



# SCIENCE

# COMMUNICATION

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# 10 MINUTES

is the average general/sustained attention span.

Continuous/transient attention span is about 8 seconds.



# 25 YEARS

is the number of years it took me to realize that communication is all about the receiver and that dialog can help matching expectations and progression

The goal of science communication is to communicate scientific results to select target groups

# WHAT IS SO SPECIAL ABOUT SCIENCE COMMUNICATION?

## *Critical rationalism*

**Ontology:** what is reality? We study a single reality.

**Epistemology:** how do we know something? Reality can be measured.

**Methodology:** How do we find out? Usually quantitative experiments, methods and analysis, falsification of hypotheses

**Learning from journalism:  
*why* to communicate**

**Learning from communications and  
journalism: *what* to communicate**

**Learning from communications and  
rhetoric: *how* to communicate**

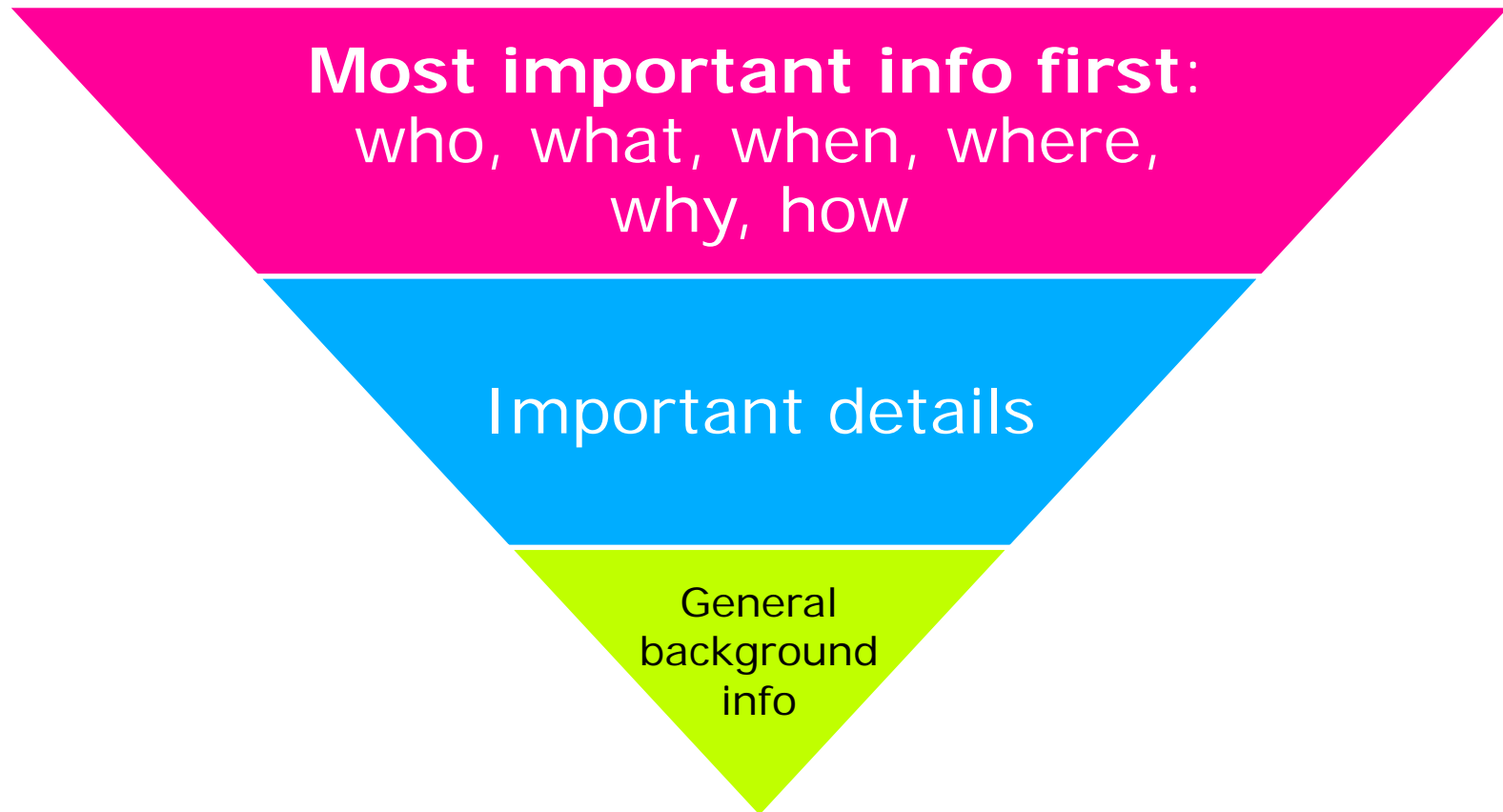
# Why to communicate?

## The five news criteria

- **Actuality:** Why bring the story/message now?
- **Relevance:** What is the relevance for the reader or viewer?
- **Identification:** Can the reader or viewer identify with the topic of the story?
- **Sensation:** Is the story surprising and exciting?
- **Conflict:** Does the story have conflicting views?

# What to communicate?

## The journalism triangle





# What and how to communicate? the seven C's

**Completeness**

**Conciseness**

**Consideration**

**Concreteness**

**Clarity**

**Courtesy**

**Correctness**

<http://www.managementstudyguide.com/seven-cs-of-effective-communication.htm>

## What and how to communicate?

### 1. Completeness

- A message is "complete" when it contains all facts the listener needs for the reaction you desire.
- Listeners differ in their mental filters; they are influenced by their backgrounds, viewpoints, needs, attitudes, status, and emotions.

## What and how to communicate?

### 2. Conciseness

- Conciseness is saying what you have to say in the fewest possible words without sacrificing the other C qualities.
- Eliminate wordy expressions
  - Include only relevant statements.
  - Avoid unnecessary repetition.

## What and how to communicate?

### 3. Consideration

- Prepare every message with the recipient in mind and try to put yourself in his or her place.
- Try to visualize your listeners (or readers)—with their desires, problems, circumstances, emotions, and probable reactions to your request
- This thoughtful consideration is also called the "you-attitude"

## What and how to communicate?

### 4. Concreteness

- Communicating concretely means being specific, definite, and vivid rather than vague and general.
- Use specific facts and figures.
- Put action in your verbs.
- Choose vivid, image-building words.

## What and how to communicate?

### 5. Clarity

- Getting your message across so the receiver will understand what you are trying to convey. You want that person to interpret your words with the same meaning you have in mind.
- Choose short, familiar, conversational words
- Construct effective sentences and paragraphs
- Achieve appropriate readability (and listenability)
- Include examples, illustrations, and other visual aids, when desirable.

## What and how to communicate?

### 6. Courtesy (politeness)

- Courteous messages help to strengthen the bond between you and listeners Courtesy stems from sincere you-attitude.
- Be sincerely tactful, thoughtful, and appreciative.
- Omit expressions that irritate, hurt, or belittle.
- Grant and apologize good-naturedly.

## What and how to communicate?

### 7. Correctness

- Use the right level of language
- Include only accurate facts, words, and figures
- Maintain acceptable writing mechanics
- Choose nondiscriminatory expressions
- Apply all other pertinent C qualities



# How to communicate?

## rhetoric is modes of persuasion

- **Logos:** logical appeal or the simulation of it
  - facts and figures that support the speaker's topic
- **Pathos:** is an appeal to the audience's emotions
  - demonstrate agreement with an underlying value of the reader or listener
- **Ethos:** is an appeal to the authority or honesty of the presenter
  - convinces the audience that he or she is qualified to present (speak) on the particular subject

## References and further reading

- [http://www.sdu.dk/en/Om\\_SDU/Fakulteterne/Teknik/Kontakt/Nyhedskritierne](http://www.sdu.dk/en/Om_SDU/Fakulteterne/Teknik/Kontakt/Nyhedskritierne)
- [http://en.wikipedia.org/wiki/Inverted\\_pyramid](http://en.wikipedia.org/wiki/Inverted_pyramid)
- [http://www.explorehr.org/articles/Personal\\_Development/Seven\\_Communication\\_Principles.html](http://www.explorehr.org/articles/Personal_Development/Seven_Communication_Principles.html)
- <http://www.managementstudyguide.com/seven-cs-of-effective-communication.htm>

# Communicating scientific results and knowledge

Area	Target group	Knowledge level	Goals
Research	Researchers and developers	General scientific/engineering education	Knowledge dissemination obligation, facilitating scientific impact and recognition, project partner recruitment
Education	Current and future students	General public level	Retention and recruitment
Innovation	Companies and organization employees (business developers, product managers etc.), policy makers, general public	General public level	Knowledge dissemination obligation, public branding, project partner recruitment

# Danish ministry level societal challenges

Innovation strategy: Danmark Løsningers Land, 20.12.2012

A society facilitating green growth

A society supporting health and quality of life

An effective and competitive society

A competent and cohesive society

A high technology society with high innovation capacity

Knowledge generates value: increased collaboration between research institutions and companies

Education system shall support the increase of innovation capacity

<http://ufm.dk/publikationer/2012/danmark-losningernes-land>

# Horizon 2020 societal challenges

Health, demographic change and wellbeing
Food security, sustainable agriculture and forestry, marine and maritime and inland water research, and the bio-economy
Secure, clean and efficient energy
Smart, green and integrated transport
Climate action, environment, resource efficiency and raw materials
Europe in a changing world - inclusive, innovative and reflective societies
Secure societies - protecting freedom and security of Europe and its citizens

<http://ec.europa.eu/programmes/horizon2020/en/h2020-section/societal-challenges>

# Society readiness level (SRL) can help setting expectations

IDEA

- SRL 1: identifying problem and identifying societal readiness
- SRL 2: formulation of problem, proposed solution(s) and potential impact, expected societal readiness; identifying relevant stakeholders for the project.
- SRL 3: initial testing of proposed solution(s) together with relevant stakeholders

IMPLEMENTED

- SRL 4: problem validated through pilot testing in relevant environment to substantiate proposed impact and societal readiness
- SRL 5: proposed solution(s) validated, now by relevant stakeholders in the area
- SRL 6: solution(s) demonstrated in relevant environment and in co-operation with relevant stakeholders to gain initial feedback on potential impact

REFINE/  
EXPLOIT

- SRL 7: refinement of project and/or solution and, if needed, retesting in relevant environment with relevant stakeholders
- SRL 8: proposed solution(s) as well as a plan for societal adaptation complete and qualified
- SRL 9: actual project solution(s) proven in relevant environments

[https://innovationsfonden.dk/sites/default/files/societal\\_readiness\\_levels\\_-\\_srl.pdf](https://innovationsfonden.dk/sites/default/files/societal_readiness_levels_-_srl.pdf)

# The four parts of a presentation in as few slides as possible

Part	Content	Knowledge level	Goals	Target group
1	The problem and context as well as relation to societal challenges and SRL	General public level	Relevance and identification for listeners	All
2	Hypotheses, specific problems addressed, results and future projections and outcomes	General public level	Providing listeners with knowledge and why results are important, surprising, and has impact and societal consequences	All
3	Scientific material and methods as well as detailed results	General scientific/ educated in field	Convincing the educated about completeness and correctness	Students and researchers
4	References and related work	General scientific/ educated in field	Convincing the educated about completeness and correctness and creating recognition	Students and researchers

# Guidelines for slide deck production

1. Select the topic: an area where you have some significant knowledge and results.
2. Prepare a slide deck with 4 parts and use multimedia elements.
3. Only first two parts if general audience unless simple view graphs pictures can be made.
4. Use why, what, and how to communicate elements as a check list to enhance presentation.
5. Make sure to plan for 0.5-1 slide per minute.
6. Rehearse you presentation - especially with focus on how to communicate.

**TED** here we come