The Researcher's Toolbox: Transforming Data into Stunning Presentations

Planning Effective Presentations

Graziano Ciocca

IR0000032 – ITINERIS, Italian Integrated Environmental Research Infrastructures System
(D.D. n. 130/2022 - CUP B53C22002150006) Funded by EU - Next Generation EU PNRR-Mission 4 "Education and Research" - Component 2: "From research to business" - Investment 3.1: "Fund for the realisation of an integrated system of research and innovation infrastructures"

Finanziato dall'Unione europea NextGenerationEU
Ministero dell'Università e della Ricerca
Italiadomani

Who are the science communicators?

They explains scientific ideas in clear and engaging ways, helping many people understand how nature and technology work.

Piero Angela

They spark interest

Who are the science communicators?

G.Eco is an Italian company focused on **environmental education**

Tool n. 0:

THE TOOLBOX
AKA
WHAT SCI-COMM IS

WHAT IS SCI-COMM?

Science communication

is the practice of

raising awareness of science-related topics

informing

getting involved with audiences

that include, at least in part

people from outside the science community.

WHY IS SCI-COMM IMPORTANT?

Spread knowledge by making science accessible to all

Enable informed decisions for society and individuals

Prevent misinformation and debunk fake news

Spark curiosity and inspire future scientists

Build trust through transparency and credibility

UNIVERSITIES MISSIONS:

1 EDUCATION

Knowledge transmission

2 RESEARCH

Knowledge Creation

3 THIRD MISSION (OUTREACH)

Knowledge Exchange & Impact

WHAT IS THE THIRD MISSION?

Transforming academic knowledge

into

value

through

direct engagement

with

civil society

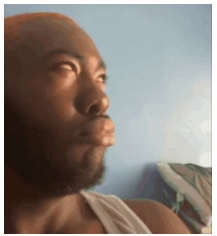
business sector

- economic
- cultural
- social

THIRD MISSION ACTIVITIES

- **Contract research & Consultancy**

  (*Third-party research*)
- **Archaeological sites and museum hubs**
- **Consortia and other activities**
- **Lifelong learning / Continuing education**
- **Public Engagement**



What is PE?

What is “Public Engagement”?

Several initiatives aimed at sharing

Results **Processes**

of Research

+

Nurturing the mutual exchange of

- **knowledge**
- **skills**
- **views**

with the various social actors

Tool n. 1: Requirements gathering

How much time do I have to perform?

Who is my audience(s)?

Is my audience prepared on the topic or they don't know nothing?

Is my audience interested on what I'm going to show/tell?

Where the activity will have place?

How many speakers are before/at the same time/after me?

What they will talk about?

MEASURING TAPE: Requirements gathering

Takeaway:

You have to know what the client and the audience expect from you and what constraints you will have.

Tool n.2: choose your goal

In pedagogy, what is the meaning of "goal" (or "objective")?

Something that the audience will learn/will be able to do after participating in your activity.

PENCIL: choose your goal

So, ask yourself:

(and write it down)

What do I want to talk about?

What is the single most important thing I want my audience to do or think when they leave the room?

Which goal I'm pursuing?
Awareness
Belief or
Committment?

PENCIL: choose your goal

Takeaway:

What do I want that my audience will do / believe after my presentation?

This is the goal and should be your compass.

Tool n. 3: planning

You should say/show something if it is useful to

- **Deal with the topic**
- **Engage the audience**

Tool n. 3: planning

SECOND: the words

Every scientific term (jargon)

If unnecessary → **Should be removed**

If necessary → **Should be introduced**

Sandpaper: planning

Takeaway:

When you’re preparing your presentation, ask:

"Does this slide/data point directly support the single objective?"

Tool n. 4: balance

Balance these two aspects

Speaker

Medium

If unbalanced, audience can think:

Why are you showing us that?

What are you doing here? (or worse)

Tool n. 4: balance

We should show on the medium everything that SUPPORTS our speech and not REPLACE it.

In a presentation, show key words instead of sentences and show them progressively

Pictures (and slides in general) should be auto-explicative.

Tool n. 4: balance

How many elements should be on a slide?

Hot to avoid death by PowerPoint

YouTube channel: TedX Talks

BUBBLE LEVEL: balance

Takeaway:

Try to put maximum **3-5 elements** of interest per slide.

Cut/split any slide that cannot be delivered concisely.

Tool n. 5: retain attention

Try to catch the audience's attention and retain it

Setup

Space

Speaker

NAIL: retain attention

Takeaway:

Use the environment
in the best way.
Remove barriers and use your
body and tone of voice to engage the audi
Use a good hook in the first moments on the
stage. Do the housekeeping later.
Connect with the audience.

Tool n. 6: adapt to your audience

Know your audience

The audience can participate in your activity for three main reasons:

1. They wanted to
2. They were accompanied
3. They are random encounters

In each case, you have to find a link with these people to engage them

Tool n. 6: adapt to your audience

We learn better if:

Different parts of the brain are involved	THEN	Use different languages and activities
The new knowledge is built upon something that we are already familiar with	THEN	Check the knowledge of the audience or assume that they haven't any
Informations are linked to emotions	THEN	Amaze

Tool n. 6: adapt to your audience

Here's several methodologies to amaze the audience

1. Questions/quizzes 
2. Storytelling 
3. Analogies and metaphores 
4. Active engagement 
5. POV change 
6. Everyday's life link 
7. Exhibit/Experiments/ Experiences 

Tool n. 6: adapt to your audience

1. Questions/quizzes

Immediate use of rhetorical or interactive questions to invite to mental engagement and recall.

“Raise your hand if…”

Tool n. 6: adapt to your audience

Questions/quizzes

- High audience participation.
- Instantly assesses prior knowledge.
- Activates curiosity.

- May make some participants uncomfortable.
- Requires excellent time management.
- If online, requires connection and devices

Tool n. 6: adapt to your audience

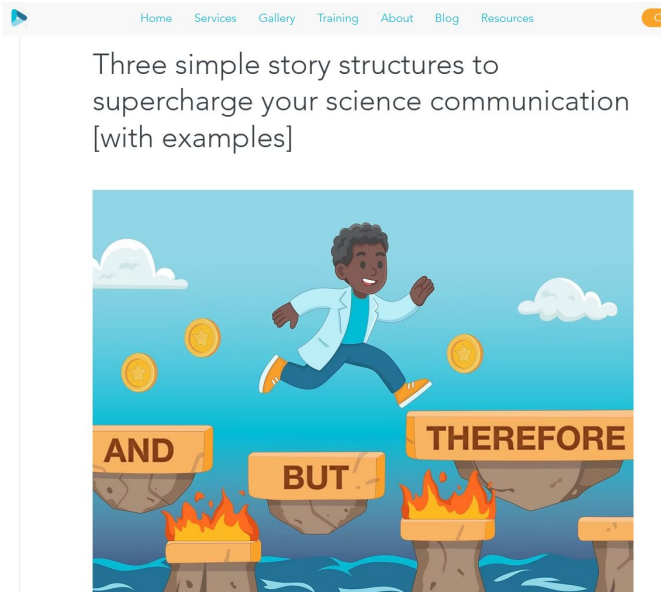
2. Storytelling

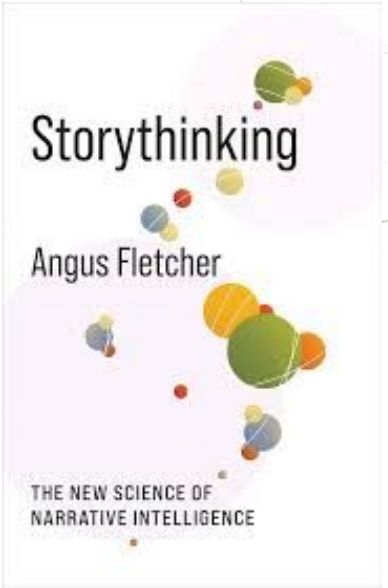
Weaving core content into compelling narratives (personal anecdotes, bios or case studies).

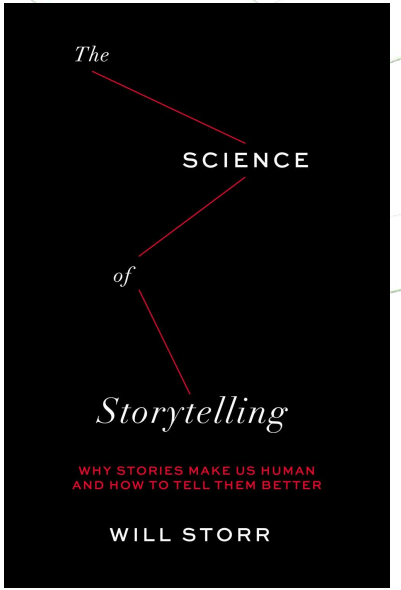
“This is the story about a huge mistake that became one of the biggest science discoveries…”

Tool n. 6: adapt to your audience

2. Storytelling







Tool n. 6: adapt to your audience

2. Storytelling

It has been shown that telling a story is the best strategy for conveying information, because people process stories differently than they do with information conveyed in non-narrative ways, for example as a simple list of facts.

(Jill Avery, Brand Storytelling,
in Harvard Business Schiik Technical Note 519-049, october 2020)

Tool n. 6: adapt to your audience

Storytelling

- Creates emotional connection (relatability).
- Information is highly memorable.

- Requires strong narrative skills.
- Risk of rambling and losing focus on data.
- “Fluff overcome crunch”

Tool n. 6: adapt to your audience

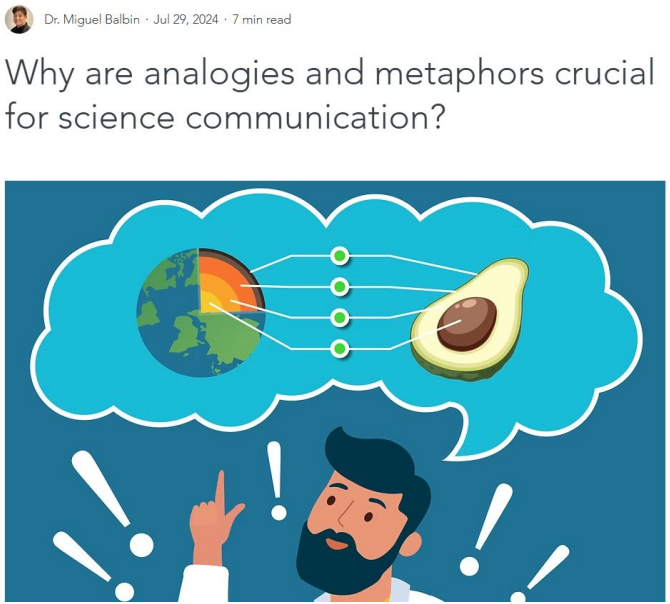
3. Analogies and metaphores

Explaining complex, abstract ideas by comparing them to simple, familiar concepts or objects.

“It’s like a cat inside a sealed box, with poison in it, linked to a radioactive element…”

Tool n. 6: adapt to your audience

3. Analogies and metaphores



Article on the topic:

https://www.animateyour.science/post/why-are-analogies-and-metaphors-crucial-for-science-communication

Tool n. 6: adapt to your audience

Analogies and metaphores

- Simplifies abstraction, facilitating rapid understanding.
- Excellent tool for retention.

- If chosen poorly, can confuse or mislead the audience.
- Risk of over-simplification.
- Can overshadow the content

Tool n. 6: adapt to your audience

4. Active engagement

Physically involving the audience (e.g., role-play, physical demonstrations, voting by standing, games).

“Now, you are actine fibers. You are myosin fibers. Now let’s see what happens when a muscle contracts”.

Tool n. 6: adapt to your audience

Active engagement

- Breaks physical inertia and fatigue.
- Creates high energy and caters to kinesthetic learners.
- Good retention.

- Time-consuming and potentially chaotic.
- Requires a highly confident facilitator.

Tool n. 6: adapt to your audience

5. Change of Point of View (POV)

Presenting the topic from an unexpected perspective (e.g., an object, a substance, the end-user, or a historical figure).

“What’s like to be a carbon atom? Let’s see what happened to one of them in the last billion years”

Tool n. 6: adapt to your audience

POV shift

- Generates fresh insights and encourages empathy.
- Forces critical reframing of the problem.

- Can be complex to set up clearly.
- May confuse the core message if not well-introduced.

Tool n. 6: adapt to your audience

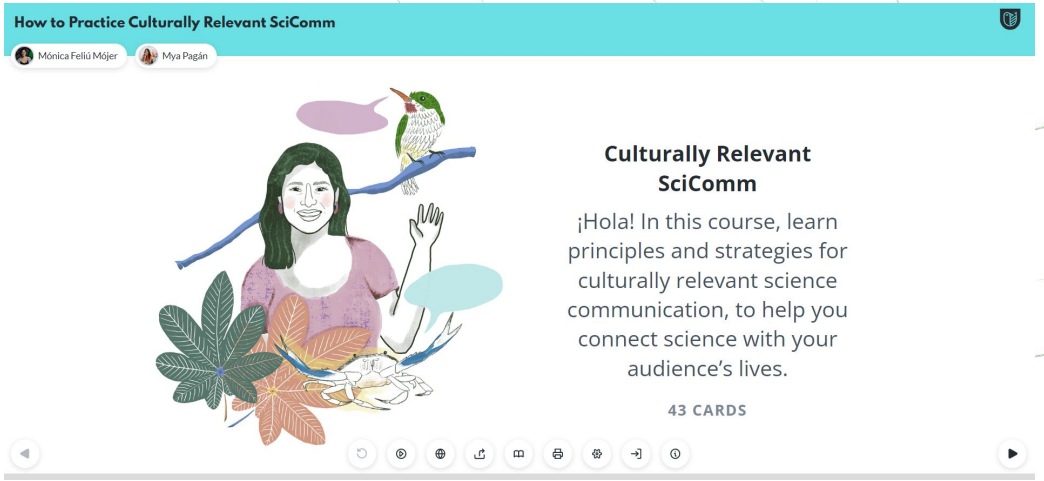
6. Everyday life link

Directly connecting complex research or abstract theory back to daily, mundane experiences.

“This morning you flushed your toilet. But where that water go. And from where went it?”

To read more about:

Everyday life link



https://app.us.lifeology.io/viewer/lifeology/scicomm/how-to-practice-culturally-relevant-scicomm-en-US

Tool n. 6: adapt to your audience

Everyday life link

- Establishes immediate relevance ("WIIFM").
- Grounds abstract ideas in reality.
- Crucial for communication to communities

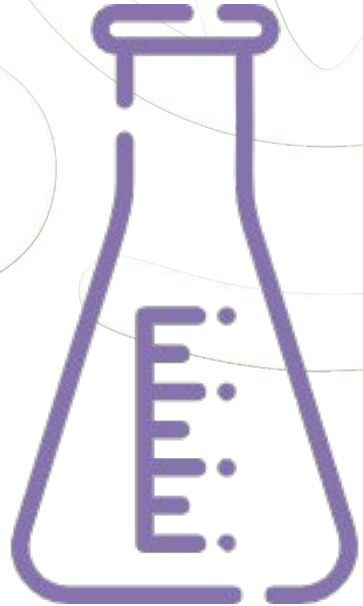
- May feel forced or too simplistic for an expert audience.
- Risk of trivializing serious work.

Tool n. 6: adapt to your audience

7. Exhibit/Experiments/Experiences

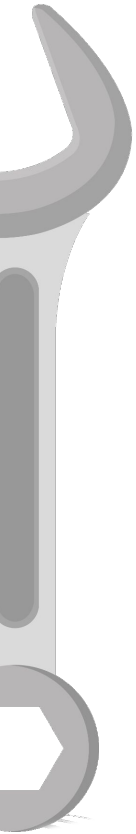
Conducting a short, live demonstration or showing a physical prop/material on stage.

“Try this: rotate your right foot clockwise. Now draw a “6” starting from the top with your right hand. What happened?”



WRENCH: the right key

Exhibit/Experiments/Experiences



- Highly visual, memorable, and multi-sensory.
- Instantly boosts credibility (proof).

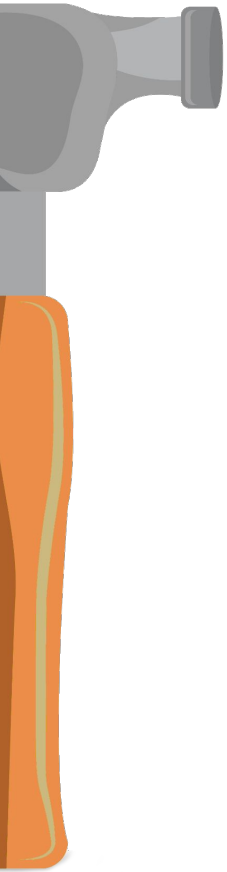
- Logistics are challenging (setup, visibility).
- High risk of technical failure (Murphy's Law).

WRENCH: the right key

Takeaway:

Every methodology has strength and weaknesses.
Choose the right one for your audience and tailor it on them.

Tool n. 6: redundancy



Reinforce the message, avoiding repetition

In communication, **redundancy** is not repetition; it is Reinforcement through different sensory channels.

This principle is vital for moving information from the audience's short-term memory to their long-term memory.

Tool n. 6: redundancy

Many ways for redundancy

Sensory Reinforcement

Goal: Engage multiple cognitive pathways.

Structural Repetition

Goal: Establish a logical framework for recall.

Introduce the topic, explain the topic and close with a "take home message".

Lexical Variety

Goal: Make the concept sticky by connecting it to different analogies.

HAMMER: redundancy

Takeaway:

Don't say the same thing the same way twice. Say the same core concept in many different ways.

Tool n. 8: aesthetics

Show only things that you want to show and make them visually appealing.

Your presentation should be recognizable even in a single slide (“smashable”)

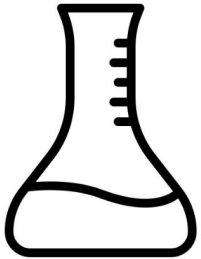
Don’t use too much fonts, gifs and colors. Respect the alignments.

Choose coherent graphics (i.e. don’t mix pictures with icons)

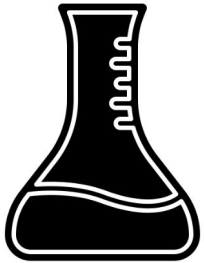
Tool n. 8: aesthetics

Visual: all the same style

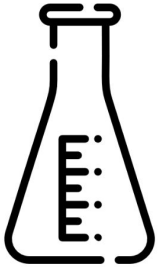
Icons style



Outline

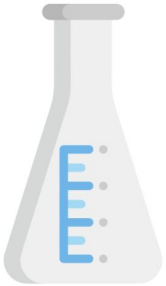


Glyph



Lineal

Lineal color



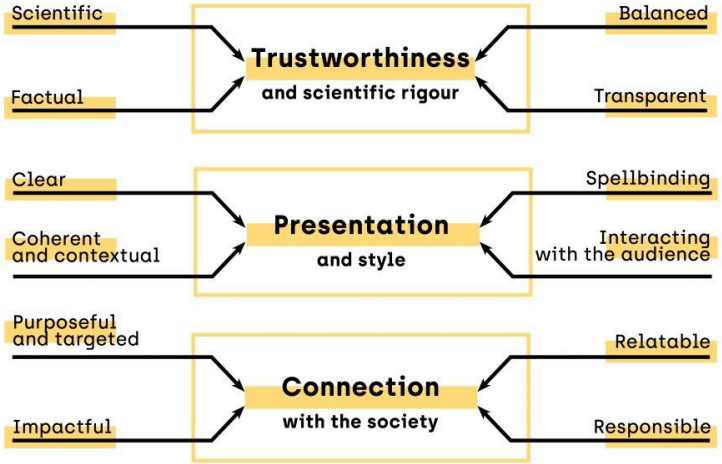
Flat

To read more about:

https://questproject.eu/wp2-measuring-and-assessing-science-communication-quality/

quest

questproject.eu



12 QUALITY INDICATORS for SCIENCE COMMUNICATION

THANKS!

Graziano Ciocca

IR0000032 – ITINERIS, Italian Integrated Environmental Research Infrastructures System
(D.D. n. 130/2022 - CUP B53C22002150006) Funded by EU - Next Generation EU PNRR-Mission 4 "Education and Research" - Component 2: "From research to business" - Investment 3.1: "Fund for the realisation of an integrated system of research and innovation infrastructures"

Finanziato dall'Unione europea NextGenerationEU
Ministero dell'Università e della Ricerca
Italiadomani