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Science Communication: A Blast from Space

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MAIN POINTS OF DISCUSSION

What is science communication?

Why do we need science communication?

How do we communicate science effectively?

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Science is the systematic enterprise of gathering knowledge about the world and organizing and condensing that knowledge into testable laws and theories.

Council of the American Physical Society, 1998.

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Science extends and enriches our lives, expands our imagination and liberates us from the bonds of ignorance and superstition.

The success and credibility of science is anchored in the willingness of scientists to:

* Expose their ideas and results to independent testing and replication by other scientists. This requires the complete and open exchange of data, procedures and materials.

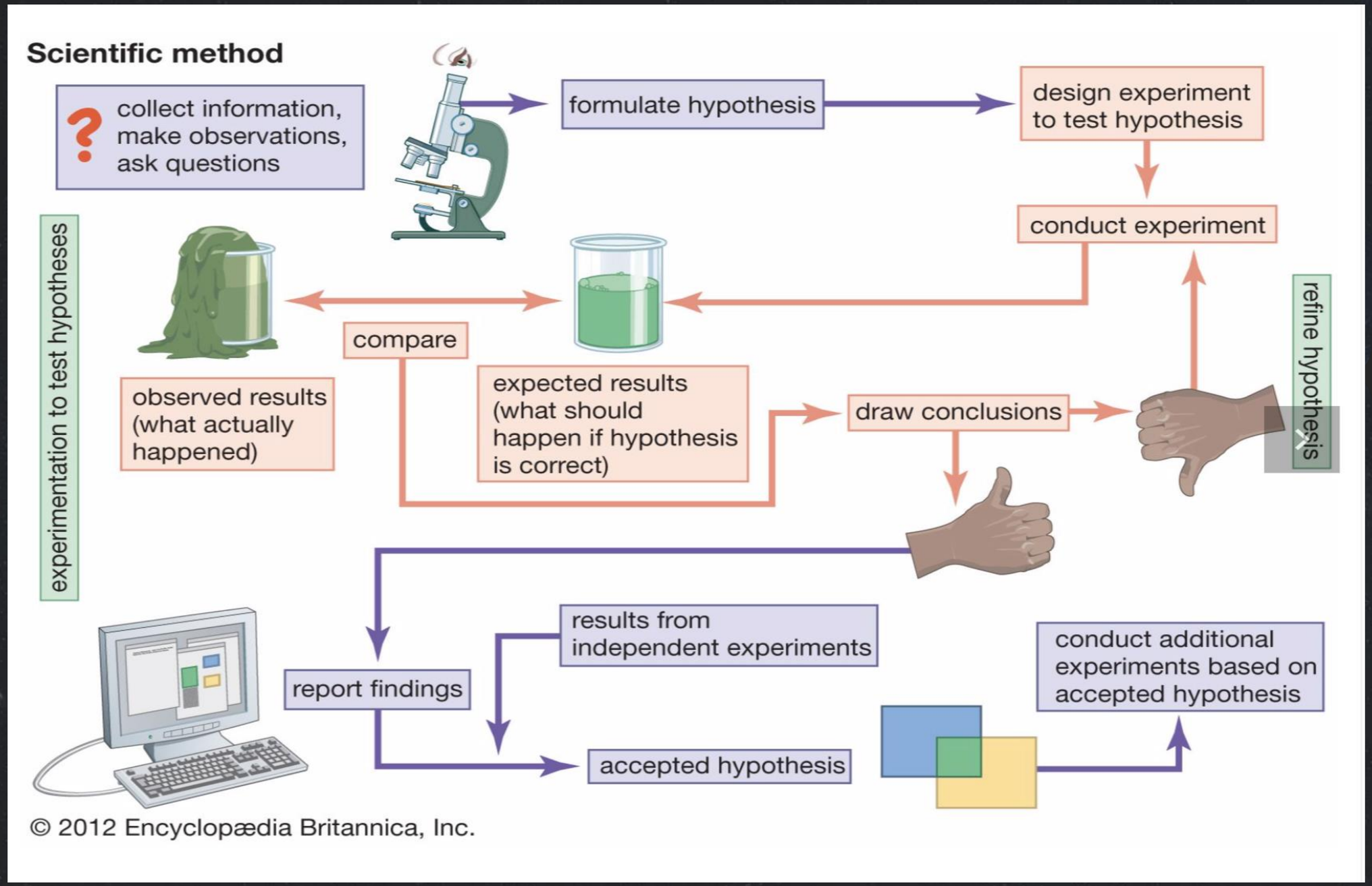
* Abandon or modify accepted conclusions when confronted with more complete or reliable experimental evidence.

Adherence to these principles provides a mechanism for self-correction that is the foundation of the credibility of science.

Council of the American Physical Society, 1998.

Science and Scientific Communication

The Scientific Method	The Scientific Communication Path
Observe and question	Define the question
Propose tentative hypotheses	Gather information and resources
Make prediction about observed phenomena	Formulate hypothesis
Test by making observations	Perform experiment and collect data
Accept or reject hypotheses that fail to predict new observations	Analyze data
	Interpret and draw conclusions for new hypotheses
	Publish/communicate results



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Scientific Communication and Science Communication

1. Peer-to-peer (scientists to scientists)
2. Popular science (scientists to public through various media channels)
3. Science journalism
4. Citizen science

Science Communication

A man who wants the truth becomes a scientist.
A man that wants to let his subjectivity free may become a writer. But what should a man do who wants something in-between?

- Robert Musil

Science Communication

Science is arguably the greatest achievement of our culture, and people deserve to know about it. (Durant, Evans & Thomas, 1989, p. 11).

To take science as culture in this way is to understand it not only as relating to the scientific, technical, political, or economic aspects of a society, but to its artistic and social expressions.

Science is an achievement of our societies, and its representation within public communication should be understood as being as much about contemporary popular culture as contemporary science.

(Davies, et al., 2019)

Science communication as a cultural practice

Science communication as a space of collective meaning-making.

(Davies, et al., 2019)

Meaning-making is often, in practice, storytelling: from the earliest myths to contemporary story-based podcasts [Kaiser et al., 2014; Linett, 2013], human animals have used narrative to explain the world around them.

(Davies, et al., 2019)

Science communication as meaning-making

@ Science communication as experience

@ Science communication as identity work

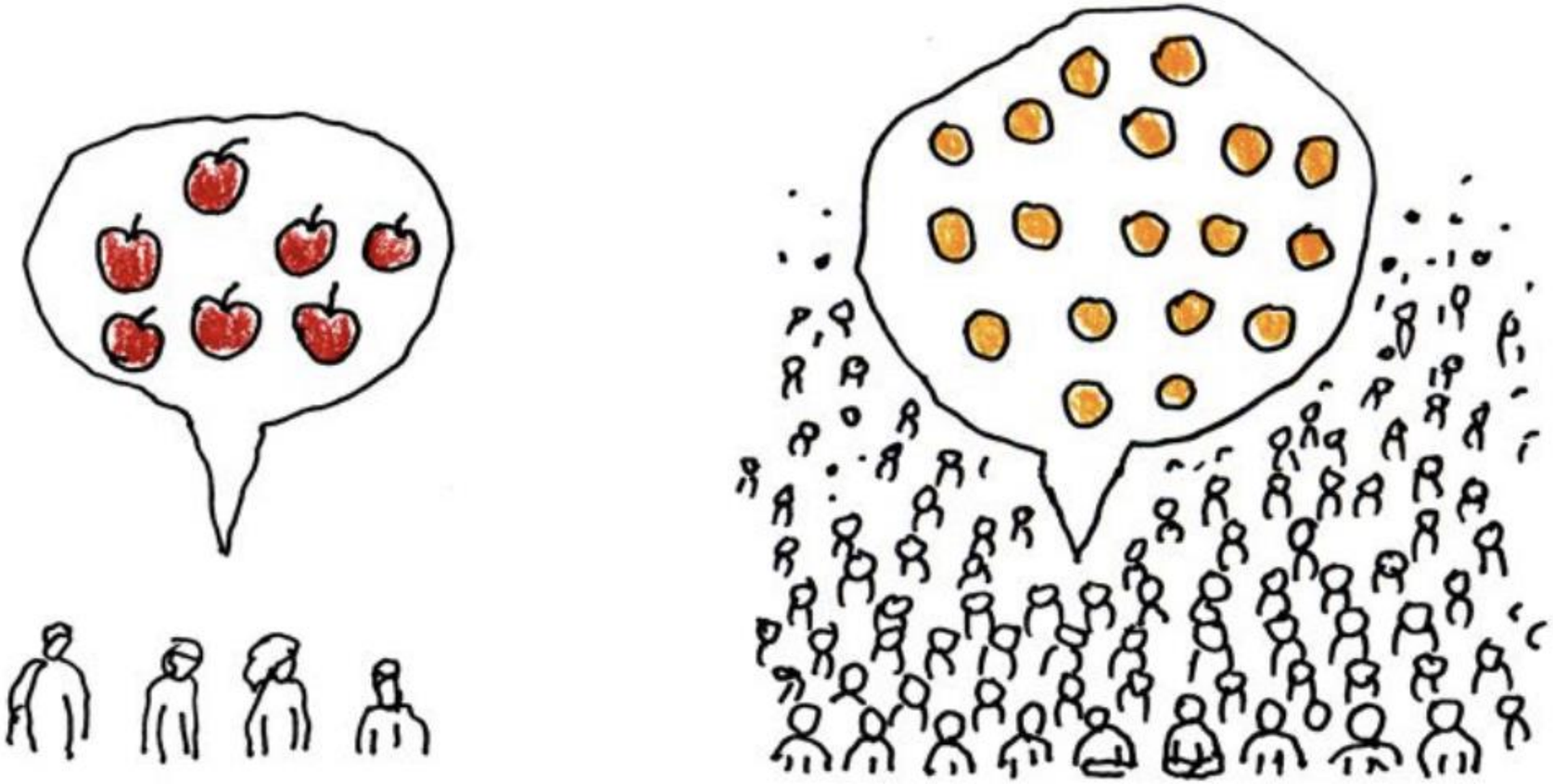
@ Science communication as emotional

@ Science communication as fiction

(Davies, et al., 2019)

Why do we need science communication?

science communication



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- Simply **to share the findings and excitement of science**.

- **To increase appreciation for science as a useful way of understanding and navigating the modern world**. This goal assumes that people who have more knowledge about and are more comfortable with science will be more willing and able to use knowledge from science in their everyday lives.

- **To increase knowledge and understanding of the science related to a specific issue.** In this case, communicators may seek to inform or educate people about the relevant facts from science and their meaning for the issue.

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National Academies of Sciences, Engineering, and Medicine. (2017). Communicating Science Effectively: A Research Agenda. Washington, DC: The National Academies Press. doi: 10.17226/23674.

- **To influence people's opinions, behavior, and policy preferences.** This goal becomes salient when the weight of evidence clearly shows that some choices or policies have more positive consequences for public health, public safety, or some other societal concern.

- **To engage with diverse groups so that their perspectives about science related to important social issues can be considered in seeking solutions to societal problems** that affect everyone. Meeting this goal requires understanding the concerns of each group and working together to find acceptable solutions by, for example, identifying important research questions that scientists should be exploring further.

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1. To enable the exchange information and foster collaboration among scientists;

2. To inform policy-makers and provide sound bases for decision-making;

3. To enhance public understanding and appreciation of the value of science in everyday life; and

4. To enable informed decision-making among the citizenry.

How do we communicate science effectively?

Base communication models	Ideological and philosophical associations	Dominant models in PCST	Variants on dominant PCST models	Science's orientation to public
Dissemination	Scientism Technocracy	Deficit	Defence Marketing	They are hostile They are ignorant They can be persuaded
Dialogue	Pragmatism Constructivism	Dialogue	Context Consultation Engagement	We see their diverse needs We find out their views They talk back They take on the issue
Conversation	Participatory democracy Relativism	Participation	Deliberation Critique	They and we shape the issue They and we set the agenda They and we negotiate meanings

Analytical Framework of Science Communication Models

https://www.researchgate.net/figure/Analytical-Framework-of-Science-Communication-Models_tbl1_29652305

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Challenges in communicating science effectively

Conflicts over the beliefs, values, and interests of individuals and organizations, rather than simply a need for scientific knowledge, are central to the debate.

The public perceives uncertainty either in the science or its implications or as a result of communicators making different and sometimes contradictory statements in the public sphere.

The voices of organized interests and influential individuals are amplified in public discourse, making it difficult for the state of the scientific evidence to become clearly known.

National Academies of Sciences, Engineering, and Medicine. (2017). Communicating Science Effectively: A Research Agenda. Washington, DC: The National Academies Press. doi: 10.17226/23674.

Filipino perception leans towards the negative side when asked about “science” alone, but leans toward the positive side when asked about “technology” (ISSP, 1993-2010 and WVS Surveys, 2012)

Filipinos are skeptical about science, but positive attitude towards tangible outputs, or applications of science

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48 percent of adult Filipinos agree that modern science does more harm than good, whereas only 21 percent disagree, and 31 percent can’t choose what to say.

The balance of opinion indicates that **it leans toward anxiety, or skepticism, about modern science.**

- *Mahar Mangahas (International Social Survey Program as published in Philippine Daily Inquirer, December 15, 2018)*

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Challenges, common mistakes, misconceptions, and gaps in telling STEM stories

Interpreting and simplifying complex scientific concepts to write interesting **stories may be difficult for many science journalists** (jargon, numbers, etc.)

When scientific research is reported in the news media, **important information regarding contexts and methods is often lost** (Pellechia 1997)

Science Journalism often **fails to describe the limitations of the reported study, funding sources** supporting the research, or financial **conflicts of interests of investigators** (Winsten, 1985; Moynihan & Sweet, 2000; Caulfield, 2004)

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Challenges, common mistakes, misconceptions, and gaps in telling STEM stories

News stories sourced from press releases of government agencies, R&D institutions, academe, industry, and advocates/NGOs, may lack sufficient information, and tend to support the agenda of the sources;

Most newspapers rely on news service for science stories that are of global interests;

Sources are not always quoted accurately or in context ; and

Science news are usually **event-driven**, **reinforces the voice of their sources**, and therefore **lack the deeper and more critical treatment of claims** of those represented.

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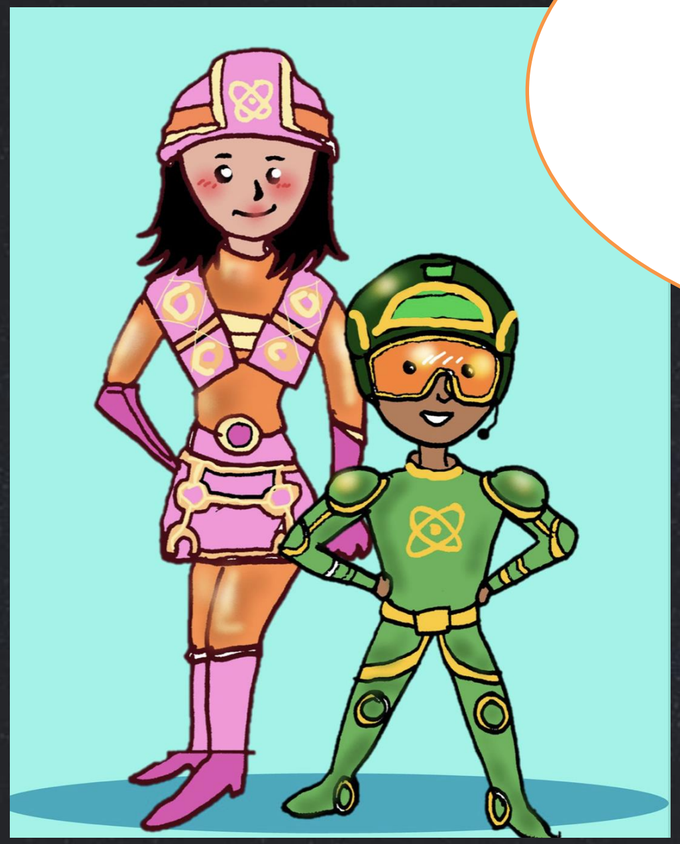
BASIC PRINCIPLES OF EFFECTIVE SCIENCE COMMUNICATION

1. What do you want to tell your audience? What is your purpose?
2. Who is your target audience (demographics, their needs, media used, language, what do they enjoy doing, etc.)?
3. Choose the medium/media to reach your target audience.
4. Craft the message to engage your audience.
5. Get the message across.
6. Encourage interaction.

How to make science exciting



Ganito kami noon…

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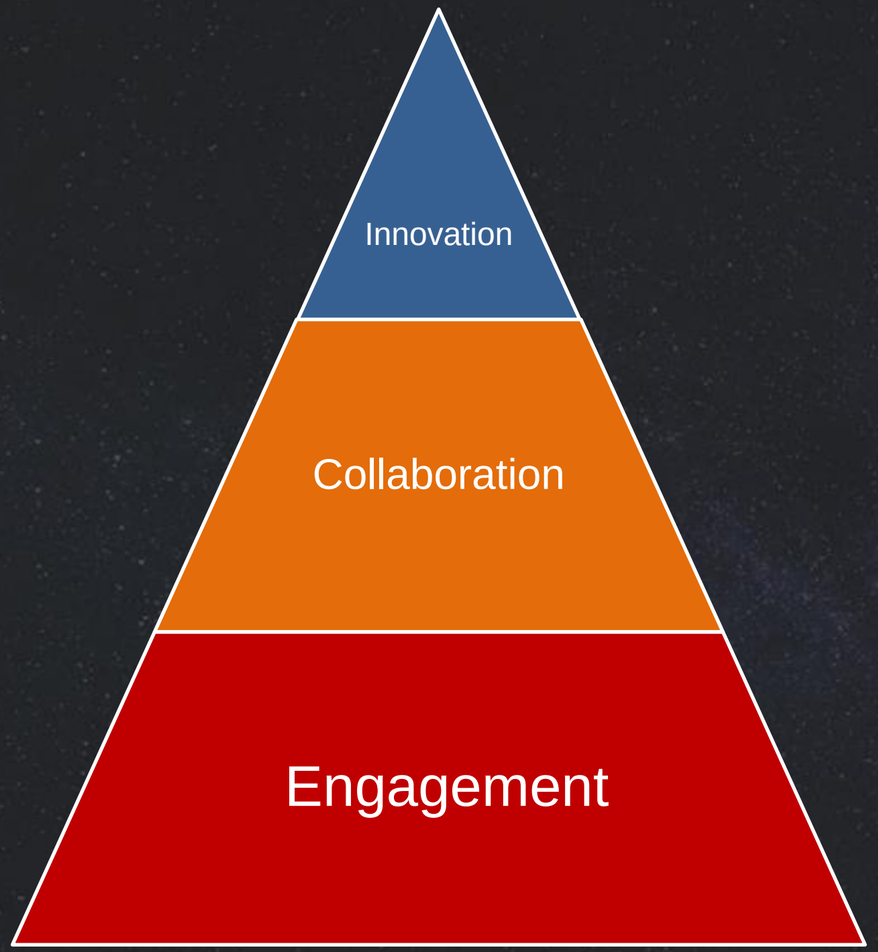
Ganito kami ngayon…



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Communicating Science in the Media

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Pitch your story ahead of time.

Know your audience/medium.

Grab attention.

Simplify (complex) scientific concepts without sacrificing accuracy. Do NOT use jargons.

Operationalize/explain technical terms and procedures.

Humanize science.

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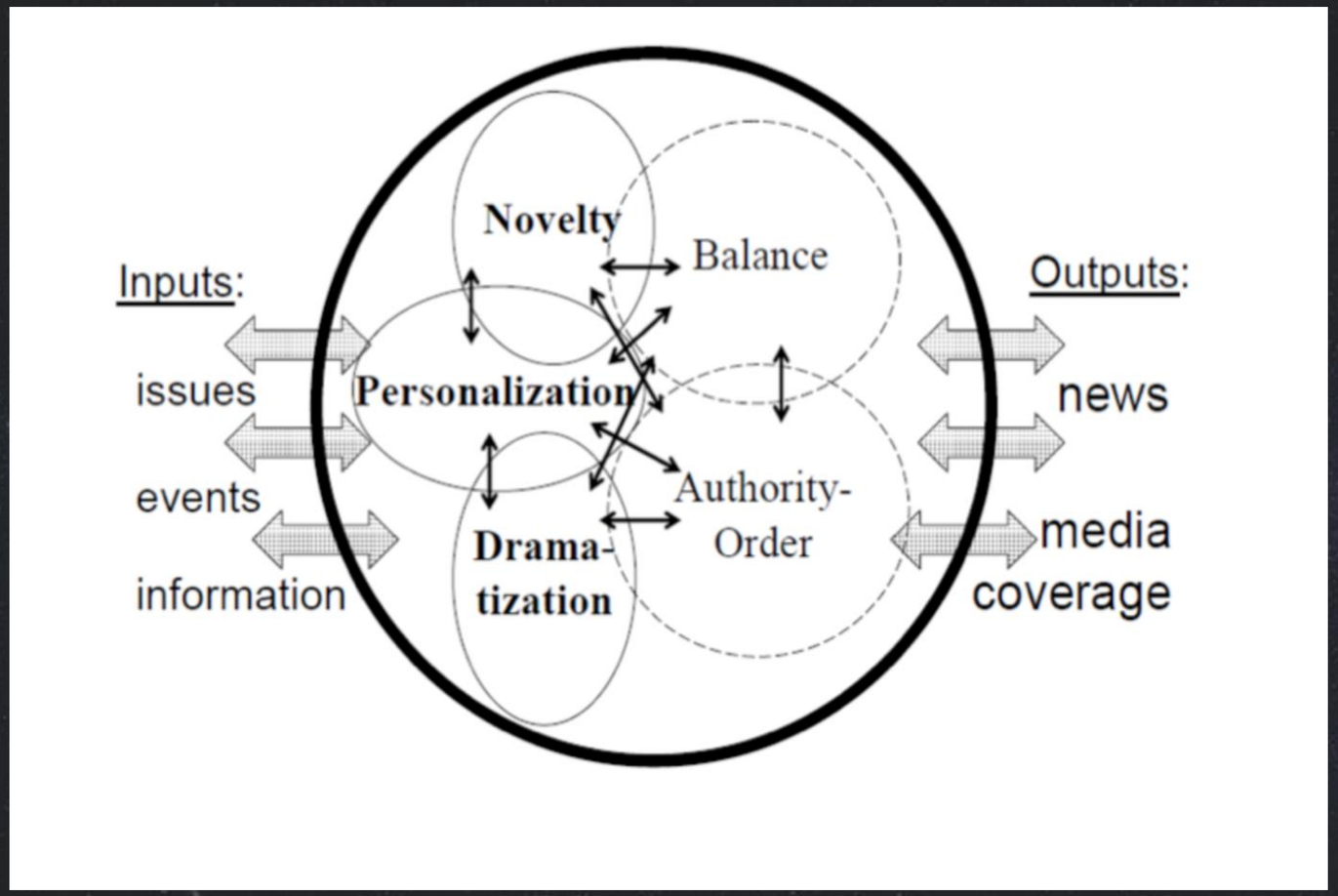
Bring the numbers close to home.

Be relevant.
Connect your story to current issues.

Verify/validate information.

Cite your sources.



Use journalistic norms most appropriate to your story.

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Tell a story!

We engage with others through stories. When you tell a story, you spark connection

Stories help us understand other people

We are drawn to stories because we see ourselves reflected in them

When we interpret the meaning in stories, we understand ourselves better

Stories transform meanings from individual to public

Stories help us to act wisely

Stories keep culture alive

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