam texts, while others involve the use of games. These new dissemination channels build on citizen science and research initiatives currently being developed on our campuses and in our regions.

Philippe Moretto,

Vice President for Transitions and Science-Society Dialogue
at the University of Bordeaux

Towards Research Outreach as Exploration

Research projects produce a multitude of scientific documents and information. One can wander through them as if through a forest. The scientists leading these projects have their landmarks there, like markers on a map. The resulting journeys are as much about how project participants interpret these scientific documents as they are about the documents themselves. Some read them through the lens of their discipline, methods, techniques or results.

AN INVITATION TO DISCOVER

Wanting to share your research project means inviting people to wander through this forest of scientific documents and information. Yet, each person who encounters this research project may have a personal and unique interpretation of it, depending on their age, educational background, profession, personal interests, or culture. For, just as in a forest, several paths present themselves to us, paths we can take or from which we can stray. Our mood will lead us to pay attention to what lives, what dies, what sings, what struggles. With our heads in the clouds, we'll see the birds; with our feet on the ground, we'll notice the mushrooms. Whether in a hurry or at a leisurely pace, we will traverse the forest differently. Wanting to help others discover your research project means accepting that you are not necessarily the guide, and that without a guide, the walk is not for that reason any less meaningful.

EXPLORATION AND SHARING

Research outreach can thus be likened to the browsing of books practiced in a library. It involves more than just transmitting knowledge; it involves sharing readings and, in the case at hand, individual and collective readings of scientific information. From this sharing, exchanges rich in questions and ideas can emerge, reflecting a fruitful dialogue between science and society. This exchange can inform future research projects, inspire partnerships, confirm existing issues, or raise new questions.

To carry out this kind of science outreach, - that is, to organize an exploration of a research project, the tour requires very little material:

- Commit to fostering dialogue between science and society;
- Provide a documentary map of an ongoing or completed research project;
- Organize outreach activities aimed at encouraging thoughtful engagement with science.

The walk is simple, but carrying it out may require a bit of practice. This research outreach guide offers detailed maps of the experiments conducted as part of the ECODOC research project regarding the mapping of research projects. We hope that our experiences will inspire you to create your own opportunities for outreach by presenting thoughtful interpretations of science, opportunities that benefit all stakeholders: researchers, outreach practitioners, information professionals and citizens.

PART 1

Documentary Map of a Research Project

Leaving traces...

Ask a researcher about the documents produced by their research project, and you'll likely walk away with just a copy of the published scientific papers. In fact, the scientific paper is a good summary of the project. It provides an overview of the context, methodology, results and key issues. It might be sufficient if its academic format, both in the document's structure and style (not to mention the language), did not make it inaccessible to non-specialists.

However, a research project cannot be fully understood through the final document it produces. It is also understood through the documents that bear witness to the research project in its temporality, its forms, its experiments, its actors and so on. It is by seeing the scientific process at work that we can truly grasp what science does, provokes, engages in and transforms.

Producing a documentary map of a research project requires paying attention to all those moments that necessitated choices, marked turning points and resolved aporias. Each of these moments has left traces. It is precisely these traces that make up the map of the research project and give it substance in the non-academic world.

Mapping a research project, whether ongoing or completed, thus allows us to identify all the elements of the story told by the project and to bring out the scientific narrative it conveys.

PRACTICAL GUIDE

HOW TO CREATE A DOCUMENTARY MAP?

Duration: 2 to 6 hours, depending on the time needed to gather the information in digital and/or printed form

Materials: a server where all documents can be gathered and organized into a single folder

Budget: none, other than time

Format: In-person or via video calls

Facilitation: A researcher can create a documentary map for their research project independently, but information specialists and librarians can serve as valuable partners in a collaborative process to ensure no documents are overlooked.

Participants: Any research project can be the subject of a documentary map, regardless of discipline, scope, duration, status (ongoing or completed) or format (participatory or non-participatory).

Procedure:

1. Choose the research project to map;
2. Describe your project and review the key stages of the research likely to generate documentation. Follow the list of questions to ask (see following pages);
3. Collect the documents as you go. Store them in a single digital folder, making sure to give them a name that is easy to identify;
4. Maintain a list of the documents in a spreadsheet with their names and, if possible, descriptive elements, as provided in the list (page 17);
5. Use this documentation to carry out outreach activities (see Part 2).

Methodology & Tips

Here you will find a list of questions to help you identify all the documents produced by your research projects.

WHY THIS PROJECT?

Contextual documents: excerpt from the response to a call for proposals, text or video that subjectively explains what led the researcher to choose this project, press articles, previous scientific articles.

Field-related documents: photos or a site plan, a map, promotional materials for a studied event, etc.

Agnès Villechaise's Advice:

"I realize that these documents would need to be reconstructed after the fact: many decisions were made during informal discussions, without any real formalization or archiving. This proves that when you plan to communicate your findings later, you must anticipate this well in advance and document the research with that in mind!!"

HOW WAS THE RESEARCH CONDUCTED AT THE HEART OF THE PROJECT?

Methodological documents: written and/or illustrated protocol, photos of sensors, information on instrument calibration (drone, scanner, etc.), interview guides, texts on sample targeting (whether plant, animal, or human).

Reference documents: reference articles, illustrative examples of species/fruit/leaf classification, text summarizing these methodological choices, documents on previously conducted experiments/surveys, lists of contacts or tools that facilitate data collection.

Martin Hachet's Advice:

"Provide any document that states: We will rely on a METHOD-X-Traditionally-Used-in-the-Discipline, as is done, for example, in [Reference article that uses this method]"

HOW DID YOU SHARE YOUR FINDINGS?

Academic documents: articles, article abstracts, conference papers, posters, etc.

Science communication materials: texts and materials for public lectures, excerpts from other productions: theater, comics, poetry, etc., in audio, video, or text format.

Media-produced materials: newspaper article excerpts, radio clips, etc.

Documents produced by participants in a citizen science project: podcast, text or video excerpts...

Raphaëlle Bats' Advice:

"Feel free to include documents that present raw or processed data that might initially seem difficult to access."

Raphaëlle Bats' Advice:

"These documents are often hard to find. Don't hesitate to browse the web to track them down."

WHAT DID YOU TAKE AWAY FROM THIS?

Methodological documents on data processing: analysis grids, codes, lab notebook excerpts, etc.

Documents related to statistical analysis: R code snippets, numerical measurements corresponding to various metrics for evaluating the prototypes produced (e.g., time, error rate, satisfaction level...).

Documents related to the visualization of results: dynamic/interactive or static graphs, etc.

Documents related to qualitative analysis: verbatim transcripts, excerpts from interview coding, etc.

WHAT DID YOU OBSERVE?

Data:

- visual: photos, scans, surface or X-ray imagery, etc.;
- qualitative: interview excerpts, excerpts from analyzed texts (for a corpus), excerpts from field notebooks, etc.;
- audiovisual or audio: excerpts from audio interviews, films and videos, sound recordings (e.g., birdsong), etc.;
- quantitative: complete spreadsheets or an extract of certain rows/columns, etc.

Example of documentary mapping

As part of the ECODOC project, we have mapped four research projects in forest ecology.

We would like to extend our genuine thanks to our colleagues on the steering committee who participated in this effort:



Déborah Corso,
FORLand, University of
Bordeaux, for her research
on water stress;



Thomas Caignard,
FORLand, University of
Bordeaux, for his research
on oak fruiting and leaf
phenology;



Bastien Castagneyrol,
INRAE, for his research on
oaks.

We conducted three semi-structured interviews with each of them, which allowed us to identify and compile between 20 and 50 illustrative and explanatory documents for each project: a sketch of a participatory protocol, scans of tree branches, photos of acorns, a spreadsheet tracking the forest's budbreak stages, temperature graphs, etc. The analysis of these documents now allows

us to offer you a list of descriptors (see next page) that can be useful for organizing this collection, before using it in outreach activities, such as those presented later in this guide.

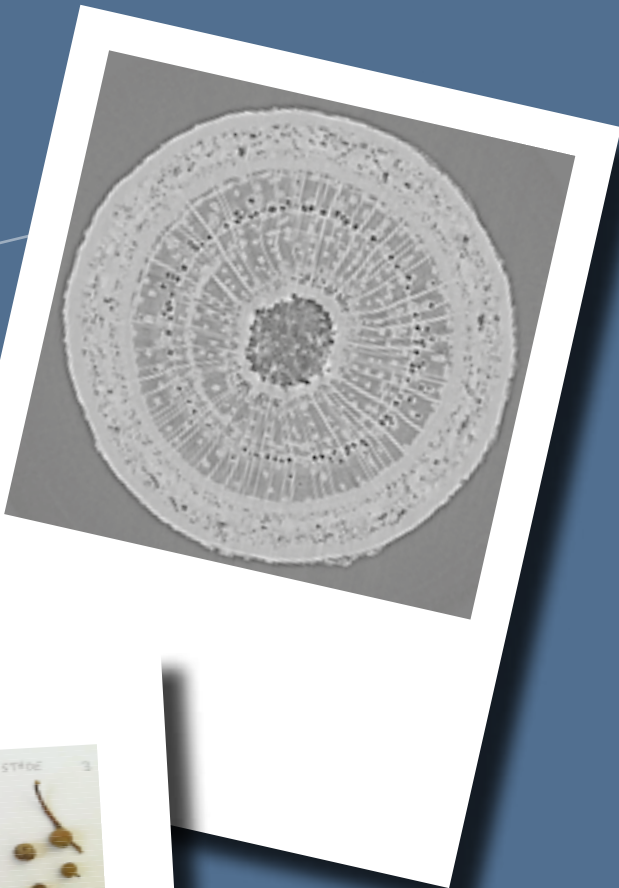
To test this list in disciplines other than forest ecology, we submitted it to **Agnès Villechaise**, a sociology researcher at the Emile Durkheim Center, University of

Bordeaux, and **Martin Hachet**, a researcher in Human-Machine Interaction at Inria Bordeaux, who are also members of our steering committee. Their feedback helped us refine the content presented in this guide. Thank you for their contribution.

TREE MONITORING – FLOIRAC

Species	Tree	ID	Area
Quercus robur	7	QUIRO_007	001
Quercus robur	33	PREX_033	001
Fraxinus excelsior	34	PREX_034	001
Fraxinus excelsior	35	PREX_035	001
Quercus robur	38	QUIRO_038	001
Quercus robur	43	LAND_043	001
Laurus nobilis	44	ROPS_044	001
Robinia pseudoacacia	45	QUIRO_045	002
Quercus robur	8	QUIRO_008	002
Quercus pubescens	9	QUIPU_009	002
Quercus pubescens	36	QUIRO_036	002
Quercus pubescens	37	QUIPU_037	002
Quercus robur	39	ROPS_039	002
Quercus pubescens	46	ROPS_046	002
Robinia pseudoacacia	47	ROPS_047	002
Robinia pseudoacacia	48	ROPS_048	002
Robinia pseudoacacia	49	LAND_049	002
Robinia pseudoacacia	54	QUIRO_054	003
Laurus nobilis	56	FROR_056	003
Quercus robur	31	FROR_031	003
Fraxinus ornus	32	QUIPU_032	003
Fraxinus ornus	40	QUIPU_040	003
Quercus pubescens	41	QUIPU_041	003
Quercus robur	42	QUIPU_042	003
Quercus pubescens	50	FROR_050	003
Laurus nobilis	51	LAND_051	003
Laurus nobilis	52	LAND_052	003
Quercus sp.	57	QUIRO_057	003

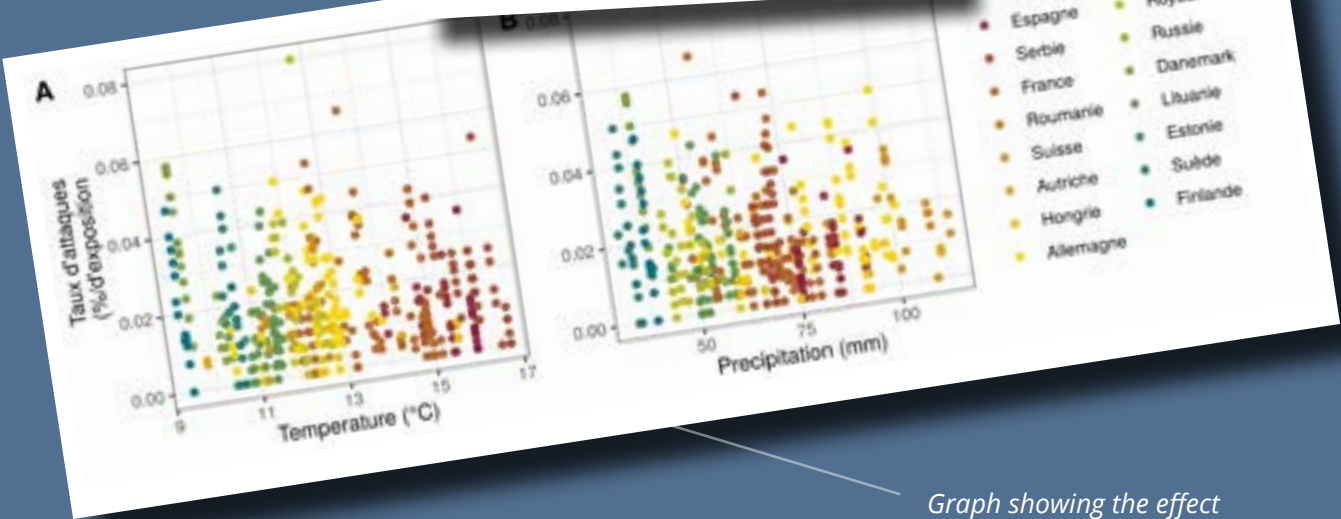
List of monitored trees.
©ForLand



Microtomography of
an Orne ash branch
captured by X-rays
©ForLand



Illustrative example
of classification.
©ForLand



Graph showing the effect
of temperature (A) and
precipitation (B) on the
rate of attacks on false
caterpillars by birds.
©Tree Bodyguards

Table describing the documents

The table opposite illustrates the diversity of documents produced in a research project and shows the many forms that scientific information can take.

It is not necessary to complete this descriptive work in its entirety to subsequently develop outreach activities. However, this work allows you to revisit the project's narrative from different perspectives: chronologically, by protagonist, by access point, by format, etc. It then becomes easier to link and organize the documents together to present them during the outreach activities you will find on the following pages.



Document 1

Excerpt from the comic book *Les Gardiens du chêne* in partnership with INRA Nouvelle-Aquitaine.
© Nathalie Vessillier

OAK PREDATORS

	Document 1	Document 2	Document 3	Document 4
	Comic Book	Protocol	Scientific Paper	Press Release
Document title	The Guardians of the Oak	List of bird species	Decomposing drivers in avian insectivory	Effects of climate on interactions between trees, insects, and predators
Document type	Information document	Data	Paper	Information document
Document purpose	Promotional tool	Measurement tool	Academic dissemination tool	Promotional tool
Date of production	2018	2021	2022	Before 2021
Document format	PDF	CSV	PDF	HTML (online)
Address or location	Project website	Not specified	BioRxiv	Institution's website
Authors	Research team	Researchers associated with the project	Research team	Funding organization
Narrative type	Educational	Scientific	Scientific	Media
Main characters	The research team at work	Birds	Birds and latitudes	Results found after the article's publication
Target audience	Current and future school partners	Research team	Participants: students and teachers	Not specified

This mapping exercise serves as a prelude to the outreach activities that follow.

PART 2

Fostering Sensitive Interpretations of Science

Outreach Activities

To explore a research project, one must certainly gather documentation on the project but also organize opportunities for engaging with it. ECODOC has experimented with several outreach activities to provide access to this raw scientific documentation and to see varied and multiple interpretations emerge from it.

These activities are part of a movement to renew outreach practices. Thus, these initiatives do not involve simplifying the project. The scientific documents are provided to participants exactly as they were produced; they were not accompanied by a lecture or demonstration and were not “translated.”

Furthermore, these initiatives are built around ongoing research projects, not established knowledge. The dissemination of research results is not a priority here.

Finally, these activities do not aim to replicate scientific experiments or handle tools and instruments, but rather to appropriate scientific information to generate new knowledge, whether scientific or not. In this regard, they are part of a dynamic of citizen participation in science and make it a principle to pay attention to listening to and expressing other perspectives and understandings of the problems scientists are addressing.

This led us to focus on sensitive approaches to science and to organize outreach initiatives that recognize the importance of individuals’ sensibilities in their reception of scientific issues and projects.

Following these principles, we have piloted three outreach initiatives for research projects, presented and detailed on the following pages:

- “Telling the Story of Science”: workshops on narrating scientific stories
- “From Tree to Leaf”: science slam writing workshops
- “It’s Your Turn”: game co-design workshops



A short (non-exhaustive) list of initiatives for engaging with and making sense of raw scientific data.

- **Drawing:** creating a story for a comic book or animated film;
- **Writing:** producing fiction, writing poetry;
- **Audio :** writing and producing podcasts or sound art;
- **Performing arts :** write and stage a physical performance, a play, or a gestural lecture;
- **Games:** create a board game, design an escape room, host a quiz night;
- **Educational:** reconstruct a timeline or use the data in workshops like the Climate Fresk.

These ideas can be implemented:

- **In the classroom:** from preschool through college;
- **Within a team:** research, lab, department, etc.;
- **During an event:** at a festival, a guided tour, a walk in the woods, etc.

2.1 “Telling the Story of Science” Workshop on Scientific Narrative

The way a research project is presented is a form of storytelling. One can describe the project by following its process, as one would in an article, or tell it from a subjective perspective, following the viewpoint of the researcher who conceived and led it. Or perhaps propose other narratives altogether. Each of these narratives reflects, through its interpretation of the project, a relationship to the subject under study, to science, and to its participants; as such, it can shed light on the concerns and sensibilities of these readers/narrators of the project.

The “Telling the Story of Science” workshops aim to work on constructing varied narratives that allow for multiple ways of telling the story of the research project. The workshop can serve as a working basis for researchers engaged in science communication or for science communication officers. In this case, it will be conducted by a team of professionals involved in the project.

However, these workshops can also be conducted with all types of participants to allow them to discover a research project by making it their own, by allowing themselves to construct and follow unique, original reading paths that create as many new journeys through the heart of scientific documents.

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PRACTICAL GUIDE

HOW TO ORGANIZE A WORKSHOP?

- **Duration:** 2 hours, including a 15-minute presentation, 1 hour of group work, and 30 minutes of debriefing, plus a 15-minute break in the middle of the program.

- **Materials:** pens and markers, sheets of paper, scissors, and tape.

- **Budget:** coffee reception and materials.

- **Format:** In-person preferred, but can be organized (and has been tested) remotely.

- **Facilitation:** by researchers or mediation professionals.

- **Participants :** 15 to 20 people. The workshop is designed for people who can read or who can receive reading assistance. In another type of workshop, the materials used were specifically with middle school students with disabilities, assisted by adults for reading, which leads us to believe that the “Telling Science” workshop could also be adapted for this audience.

- **Procedure:**

1. Divide participants into groups of 4. If the workshop is conducted in a professional setting, we recommend mixing different professions within each group.
2. Each group was assigned a research project and received a printed file and its digital copy, containing all the documents identified during the creation of the document map.
3. Participants were given “only one instruction”: to organize these documents to make them accessible and thus propose a narrative.

- **After the workshop?**

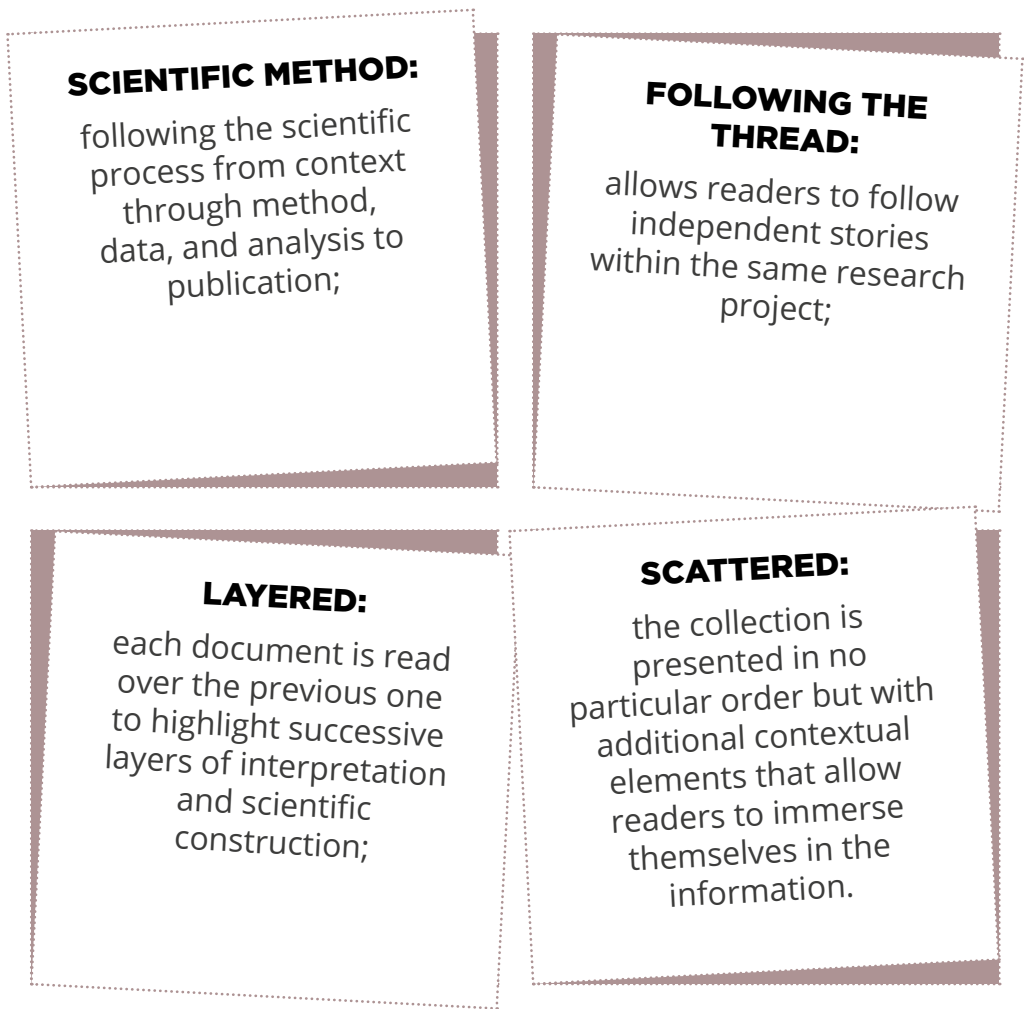
- These narratives or interpretations of the research projects facilitate understanding of the research projects and, as such, can serve as a foundation for collective projects, citizen science initiatives, or courses and training programs. They can also, after the workshop, be formalized for direct use in other outreach activities, as we did for the science slam and game design workshops (see sections 2.2 and 2.3).

An example of a “Telling Science” workshop

We organized a workshop with members of the steering committee, which consists of researchers, librarians (university and public libraries), science and/or cultural facilitators, and artists. The workshop was held during a committee meeting with some members participating solely via videoconference.

Each group worked on one of the four forest ecology research projects described above.

Four distinct narratives emerged from the workshop:



Materialization

These narratives were subsequently materialized so they could be used in other ECODOC outreach experiments, where they served as the basis for presenting research projects.

We will return to the use of these materialized narratives in the sections dedicated to science slam workshops and game workshops. Before that, let’s examine what the materialization of these unique research project narratives entails.

The following pages present each of these materializations, which ultimately take the form of a dossier, each with its own advantages and disadvantages, and can serve as a guide for materializing your own research projects, whether or not they follow a “Telling Science” workshop.

In short!

The “Telling Science” workshops have the effect of:

Facilitating the personalization of how science is read and, consequently, its narration and the transfer of knowledge. This involves accepting other interpretations, sometimes quite different, but always strikingly accurate, of our own research projects.

Make scientific outputs readable, if not perfectly comprehensible, by reframing them within a narrative that provides the right amount of contextual information.

To make visible what is at stake with science and its data, by designing variations in representation applicable to a variety of data.



The scientific method

NARRATIVE

The presentation of the information is organized into four sections that correspond to the successive stages of the scientific process:

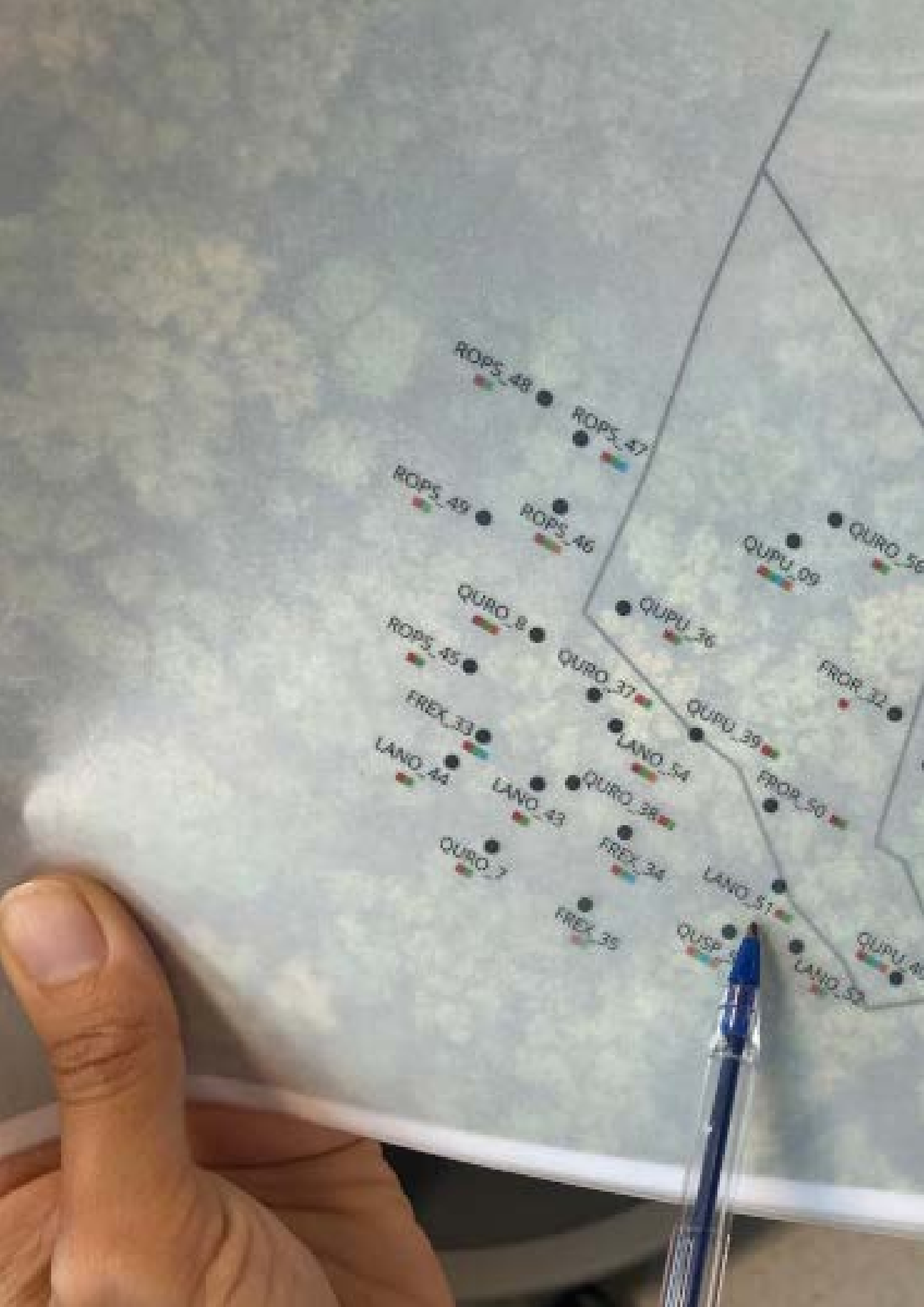
1. Context;
2. Protocol & Method;
3. Data, Collection & Analysis;
4. Results.

The organization guides the reading, but readers are free to approach it differently. However, this adoption of the academic format can be limiting, as it may give the impression that it is necessary to understand every step of the process and that only the most comprehensive overview is correct.

PHYSICAL FORMAT

- A5-sized booklet
- Cover page: project title, name of the project leader(s), summary.
- One sheet per step of the scientific method, with on the first page: the name of the step and the numbered list of documents that comprise it, and inside, the documents themselves.
- The documents are printed on A5 sheets, slipped behind this page. They can therefore be read independently of one another. Each document page contains only the document number and the data it presents.
- This format has the advantage of being easy to produce and print. It is also easy to carry and handle. However, it requires reorganizing the documents after each use.

This narrative facilitates understanding of the scientific method and allows one to assess the quality and integrity of the projects.



Layered

NARRATIVE

The layered representation shows the relationships between data and emphasizes the cumulative nature of the ongoing research.

Each layer demonstrates the addition of a new layer of information relative to the first. This breakdown helps to understand the cohesive meaning of the various documents used to describe the research project.

PHYSICAL FORMAT

This narrative may require manipulating existing documents to cut them into sequences. This will require a certain level of proficiency in desktop publishing and image manipulation, which implies, in addition to skills, a certain amount of work time following the narrative workshops.

Printing some documents on tracing paper and others on white paper presents no difficulty.

In terms of materials, this narrative requires brads to secure each group of tracing paper and facilitate their sequential movement. This physical presentation is not the most intuitive for participants, who initially explore the transparencies upside down.



Microtopographie



Vue aérienne



Bilan des potentiels hydriques



Marge de sécurité



This storytelling allows them to immerse themselves in the discovery process in an almost physical way. The information is revealed little by little, creating a sort of treasure hunt.



Scattered

NARRATIVE

Here, the documents are presented as deliberately unorganized, in a jumble. This narrative reflects and bears witness to the overflow of material that scientists face.

This disjointed narrative invites workshop participants to approach this project freely. It allows them the freedom to explore the collection of documents according to their own organization and logic.

PHYSICAL FORMAT

To materialize this scattered narrative, we printed each document on A6 sheets, creating a sort of unclassified, unorganized deck of cards. Each card features the information without context on the front, and its title or a short description on the back.

The cards are placed inside an A3 sheet folded into quarters. When closed, this sheet serves as a sleeve: its top section displays the project title and summary. When opened, the sheet unfolds like a research game board. We had printed a photo of the studied forest on it, but any other contextual or visual information can be included. This board serves, in a way, as a map and compass for navigating the information deck.

The final object is easy to transport and does not require reorganization after the educational activities, but it makes it difficult to identify missing cards, if any. On the other hand, to view and play with these cards, you need space on a table or on the floor.

This narrative requires a strong commitment from participants, who must reconstruct a narrative logic. In this sense, it serves as an excellent foundation for understanding the scientific information presented in the documents.

These narratives and their physical representations served as a foundation for the outreach activities we present in the following pages: the “From Tree to Leaf” and “Your Turn to Play” workshops.

2.2 “From Tree to Leaf”: Science Slam Writing Workshops

The previous workshops produce collective readings of the scientific narrative. However, the assimilation of this information also takes place on an individual level. Each person receives, understands and assimilates the narrative of a research project based on their perspective on the world, a perspective shaped by their gender, age, educational and professional background, family history, and languages.

The “From Tree to Leaf” workshops, science slam writing workshops, invite participants to put into words the dialogue they have with the scientific information they read. Writing allows one to re-read and connect scientific data to a personal, intimate concern, bringing the narrative into the realm of the emotional. This makes it easier to internalize the information because it is driven by emotion and the expression of unique concerns.

We have called this poetic, rhythmic writing of science, or more precisely, the rewriting of a scientific research project, “science slam.” We sometimes call it “scientific data slam” because our ambition was to make people hear, since slam is also an oral performance, what raw, processed, quantitative, qualitative, numerical, and photographic data, among others, can tell us about the world and the way we inhabit and experience it.

Through these writing and performance workshops, and by choosing poetry, we also chose to listen to what each person feels when confronted with a scientific problem and its treatment, without seeking to report precisely, accurately, or comprehensively on the research project. This choice of fiction and artistic license allows us to give a unified voice to three narratives, each of which is otherwise inaudible:

- the narrative of the trees, the one we read in our observations of them and the data we collect. Silent or difficult to read and decode without expertise;
- the narrative of the scientists, the one we read in scientific articles. Complex and codified;
- the citizens’ narrative, the one each person maintains with the world they encounter. Diverse, intimate, and confined to the private sphere.

Science slam workshops bring these voices together, allowing participants to meet and recognize that they are facing the same challenges.

What is poetry slam?

Poetry slam emerged in the 1980s, spearheaded by the poet Marc Smith, who wanted to make poetry less elitist. He thus invented slam, a form of performance poetry whose musicality is entirely carried by the words. As in rap, it features extensive use of wordplay, rhymes, and alliteration, which give the texts their full power. Poetry slam is performed not in salons but on open or competitive stages. This has the effect of turning poetry into a celebration: people cheer, applaud, and express their feelings in response to texts that are vibrant, moving, funny, technically skilled, and so on. It is socially engaged poetry, both in what it says about the world and in how it is produced, as slam aims to be an egalitarian form of creation, in the sense that all slammers have the same amount of time to perform (3 minutes), are not allowed any props or aids, and must read their own texts.



Poetry slam is performed, but it can also be read. Thus, the science slam texts written by workshop participants have been compiled into an anthology.

PRACTICAL GUIDE

HOW TO ORGANIZE A SLAM WORKSHOP?

Duration: 2 to 3 hours, including a 10-minute introduction, 20 minutes of exercises, a 10-minute slam demonstration, 1 hour and 20 minutes of writing, and 30 minutes to 1 hour of performance. Allow an additional hour for recording the texts.

Material: pens and sheets of paper.

Budget: coffee reception, materials, and compensation for the slam artists supporting the project.

Facilitation: by researchers or by professionals in outreach/facilitation and slam artists. To design and facilitate these workshops, we collaborated with Street Def Records, a Bordeaux-based slam and hip-hop association. This work was carried out during a research residency in Arès (Gironde, France) in October 2023.

Participants: Ideally 15 people, though we have already successfully tested this in classes of 25 to 30 middle school students. Our participants ranged in age from 11 to 83, but age matters less than the ability to read and write, although the workshop also works for people with disabilities, provided they have assistance with reading and writing.

Procedure:

1. Welcome with coffee, tea, pastries, and sweets;
2. Introduction to the research project and the facilitators;
3. Exercise: rhyming games;
4. Brief presentation of the research projects and scientific documents: project title, researchers' names, and project summary;
5. Slam poetry demonstration featuring texts created by the slam artists based on the research project documents;
6. Presentation of writing aids;
7. Writing. Participants were given a single instruction: to write a slam text based on the documents. The slam artists provided guidance and advice. The scientists answered any questions about the documents;
8. Exercise: pronunciation games;
9. Performance;
10. Recording.

STREET DEF RECORDS

Street Def Records

Street Def Records is a Bordeaux-based organization that offers cultural initiatives at the intersection of slam, rap, and poetry. It works with museums, theaters, schools, and medical facilities, and offers artistic performances in public spaces, poetry tours of sites such as the Musée d'Aquitaine or the St-Michel neighborhood, as well as a platform for expression through the organization of several open mic events, notably slam, rap, and jam sessions.

Street Def Records is made up of enthusiasts of rap, slam, and more broadly, everything related to the French language, united by common goals: to share a love of words, to contribute to community education and reflect on its challenges, and to champion and promote the spoken word arts. We also aim to provide artists, who are often underre-

presented, with opportunities for exposure and a path toward professional development.

The writing workshops are led by experienced artists and practitioners who are committed to sharing their passion and giving everyone the opportunity to express themselves through writing, or simply to have fun with it.

While these various facilitators offer tools that are, for the most part, their own and personal, they are all driven by the same philosophy: everyone is capable of writing, and writing allows us to free ourselves, to flourish, to fulfill our potential, and to express ourselves.

The “From Tree to Leaf” Workshops, Step by Step

As part of the ECODOC project, we organized science slam writing workshops titled “From Tree to Leaf”

PROVIDING MATERIAL TO WRITE ABOUT

Writing based on a specific topic is easier than writing based on a general theme.

To this end, our science slam workshops were based on providing scientific documents compiled following the “Telling the Story of Science” workshops. This requires time to organize these documents and time during the workshop for participants to look at and/or read them.



Sica

From the personal to the collective, Sica writes, conveys, and gives voice to emotions.



Fleyo

Fleyo, from Stockholm to Bordeaux, combines live performance, competitions, festivals, and songwriting.



Daitoha

Daitoha, a rapper and slam poet, blends poetry, the local scene, and national hits.

We also felt it was important to show that these documents could indeed be turned into slam poetry. To that end, we organized the workshop with three slam poets:

- Sica (<https://www.instagram.com/sicabx/>) ;
- Fleyo (<https://www.instagram.com/fleyo/>) ;
- Daitoha (<https://www.instagram.com/daitohastreetdef/>) ;

Each of them wrote and performed a slam poem inspired by the forest ecology research projects we are working on. Hearing these poems performed live in the workshops allows participants to discover slam poetry and to see that different—yet relevant and moving—interpretations can be drawn from the same documents.

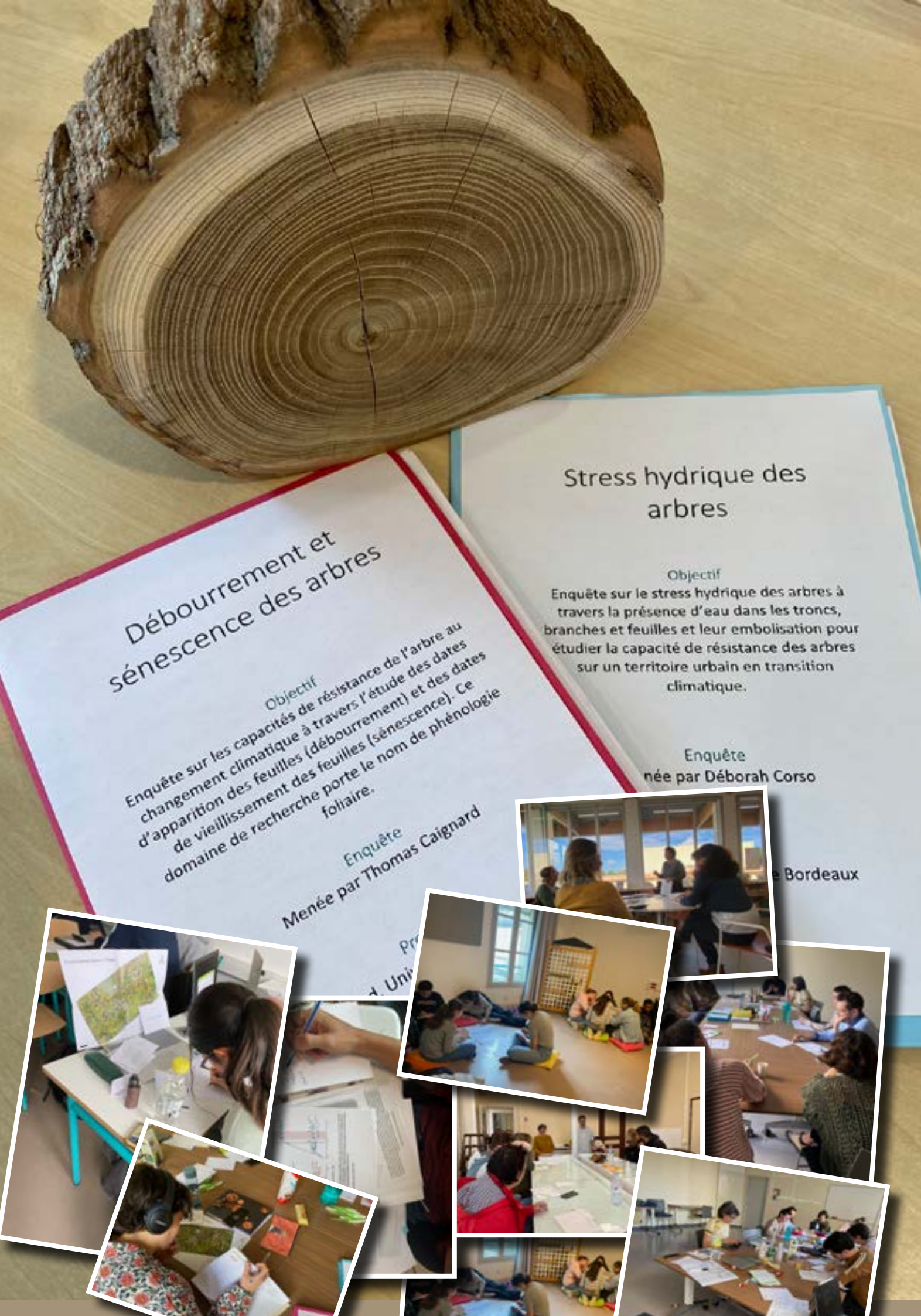


Participants' comments

“The handouts were quite engaging and educational. For me, it’s very difficult to make scientific content accessible and educational to make it more understandable. It’s a real challenge, in fact, for an audience that isn’t necessarily familiar with these subjects and issues. I found them well-done and easy to understand. You can quickly find the information, get a sense of the issue, and grasp the stakes surrounding this research. Even the format is quite practical for flipping through.”

“Actually, what I found quite interesting is that... it feels like it’s really raw data. But in fact, when you start really digging into the material, you realize that everything has been meticulously curated, that the content has been carefully selected, and that connections have already been drawn. Stories can already emerge from the presentation of the data itself.”

“I didn’t approach the documents in a linear way at all. I think I wanted to experience them in a more intuitive way. So, I took what resonated with me.”



WORKSHOPS ACCESSIBLE TO EVERYONE

Making the workshops accessible requires careful consideration of the venues for these gatherings and writing sessions. By organizing these workshops in partnership with municipal libraries (Arès and Floirac), and later through an event held on the Victoire campus of the University of Bordeaux (Festival Bascule(s)), we were able to reach people with diverse backgrounds and interests: some for writing, others for the theme of trees, others simply for group activities on Saturday mornings, and so on.

In addition, we organized this workshop with students from a ULIS (Localized Unit for School Inclusion) class and their peers from a 6th-grade class. We did not change either the content of the materials or the workshop's structure. However, we divided the children into groups to write collaborative texts. Note that in situations where adults from the school setting assist children with reading and writing, care must be taken to ensure that these adults leave enough space for the children to think and construct their own narrative based on this scientific information without constraints.

Finally, even if the documents are in French, there is no requirement to write a text in the same language. We thus had one text in Spanish and one in German. Some participants whose native language was English or Greek, nevertheless preferred to write a text in French.

In the words of...

"Organizing slam poetry workshops at the media library was a natural choice, as they align so well with the library's mission. The library, a space par excellence for exchange and expression, transforms into a vibrant stage where words come alive. Accessible to all, slam poetry is an oral art form that stimulates creativity, public speaking, and active listening. These workshops, true bridges between ages, genders, and backgrounds, foster connection and offer everyone the chance to explore their imagination and share their emotions. Thanks to ECODOC, they have also allowed participants to discover a facet of scientific research, to make its words and sounds their own, thereby creating a subtle yet essential link between science and society."

Béatrice Caule Maillard, head of the Floirac Library

The decision to structure the workshop into relatively short sessions also served to ensure its accessibility to everyone, providing a comfortable setting for participants with specific needs, such as young children, people with disabilities, those with dyslexia, ADHD, autism, or the elderly.

This structure of the workshop, divided into several sessions dedicated to diverse and varied learning and practical application, both written and oral, allows everyone to find their own pace and, in the process, grasp the techniques presented and experimented with.

Street Def Records

WRITING SUPPORT TOOLS

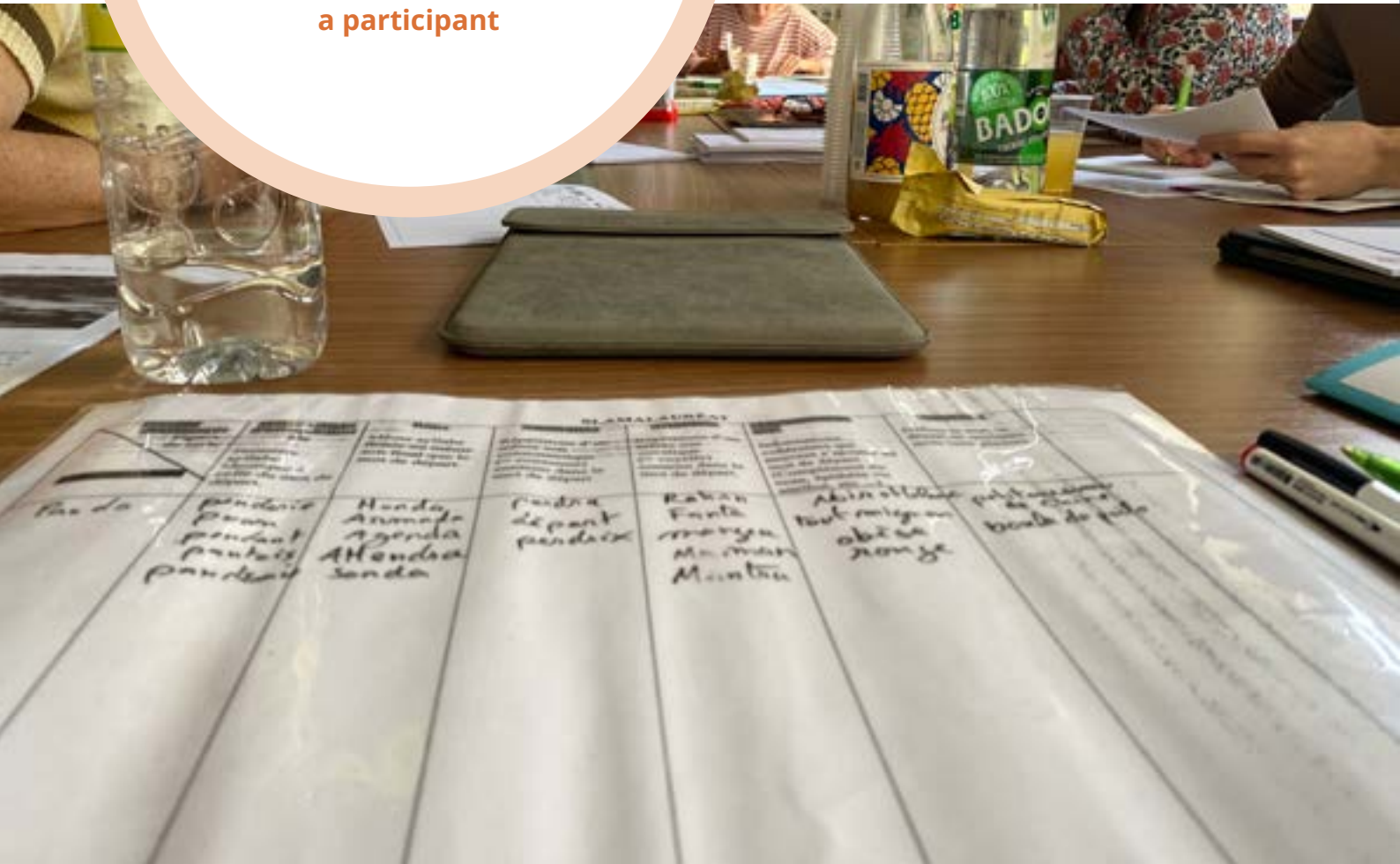
Street Def Records has designed and made facilitation tools available to groups. Oral expression exercises centered on word associations or tongue twisters (the archduchess’s socks...), the discovery of tools like the *slamalauréat*, and discussions with the various facilitators provide multiple entry points and anchors for writing.

Beyond the tools, the role of the facilitators remains essential and helps create a space of trust and sharing, while breaking down the top-down hierarchy of knowledge. The primary goal is to support budding poets, guide them, and offer advice when needed.

In the words of...

“You can use the slamalauréat, or you can choose not to. You can use it from time to time. But when you do, it’s a really cool tool. I realized that in my writing, I was missing things like that. In fact, I’ve used the slamalauréat for other creative projects.”

a participant



THE SLAMALAURÉAT

The slamalauréat is a tool born out of discussions between Elvis Lageante, known as Ésope, and Quentin Bats, known as Sica, regarding the various methods used in writing workshops. It has evolved over time, undergone several revisions, and been the subject of a research thesis exploring the potential uses of tools from poetry writing workshops in the context of French language instruction. Discussions following the tool’s implementation in various contexts have also made it possible to adapt it to different audiences and the specific objectives of each workshop.

The slamalauréat is based on the “petit bac” model, the word game ‘Categories’ and consists of a table containing:

- In rows: words chosen (for example, from ECODOC documents) for their meaning, sound, or evocative quality, selected freely according to the participants’ sensibilities;
- In columns: rhetorical devices (for example, alliteration, rhyme, assonance, initial syllables, wordplay, etc.).

The goal is to complete the table and build a set of words that will serve as a semantic field for the upcoming slam text. The words that appear in the table based on the various constraints are all linked by their sounds or their meanings.

This tool helps prevent writer’s block and thus refutes the very notion of a lack of inspiration, as it builds a solid foundation for writing a coherent text. Coherent because the words call out to and respond to one another. Coherent also, as the creative process unfolds, when each person, individually, manipulates them, sometimes reinterprets them, in short, makes them their own.

This creative approach is facilitated by the proposed tool but is not limited to its use: it is essential to guide participants in discovering and mastering it. Furthermore, the space in which it is presented plays an important role. This place of sharing and transmission, of open-mindedness and trust—which a writing workshop must be—allows everyone to experiment and express themselves freely, without fear or judgment.

Street Def Records





OUR WORKSHOPS IN FIGURES



WORKSHOPS



PARTICIPANTS



SLAM
POEMS

Key figures

- workshops in 1 year, from October 2023 to October 2024;
- 139 participants aged 11 to 83;
- 142 slam poems written, read, and sometimes recorded.

A variety of workshops

- with middle school students (11 years old);
- in the forest (as part of a guided tour);
- at a library;
- on a campus ;
- as part of a course or training program;
- as part of a festival program;
- during research residencies.

Among the participants:

- children with disabilities;
- a nursing home resident and her nurse;
- parent-child pairs;
- a rapper, a former elementary school teacher, a former bookseller, a dancehall singer, several librarians, a youth worker, a mediator, a caregiver for the elderly, special education assistants, a lawyer, a nurse, doctoral students, faculty researchers, a poet, and many others;
- People from Greece, United States, Comores and German-speaking Switzerland;
- and three slam poets!

Among the **142 texts written** during the “From Tree to Leaf” workshops, here are four...

Fruiting of the oaks

“

Flower as the seed of a tree
Stage one is statistically in development
The aborted flower, called an avorton, is it fertilized or not?
Open to the world, the seed reveals itself
Stage two accumulates cupule upon cupule
Visible and invincible, time stands still
The developing acorn denies abortion
Forged and transformed, it becomes king following stage three
A child spots it in the grove
Runs and advances before bringing it home

Calia Jacob



”

Dilated vessels
With beloved data
I race through the labyrinths
Of the forest trees
The most beautiful of trackings
The embellished embolism
Evaporated ration
Why bother?
Humans bare their teeth
Against my lethal life
And yet everyone knows that
Adam's charm is being a naked beech.

Louise Petit

”

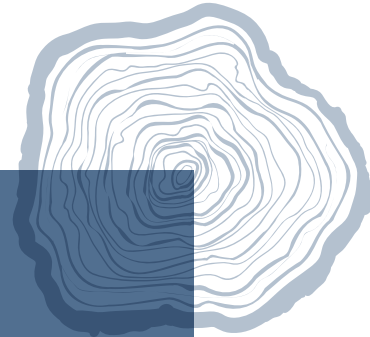
“

Juliette

This morning on the radio, they're talking about me
My name on everyone's lips excites and worries
Will I break all the records again this year?
My name is “water stress,” but I prefer Juliette.

I see them coming, armed with their tools
So-called defenders, they're intrusive
Probes, sensors, multiplexers, and dendrometers
Will you finally leave me alone, oh tender master?

Water stress



...one per research project, written by four participants, the youngest of whom was 14 at the time of the workshop.

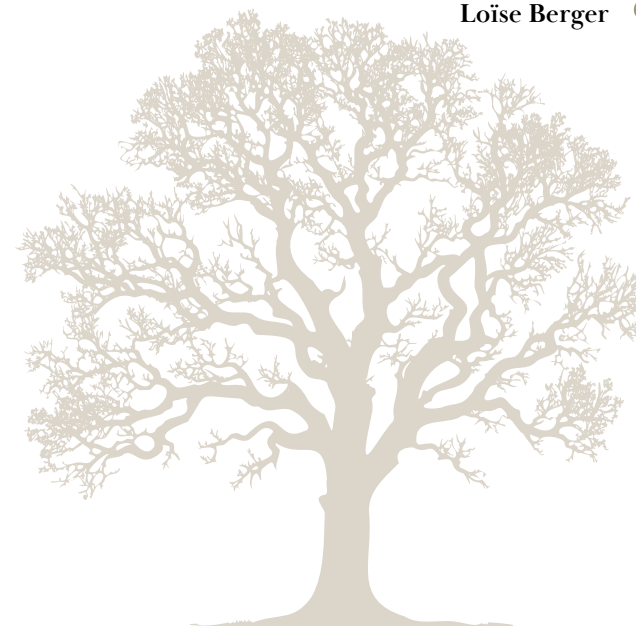
Budding and Senescence

“

They look at my body, they scrutinize my score,
they listen to my death, they lament my fate.
My bud swelling and the bourgeoisie snoring.
The closed flower, withered, limp, your fear withdrawn, lurking, sullied.
An explosion of leaves? An expansion of mourning? What does the sun do to the foliage?
A mad era that dries, cracks, burns, splits, crumbles.
Ex-tract of union between air and water, last rites in a thoroughly filthy era.
Melodrama of the pseudo-plane tree you capture with your drone, rotten psychodrama you dump on the kids.
Phenology of my leaves... Leave me alone, I'm dying.

Loïse Berger

”



“

Soon there won't be time.
I won't be able to go to Monaco.
Shaping life was harder than expected.
I thought I was finally at peace,
but no one told me I'd have to fight like at Stalingrad.

I was sure I was a predator,
maybe someone should've warned me that we're all prey.
I thought I'd reached the end,
but it won't stop as long as the mocking jay sings.

Success was just a zombie idea.
The complexity of social interactions only feeds my anxiety.
A linear path was what I hoped for,
but I wander between my choices.

Theory was easy,
but practice sucks.
Alone in the world like Chuck Noland,
I can't find my place.

I'm growing, my leaves are blooming,
but I'm getting eaten by caterpillars.
Ultimately, I live like a madman in a blurry world,
Overwhelmed by hate and change.
I sing of my sorrow in my lyrics.

Phylia

”



The contributions of the science slam workshops

The four texts you've read give you a glimpse of the quality of the writing, the poetry that can emerge from scientific information, and the participants' ability to make the materials their own to convey a personal or broader message.

*"Grumbling bourgeois or even sissies"
What do you care about all my feelings!
Quercus Petraea, Abies Alba
My leaves belong only to me!"*

Paduc

This research is the subject of an academic publication, which we will not cover in its entirety here. Let us nevertheless try to draw out a few key points for this guide.

As part of the ECODOC project, we conducted ethnographic observations of the workshops, analyzed the texts of 48 of these slams (those produced outside of a school context), and conducted about fifteen semi-structured interviews with participants.

*"Three hundred bodies,
three hundred trunks
Must he be in the synchrotron
To believe in what is truncated within you"*

Mathilde

PERSONAL READINGS

The challenge of turning information and scientific data into slam poetry was met. Every participant highlighted the importance of the tools provided. The availability of well-structured documents, as well as the slam workshop and other methods offered by the partner organization, Street Def Records, were absolutely essential for participants to engage with the materials and develop their own personal interpretations.

We were indeed able to observe the diversity of interpretations that can be produced from the same set of documents: the form of the texts, the underlying themes, and even the rhymes. While certain rhymes do indeed recur regularly (e.g., "bourgeon-bourgeois," "synchrotron-tronc"), they are never used in the same way, to say the same thing,

or within the same sentence or verse structures. In this respect, slam workshops truly allow participants to express something personal through both content and form, even when the texts are identical.

It seems to us, following Arturo Escobar, a Colombian-American anthropologist, and his concept of "feeling-thinking," that this sensitive approach to science allows participants to truly engage with complex themes that are difficult to decipher without the discipline's codes.

*"Robust trunk truncated by a hole,
quantified conquest of watery territory.
True is the excessive confidence,
this terrified earth crushed by this alliance."*

Léonore L.



KRONIKLE

The texts produced during the workshops are available on a dedicated website: the Kronikle platform.



INSTAGRAM

They have also been shared on the ECODOC Instagram account.



SITE ECODOC

A collection of texts has been produced and is available digitally on our website and in print at the project's partner libraries.

EXPRESSION OF CONCERNS

*“Okay, okay, take the data
and go study the laurel.
This is your chance to whine
about climate change that
stings and screws you over.
Damn that bloody
embolism, it’s keeping me
from finishing the whiskey.
Damn, the deadline’s
looming and the acorn’s
sprouting.
Stress is real, all the trees
are in a mess.”*

Morgane

The texts produced informed us about what the participants retained or understood from the files.

We were able to see that all the documents in the files were read and used in the texts. This is sometimes visible through the use of a word, a number, or a reference to an element.

The words that served as writing prompts were chosen for their sound or because of their meaning.

*“Success was just a zombie
idea.
The complexity of social inter-
actions
Only feeds my anxiety.”*

Phylia

*“But since climate change
has disrupted the heat and
disrupted the cycles.
Phenology in a panic, the tree
canopy in a daze.”*

Célie Filet

These ways of drawing from the documents mean that the slam poems are not an exact reflection of their content. While we expected texts that poetically recount the research projects and reflect them, the texts instead seem to use them to express personal concerns. For example, few texts fail to mention climate change or human impact on the forest, even though these two issues are not addressed in the files.

*“Who is he, a teenager, observing the shape of the flower.
An illustrative example of classification.
Why, why, just look at our expressions.
We call him the runt.”*

Kwassi

Slamming science, through the great freedom that poetry and the workshop offer, allows participants to express what matters to them, that is, within the context of our ECODOC workshops, what captures their attention when we talk about forests. For some, these will be collective issues such as solidarity and access to water; for others, it will be about how to grow, how to come into being in this world as an individual.

As a result, these texts are not scientific; they do not describe the project and are not sufficient to understand it, but are the expression of a poetic dialogue between science and society.



In the words of...

*“Suddenly, it brings
substance, humanity, and
personal and collective sen-
sitivity to these issues.”*
un·e participant·e

PRETEXTS

While these slam poems are not exact copies of the research project, they can nevertheless help define avenues for communicating research projects by providing a better understanding of which social and economic issues citizens associate with these scientific issues.

Bastien Castagneyrol, one of the researchers whose project was the subject of a slam poem, refers to these texts as “pretexts” that point us toward the concerns, obstacles, and opportunities for residents.

Furthermore, reading these texts, through the emotions they evoked, brought those present closer together by highlighting what they have in common: concerns, but also hopes, particularly regarding the role of science and scientists. This leads us to believe that the intimate and emotional expression of each person’s concerns regarding a shared topic can serve as a prerequisite for forming a group, particularly within the context of participatory research.

A SCIENCE SLAM WORKSHOP AT THE SOCIOLOGY DEPARTMENT

(1st quarter 2025)

As part of a course titled “Creative Approaches,” designed for third-year sociology students, **Agnès Villechaise**, a sociology lecturer and researcher and member of the ECODOC steering committee, proposed inviting the **Street Def Records** association to lead a sociology slam workshop.

The students worked with **Sica**, **Daitoha**, and **Jakhadi**, slam poets, to transform a scientific and sociological corpus on representations of disability, compiled by **Lucas Sivilotti**, a lecturer and researcher in the sociology of education and the project’s scientific advisor, into poetry.

On February 21, 2025, the students presented a deeply moving performance, combining technical skill and emotion, before an audience of faculty and family members, confirming the value of using poetry to engage with scientific concepts and successfully convey them.

“I found the slam poetry experience to be an original and engaging approach to helping students internalize sociological concepts. Using slam poetry as an artistic expression encouraged a sense of letting go and fostered a more sensitive and embodied way of writing about the concepts discussed, making their assimilation more intuitive and authentic.”

Lucas Sivilotti

“It’s a wonderful experience that allows for a mutual exchange of knowledge and enriches others just as much as it enriches oneself. We’re all united by a common goal, and together we’ve grasped sociological concepts and passed them on to people who knew nothing about them, yet they understood everything... and had fun doing it! I highly recommend this to anyone who wants to have a blast and learn in a different way!”

Margot Desbat, student



FEEDBACK: A SCIENCE SLAM WORKSHOP WITH MIDDLE SCHOOL STUDENTS

(ECODOC, May 2024)

Interview with **Marianne and Didier**, teachers at Georges Rayet Middle School, Floirac

Why did you choose to offer this workshop to your students?

We chose to participate in this project because it fits perfectly into the French curriculum. Additionally, the inclusive work conducted with students with special needs class seemed interesting to us as a way to encourage reflection on living together. Finally, it allowed us to begin work on the experimental forest.

What did you think of it?

We thought it was great! The facilitators, who are specialists in their field, adapted to the diverse group and offered a variety of well-structured activities that made sense for both the students and me.

Was the workshop useful for you and your students?

Yes, it was useful for fostering reflection on the experimental forest and, more broadly, on the relationship between art and nature. It was a clear and effective approach to science outreach.

Would you be willing to do it

We would be delighted to repeat the experience!

again?

Any advice for colleagues who would like to offer this to their students:

As was done for us, be sure to adapt the materials and activity suggestions to the students' age level. No preparation is necessary beforehand, but the students' work can easily be used and expanded upon.

Georges Rayet Middle School Workshop



BUILDING A SCIENTIFIC CULTURE

Through the analysis of written materials and interviews, we were able to hear what people took away from the experience.

For many, this involves both a newfound attention to trees (noting the dates when leaves appear or acorns fail to develop), a sense of relief knowing that science is addressing the issues that concern them, and an interest in little-known scientific methods (sensors, modeling clay caterpillars, the use of drones, etc.).

From the project itself, certain terms often stick, such as phenology or water stress, which people say they understand without necessarily being able to explain them. We do not see this as a problem. On the contrary, the attachment to these words and the shared experience with a scientific project also serve as a catalyst for new relationships between citizens and science. In this regard, the workshops have fully succeeded in their role as facilitators.

In the words of...

"Organizing slam poetry workshops focused on science communication, particularly regarding trees and forests, is an original and engaging way to raise public awareness of environmental issues. By offering a channel for creative expression, slam poetry makes scientific data accessible and engaging, transforming complex data into powerful stories or poems. This type of workshop allows participants to explore biology, ecology, and geography in a playful and poetic way, while fostering an emotional connection with trees and forests."

Diane Sasso-Launay, Director of Cultural Affairs for the Town of Arès

We couldn't have said it better ourselves, unless we were to slam it, perhaps...

SPACES AND TIMES FOR PRESENTATION

Presentation is an important step within the workshop itself. At the end of the writing phase and the warm-up using tongue twisters, participants are invited to take part in a brief, ephemeral slam performance and read their text to the entire group. This moment represents a first level of presentation.

A second level of presentation takes shape when the stories, in written or read form, are brought to different locations. As part of the ECODOC project, these have been reproduced in both physical and digital formats.

Leaving digital or printed traces

The team disseminated the produced slams across three platforms: On **Instagram**, two slams are posted each week to give them visibility on a network outside the university and the workshops.

On a distribution tool called **Kronikle**, for which we developed a dedicated instance for the ECODOC project. The texts are placed there within their creative context and alongside other texts written on the same themes.

On **SoundCloud**, where we uploaded the recordings made during the workshops.

Finally, we compiled all the texts into a slam anthology, published in both print and digital formats. The anthology serves as a record of the project, a token of appreciation for the participants who receive it, and an archival resource that can be deposited in a library.

All these dissemination efforts required significant work transcribing the texts and then formatting them for online or print publication.

Events and Performances

Throughout the project, several events provided opportunities to showcase the science slam poems that were created. At the **Bascule(s) Festival** and the **Climat Libé Tour**, two booths were set up to display the slams in various formats and allow visitors to listen to them through headphones.

During the Bascule(s) Festival, **Radio Campus'** presence allowed us to present the project's origins and have several participants perform live. The broadcast is now available online.

Finally, as the culminating event of the "From Tree to Leaf" workshops, the ECODOC project organized an evening event at Villa Valmont, the House of Writing and Landscapes, which allowed all project stakeholders (participants and research teams) to present the experience, discuss their feelings and the project's impacts, and offer a final ECODOC stage to aspiring slam poets.



COPYRIGHT

All these formats of dissemination require consideration of copyright. In line with the principle of open data for the research project, we sought to prioritize systems that allow for the widest possible sharing while respecting the attribution of the stories to their authors.

Thus, all collected narratives have been licensed under a Creative Commons BY license. At the end of each workshop, authorization forms were distributed so that participants could be informed and then confirm the license, while choosing the name under which their authorship would be displayed (either first and last name, a chosen pseudonym, or a pseudonym randomly generated by the team).

You can consult your university's DPO to determine the rights that best suit your specific uses and needs.

2.3 “Your Turn to Play” Game Co-design Workshops

Science outreach programs often include playful activities, such as games, quizzes, memory games, or similar, which facilitate the acquisition of knowledge presented during the outreach session. In fact, games have proven to be effective educational tools because they break away from top-down formats of knowledge transfer and make audiences more active participants in their own learning. Offering such serious games helps energize educational programs centered on research projects.

The “It’s Your Turn to Play” workshops aim to design these playful activities, which are essential for research outreach. They can be used by research teams or with people outside the project to create a game concept that will later be developed and used in other settings where future players can learn about the research project. They can also be organized without the intention of producing the game afterward, as the design experience itself is the intended form of outreach.

These workshops are therefore an excellent way for participants to engage with the research project, reflect on the key points to retain, and place themselves in a role of mediation. By seeking to create such a tool, participants take on the responsibility and challenge of framing scientific information in a narrative way, which greatly contributes to their understanding of it.

FOR YOUR INFORMATION

INFORMATION, INTERACTION, AND DESIGN....

These game co-design workshops were the result of a partnership between **URFIST Bordeaux** (Raphaëlle Bats, Mathilde Garnier), **Inria Bordeaux** (Martin Hachet, Yvonne Jansen), and the Master’s program in Design at the **University Bordeaux Montaigne** (Emilie Clément).

PRACTICAL GUIDE

● **HOW TO ORGANIZE THE “YOUR TURN TO PLAY” WORKSHOP**

● **Duration:** 2 hours, including a 10-minute introduction and contextualization, 1.5 hours of group work, and 20 minutes of presentation, depending on the number of groups.

● **Material:** pens and markers, sheets of paper, scissors, and tape.

● **Budget:** coffee reception and materials.

● **Format:** in-person.

● **Facilitation:** by researchers or by mediation/facilitation professionals

● **Participants:** 15 to 20 people. The workshop is designed for people who can read or who can receive reading assistance. In another setting, the materials used were specifically with middle school students with disabilities assisted by adults for reading, which leads us to believe that the “Your Turn to Play” workshop could also be adapted for this audience.

● **Procedure:**

● **1.** Participants were divided into groups of 4 to 5 people, selected a research project, and received a printed packet in the form of one of the materials described in the pages on the “Telling the Story of Science” workshop (page 22). During the workshop, the facilitators remained available to answer any questions about the materials.

● **2.** The key elements of game design and the constraints were presented orally and provided in printed form to the participants.

● **3.** The participants were then given a single instruction: to invent a game that would validate the knowledge learned in the packet. The groups were given (almost) complete freedom to create games tailored to their understanding of the packet and what they wanted to convey. They were advised to draw inspiration from games they know and enjoy.

● **4.** Each group designed its game using the materials provided and described it with drawings and text on storyboard sheets. Using these storyboards helps, once the design is complete, to organize ideas in a coherent, structured, and visual way, without overlooking key elements (game rules, number of players, spatial positioning, etc.).

The “Your Turn to Play” Workshop, Step by Step

Five game design workshops based on scientific documents collected from forest ecology researchers were organized in the spring of 2024.

The first was held at Inria, with an invitation extended to Inria colleagues and students in the Master’s in Design program at Bordeaux Montaigne University. Those in attendance were not familiar with forestry topics, but were well-versed in design and creativity.

The second series of three workshops was organized as part of a second-year undergraduate course in Information and Communication Sciences at Bordeaux Montaigne University. During a tutorial on the challenges of science communication, students were invited to design games on a topic outside their field of study, using creativity techniques rarely employed in class.

Finally, the last workshop was held at the Roland Barthes Library in Floirac. The workshop was part of the library’s program and required registration. A youth worker from the community center brought two teenagers, aged 12 and 15, to participate in this workshop.

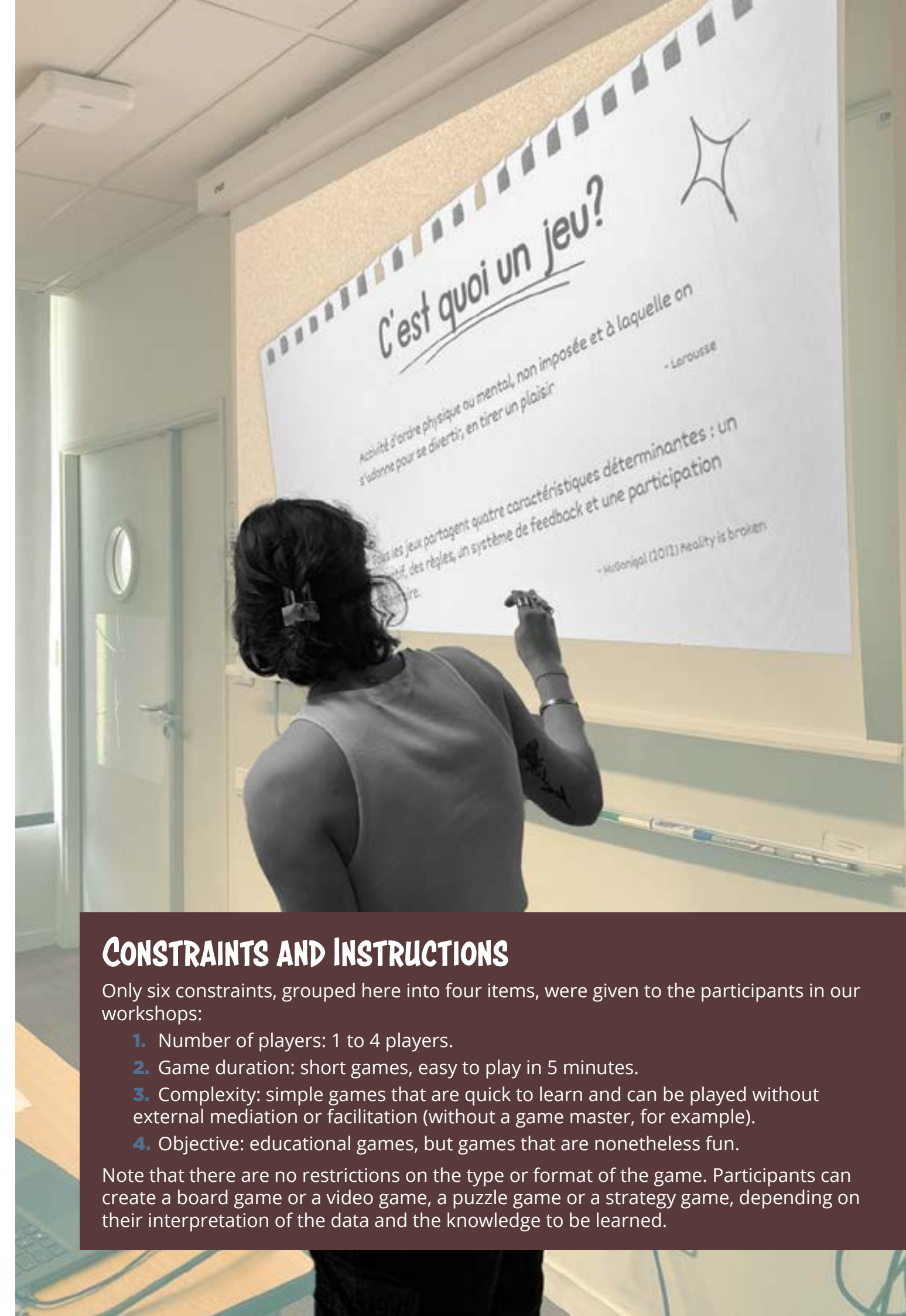
In the five workshops mentioned above, two hours were sufficient for each group to propose a game detailed enough to convey its objectives, rules, necessary materials, and playing conditions. Moreover, each group created a unique game, sketched and described it, sometimes even going so far as to design the game boards, pieces, avatars, and so on.

At the 2025 edition of the Bobcatsss International Conference in Istanbul, the team sought to test the workshop’s adaptability to other topics and proposed an adaptation of the “Your Turn to Play” workshop based on an educational game about the current social and technical challenges of artificial intelligence (AI) developed for a course.

The workshop, lasting 1.5 hours, brought together six participants, divided into three groups. Three games were thus designed and described:

- **A game on the history of AI** where players must match items on a timeline.
- **A game inspired by Candy Crush** featuring logos of research tools to help players learn about their uses.
- **A matching game** where players must group AI tools with the same function, the same level of complexity, or according to other categories that group them together.

This workshop confirmed the possibility of adapting this form of facilitation through game design to different themes and different contexts of knowledge transfer.



CONSTRAINTS AND INSTRUCTIONS

Only six constraints, grouped here into four items, were given to the participants in our workshops:

1. Number of players: 1 to 4 players.
2. Game duration: short games, easy to play in 5 minutes.
3. Complexity: simple games that are quick to learn and can be played without external mediation or facilitation (without a game master, for example).
4. Objective: educational games, but games that are nonetheless fun.

Note that there are no restrictions on the type or format of the game. Participants can create a board game or a video game, a puzzle game or a strategy game, depending on their interpretation of the data and the knowledge to be learned.



Types of games designed in the “Your Turn to Play” workshops

A total of **21 games** were designed during the “It’s Your Turn” workshops on trees and forests, demonstrating the great creativity and richness of the concepts proposed by the participants. Five distinct categories of games emerged, based on game mechanics and winning strategies:

- **Trivia games** requiring players to combine correct answers with quick execution under pressure;
- **Observation games** requiring players to organize series of information received at different times;
- **Memory games** testing players’ ability to combine acquired information with short-term and visual memory of the game board;
- **Games of chance**, where knowledge acquisition does not proceed through successive layers of information but must be mobilized randomly, driven by a process of luck or chance;
- **Simulation games**, where players must master a specific mechanism that allows them to apply the knowledge they have acquired.
- **Memory and observation games** are similar in principle but use different mechanics (time and space), which justifies their separation into two categories.

The table on the following spread summarizes each game created with descriptive details.

PRODUCING THE GAMES AFTER THEIR DESIGN

Beyond simple co-design, it is possible to proceed to the production and publication of the game, but this requires careful planning in terms of time and budget starting from the workshop preparation phase, or even the research project phase.

Funding for this type of science outreach project can be secured through various means:

Research funding agencies, such as the ANR, encourage the inclusion of outreach and dissemination activities in their calls for proposals;

The ANR’s 1% CSTI (Scientific, Technical, and Industrial Culture) program also provides funding opportunities;

Partners, such as the Science and Society departments within higher education and research institutions or the Centers for Scientific and Technical Culture (CCSTI), can also assist in securing the necessary funding.

The design developed in the “A vous de jouer” workshops is generally not sufficient to create the entire game mechanics and the design of the cards, boards, dice, and other game components. One can turn to an association or a company specializing in game engineering, such as Prismatik or Scube, which have supported numerous scientific projects in game creation.

The cost of a game varies widely, depending in particular on its complexity, the physical resources required (cards, tokens, boards, etc.), and the human resources needed for its design. Consequently, production timelines can also vary, generally ranging from one to two years between the project’s launch and the first official game session. This timeline includes the design, testing, and printing phases.

To discover other initiatives or discuss projects combining science and games, you can contact the National Observatory of Scientific Culture Games (ObsciGame).

Legend	
2 	Number of players
	Quick game
	Long game
	Card game
	Skill game
	Dice game
	Video game
	Team game
	Outdoor game

	Jeu de questions	Jeu d'observation
	Quiz Game	Spot Game
The Sloaker Game		
untitled		
Mille-Leaves		
The Acorn Free One		
Oak Me Up!	2-4   	
FOR'QUEST	2-4   	
What tree for Floirac?		
Beleaf		1    
Oak Race		
HYDRA-TREE		
Floirac Forest Happy Families		
Hy-dratus Robur		
Epic Woodland		
Objective Acorn	2-4   	
Bud Bluff!		
Memory acorn		
Acorn, set, go!		
The Oak Cycle	2-4   	
No stress forest !		
Wintering		

Jeu de mémoire	Jeu de hasard	Jeu de simulation
Memory Game	Lucky Game	Simulation Game
		2   
		3    
		2-6   
2-8   		
		1   
	2-4   	
2-6   		
		1   
		2-6   
2 et +   		
2-6   		
	20    	
		1   
	2 et +   	

TRIVIA GAMES

Trivia games, or puzzle games, are games where players answer a series of questions to test their knowledge in various fields. This type of game can take different forms, such as board games or video games.

For example, during one of our workshops, a group created the game For'Quest. This game is based on a research project on oak fruiting.

The goal of the game is to help the trees in the forest grow by demonstrating the ability to identify the different stages of development of the trees' fruit.

To do this, players are invited to move forward on a board, similar to a board game. They must draw cards and then answer questions, which can be multiple-choice, true or false, or open-ended. Players earn points for each correct answer; the number of points varies depending on the difficulty of the question. Each point earned helps their tree grow and contributes to the growth of the forest.

Designing the game required significant work describing the trees and their fruits.

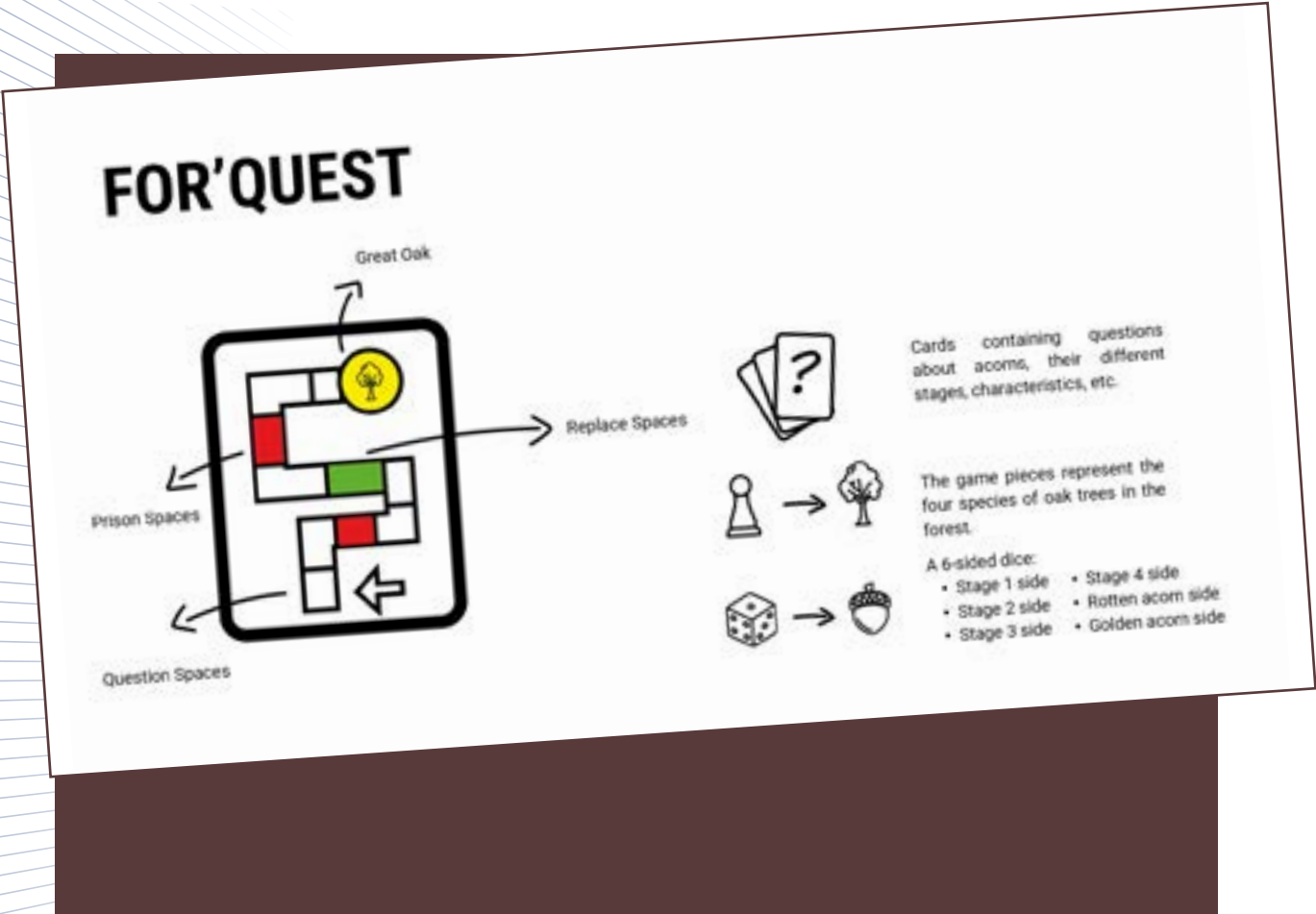
SPOT GAMES

Observation games are games in which players are initially given information in the form of text, images, or audio, and are then tested on their ability to visually recognize or identify this information in a different context or among other elements. An observation game can take various forms, such as board games or video games.

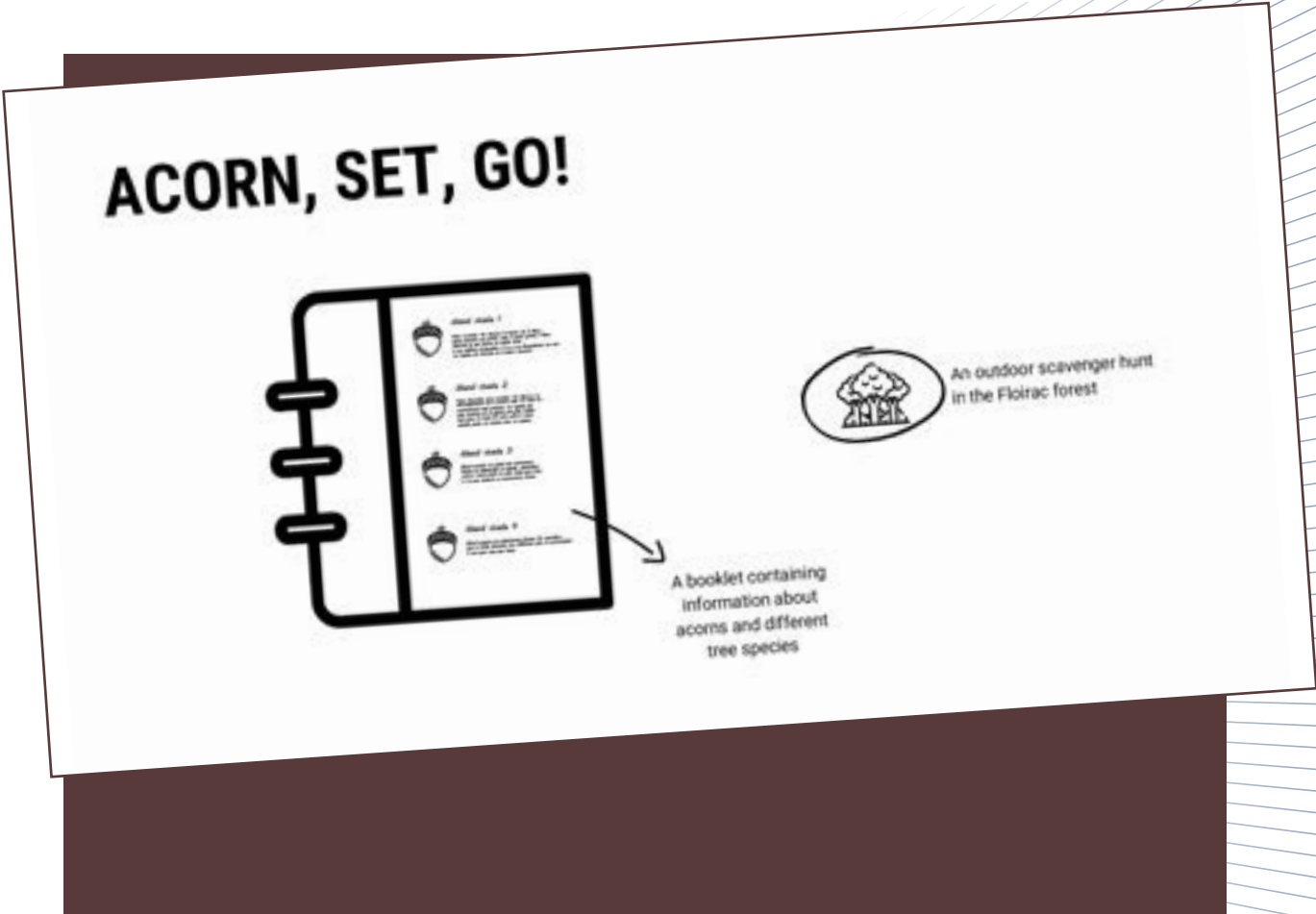
For example, during one of our workshops, a group created the game Acorn, Set, Go! This game is based on a research project on oak fruiting. The goal of the game is to explore the forest and learn to identify the different stages of fruiting in its trees.

To do this, players participate in an outdoor orienteering race in a forest and must identify the fruits of the trees that match the descriptions provided in a game booklet. Players earn points for each correct identification. Points may vary depending on the rarity of the identified item. Points are validated based on the fruit that is physically collected or photographed.

Designing the game also required significant work describing the trees and their fruits.



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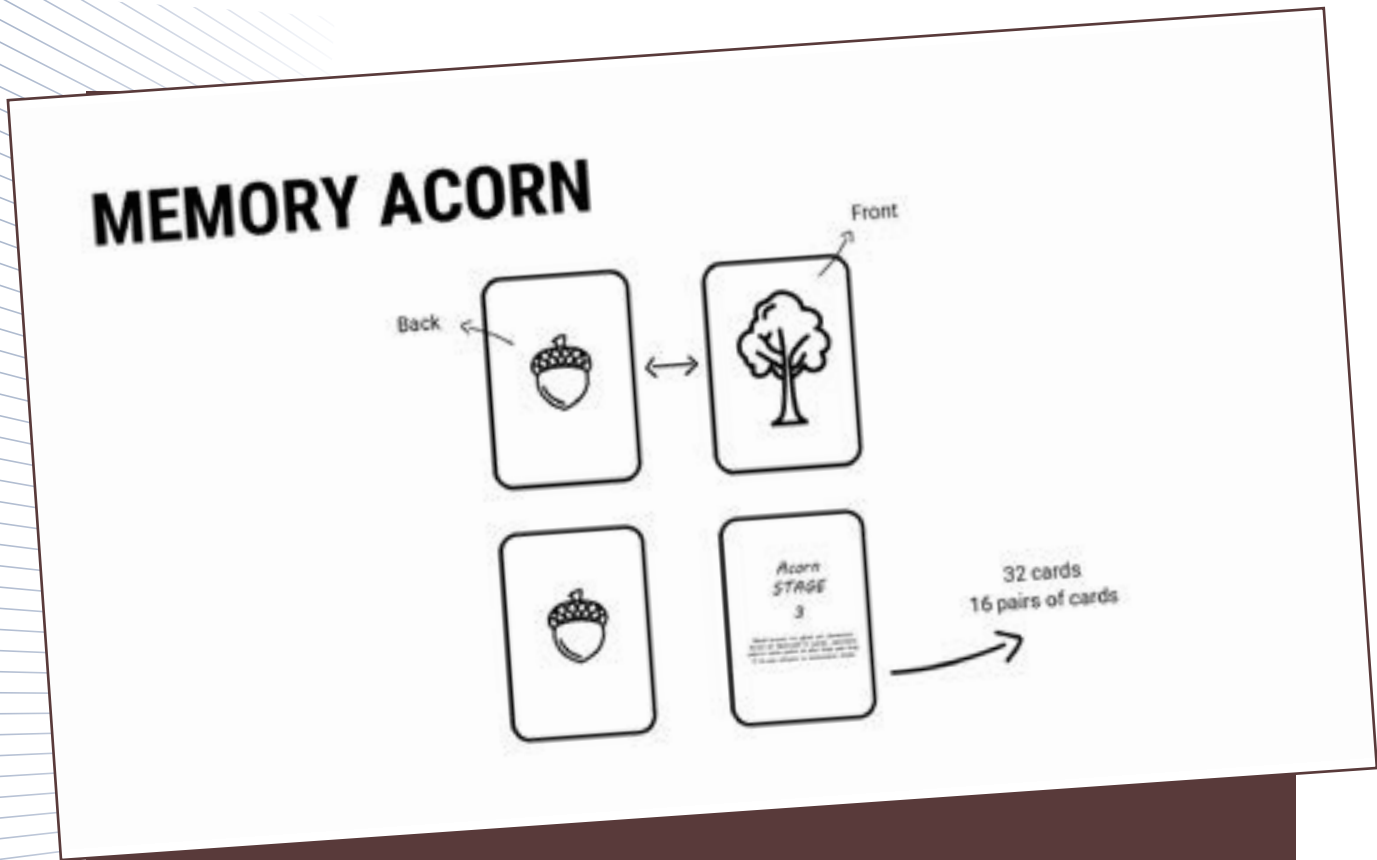
MEMORY GAMES

Memory games are games in which players must recall previously presented information to complete tasks or solve challenges. A memory game can take various forms, such as board games, video games, etc.

For example, during one of our workshops, a group created the game Memory Acorn. This game is based on the research project on oak fruiting. The objective of the game is to win as many cards as possible by demonstrating the ability to identify the different stages of development of the tree fruits.

To do this, players are asked to collect cards that do not have the same image but share the same meaning. Thus, one card will have a definition and the other a photo of the object being defined.

Designing the game required the group to develop strategies such as identifying patterns and creating associations and connections between different elements. A good memory and concentration can help players collect the requested items.



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SIMULATION GAMES

Simulation games are games in which players are confronted with complex situations or interactive mechanisms that they must understand in order to succeed. Solving these problems often involves critical analysis, logical deduction, and sometimes experimentation to find effective solutions. In this type of game, players can take on different roles, each with distinct abilities and responsibilities.

For example, during one of our workshops, a group created the game Mille-Leaves. This game is based on a research project on leaf phenology.

The objective of the game is to grow the trees in the forest by demonstrating the ability to identify the different stages of leaf development on those trees.

To do this, players, much like in Mille Bornes, compete against one another and must succeed in growing their forest before their opponents.

Players are encouraged to use resources (bonus cards and penalty cards) and choose the actions most beneficial to achieving their goal. They must be able to identify the penalty resolutions needed to restore growth to their forest.

Designing the game required a significant effort to understand the obstacles to forest growth.



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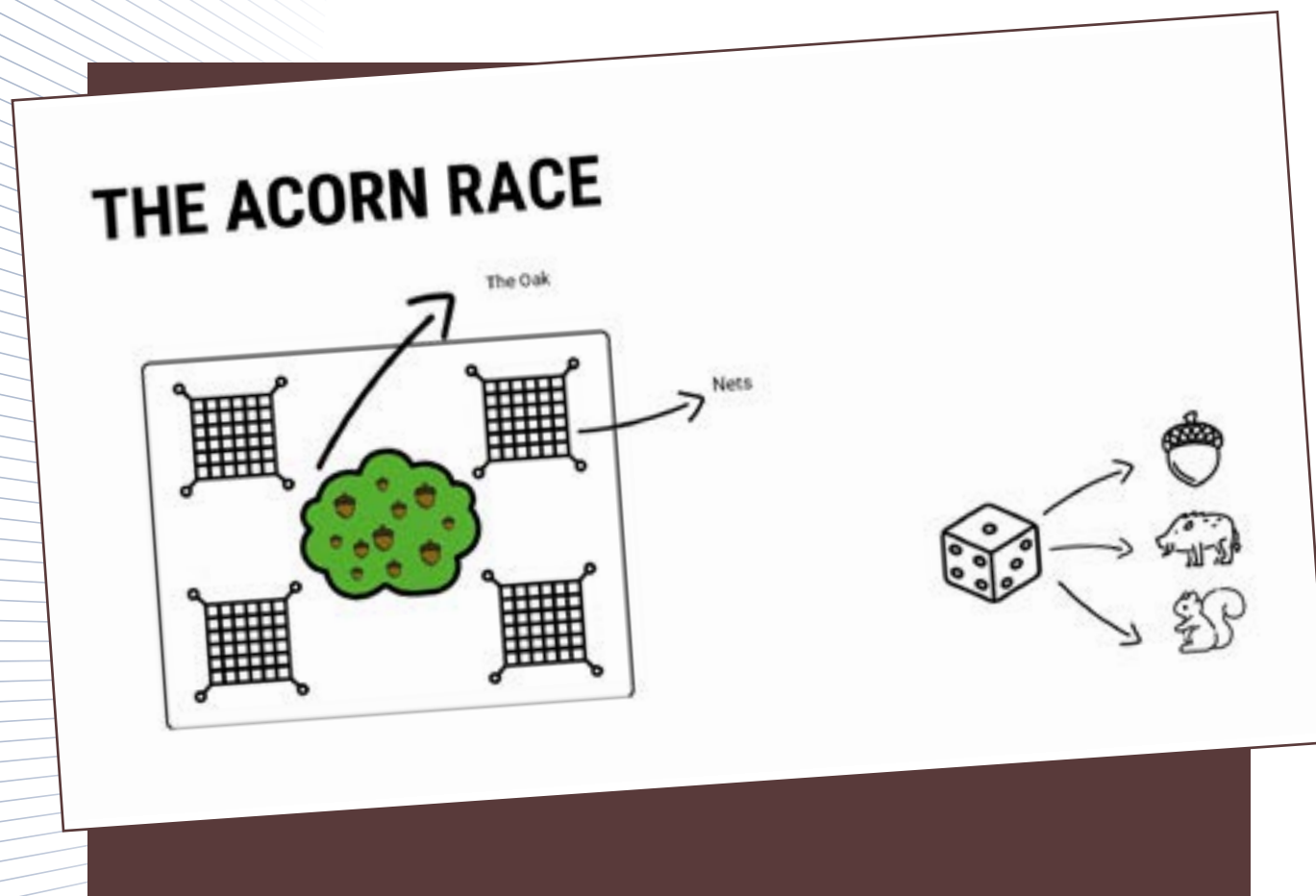
LUCKY GAMES

Games of chance are games where success and failure depend mainly on luck rather than specific skills or an elaborate strategy. Nevertheless, luck is often associated with speed-based mechanics that require players to have understood the meaning of the information presented in the game.

For example, during one of our workshops, a group created the game « Acorn Race ». This game is based on a research project about oak fruiting. The objective of the game is to collect the most stage 4 acorns to grow your forest.

To do this, players move around a board and roll a die that allows them to either gain an acorn from stage 1 to 4, steal acorns from opponents (squirrel), or lose their own acorns (wild boar). To play quickly and win, players must be able to identify the different stages of oak fruiting.

The game's design required the team to consider the conditions under which these fruits appear, some of which are more abundant in the game than others.



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Validity of Information in Games

The design of the games confirmed everyone's ability to grasp scientific information and make it their own. But what about the validity of the information presented?

If the workshop's goal is to spark curiosity about the topic, then the workshop stands on its own. The diversity of the games reflects the curiosity and enthusiasm generated among the participants. On the other hand, if the workshop aims at knowledge acquisition, then the quality of information presentation is essential.

Discussions with the researchers leading the projects that inspired the game designs allowed us to assess the accuracy of the games, particularly those that, beyond conveying established knowledge (such as the stages of fruit development on trees), help participants understand the processes at work that explain the changes trees undergo.

Nevertheless, it is important to remain vigilant to ensure that the workshop's objectives, namely, to help participants learn scientific data and knowledge and to guide them in creating tools for learning scientific knowledge, are fully achieved. Moving from one of these objectives to the other requires verifying that the scientific knowledge and processes discovered in the resource pack are well understood.



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SCIENTIFIC INFORMATION AND GAMES

Our analysis of the designed games revealed that participants drew upon all the documents made available to create their games. However, they showed a clear preference for information presenting protocols and methods, perhaps at the expense of information presenting data analysis and results.

The visual nature of the documents in the Protocol section (in the given implementation) partly explains the heavy reliance on these elements. For instance, in one of the research projects, a table featuring photos of leaf development with captions became the focal point for most groups.

Visual documents and photos, which provide clear and quick representations of information, are the easiest to use without requiring in-depth reading, which is particularly useful during the rapid development of a game. Furthermore, photos are often more appealing and memorable than text alone, which enhances their effectiveness as reference tools.

In short!

To ensure the validity of the knowledge, it may be helpful to place the game design workshop within a learning context by:

- Prior to the workshop, knowledge transfer in the form of a resource packet, a research project, or activities such as attending a lecture, watching a video, or visiting an exhibition, etc.
- After the workshop, a knowledge assessment session can be organized either within the game by providing knowledge assessment worksheets, or in a mediation or teaching setting by reviewing the knowledge acquired.

IT'S YOUR TURN!

[illegible]

Conclusion

This guide presents a possible application of the research conducted during the first phase of the ECODOC project. This phase involved reflecting on the processes of producing, translating, and appropriating scientific information.

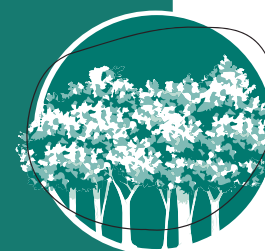
We have drawn conclusions regarding scientific mediation, the creation of narratives, and the sharing of diverse interpretations that we can construct from a documentary corpus reflecting the diversity of the processes through which scientific knowledge is produced. It is this work on sensitive interpretations of research that we wanted to share with you.

This guide now awaits implementation so that these experiments can be organized in other places, with other audiences, on other themes, and for other disciplines.

We firmly believe that this approach will benefit both science and society and will contribute to the necessary dialogues we must engage in to adapt to the territories in transition where we live.

In the meantime, the ECODOC project continues. The next steps will focus on developing a system to showcase these sensory readings, which can be set up and used in libraries, classrooms, the forest...

To be continued...



To learn more about the project and its progress, please visit the dedicated website: ecodoc.u-bordeaux.fr

For any questions, please contact:

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Postface

The ACT project (An Augmented University for a Campus and a World in Transition) was launched to enable the University of Bordeaux to become a key player in societal and environmental transition. With this in mind, one of its objectives is to empower the entire community to act as agents of transition and to strengthen the sense of belonging. This is why, from its very conception, ACT's aim was to organize real-world experimental laboratories, now known as Living Labs, which are intended to be testing grounds where citizens, residents, and users are considered key actors in the research process.

The ECODOC project is one of the projects supported by ACT. It is part of the Climate and Biodiversity Living Lab, one of ACT's six Living Labs. By enabling residents to craft their own narratives using forest research data, ECODOC facilitates understanding of the researchers' study topics and fosters connections between communities. This connection and the appropriation of scientific data should foster a sense of closeness, spark interest, and ultimately engage citizens in the transition. The circulation of information indeed enables the participation of various local stakeholders, but beyond that, it offers everyone the opportunity to make decisions.

However, given its research topics, ECODOC extends far beyond a single Living Lab and provides valuable tools for researchers and organizations seeking to develop their outreach activities. ECODOC offers useful insights to researchers and practical tools for listening to all voices within a region. The project illustrates, through concrete examples, how to give people a voice through, for instance, slam poetry, or how to enable any audience to participate and make proposals. This outreach guide brings together tools and practical advice to facilitate, regardless of one's field of study, the outreach approach one wishes to pursue.

As envisioned within the ACT framework, this project highlights different ways to address major transition challenges and explores how to mobilize multidisciplinary expertise and the diversity of our community, external stakeholders, and citizens. Through this guide, ECODOC paves the way for future projects.

Elodie Martin

ACT Program Manager

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LET'S SLAM OUR DATA

We slam data from another domain,
Strong in theme, we slam our problems
Not the problems of pacified crowds
But the prolegomena of emancipated folks
that's our slams proliferating
that's our words interfering
We arrange and balance our affinity
We mix the frequencies of our equality
Emotion liberated
Stories shared.
Our citizen science project can begin!

Raphaëlle



ECODOC

université
de BORDEAUX



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