

Day 4 – What to do

- (Videos on TRIS buffers and calibration)
- CO2sys
- Video on radioecology
- Lecture on policy (Virtual)
- Lecture on communication
- Country slides and continued discussion
- Participants presentations



IAEA

Ocean Acidification
International
Coordination Centre

OA-ICC



INTERNATIONAL ALLIANCE TO
COMBAT OCEAN ACIDIFICATION



Basic Training Course on Ocean Acidification

9 - 13 September 2024

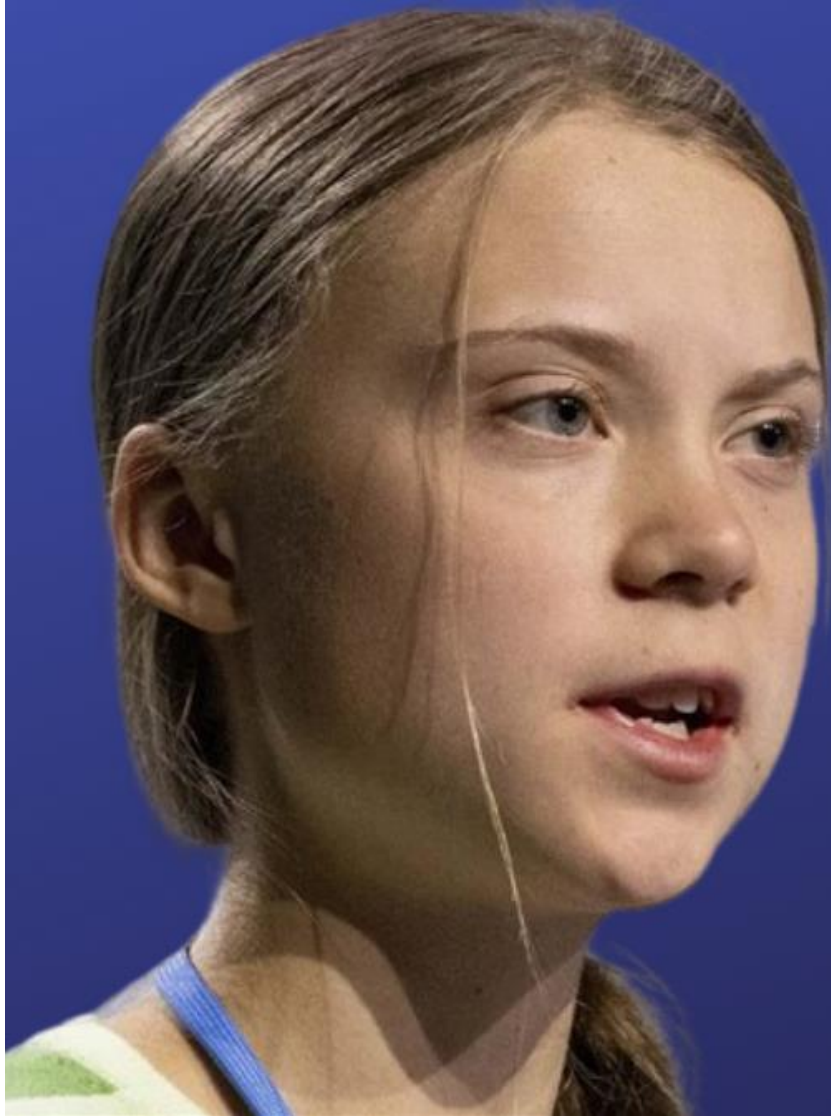
EVT2205463

hosted by

United Methodist University (UMU)

Science communication as a tool to address ocean acidification

Urgency



**"I want you
to act as if your
house is on fire.
Because it is."**

– Greta Thunberg

Law of instrument



*COP26 is just 'blah
blah blah' and won't
lead to real change*

A failure to communicate?



Tim Minchin

*The idea that (...) the science of anthropogenic global warming is controversial is a powerful indicator of the extent of our **failure to communicate**.*

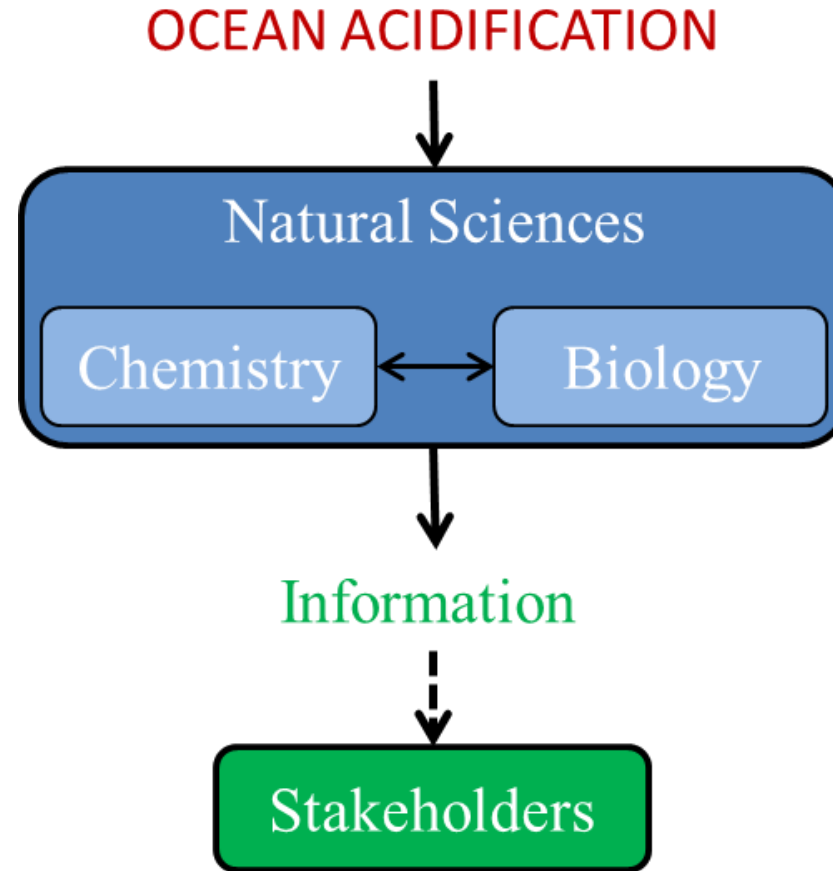
A failure to communicate?

*Scientists are
sometimes poor
communicators...*



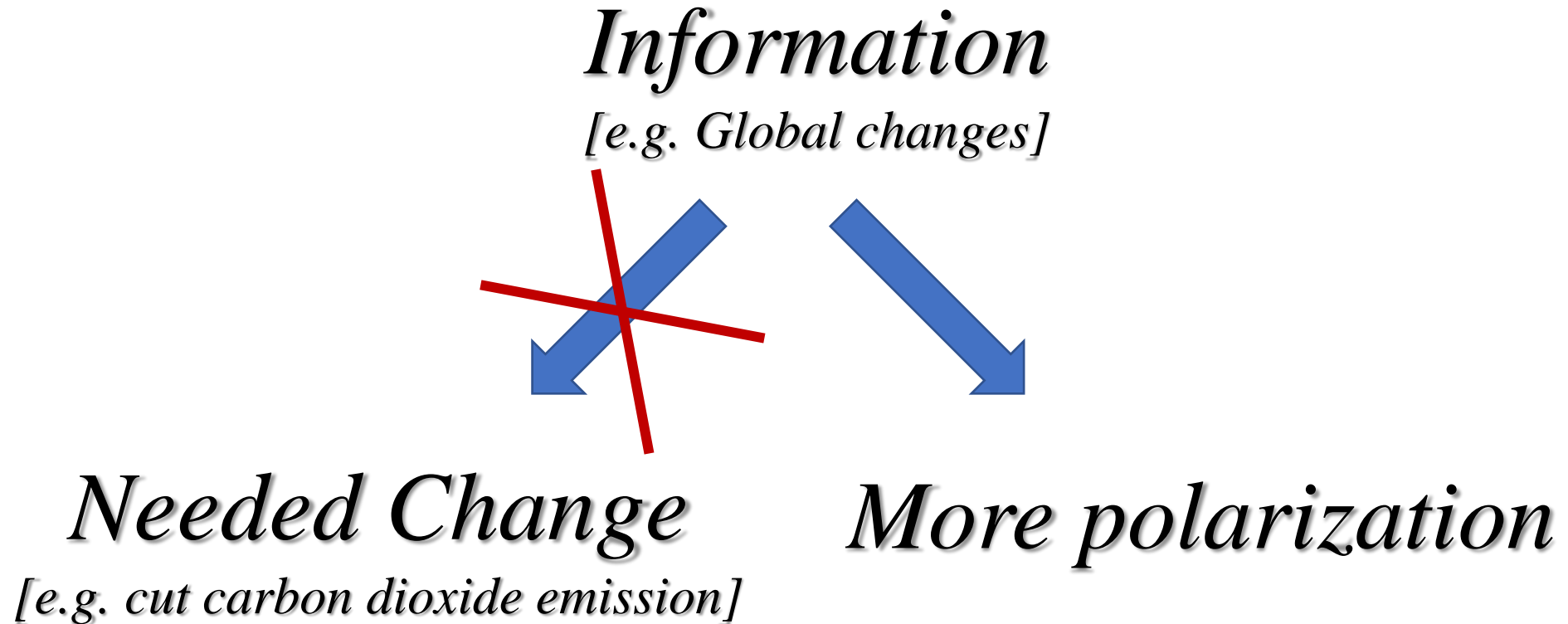
... and nerds

Efficient communication...
... a need for a new strategy

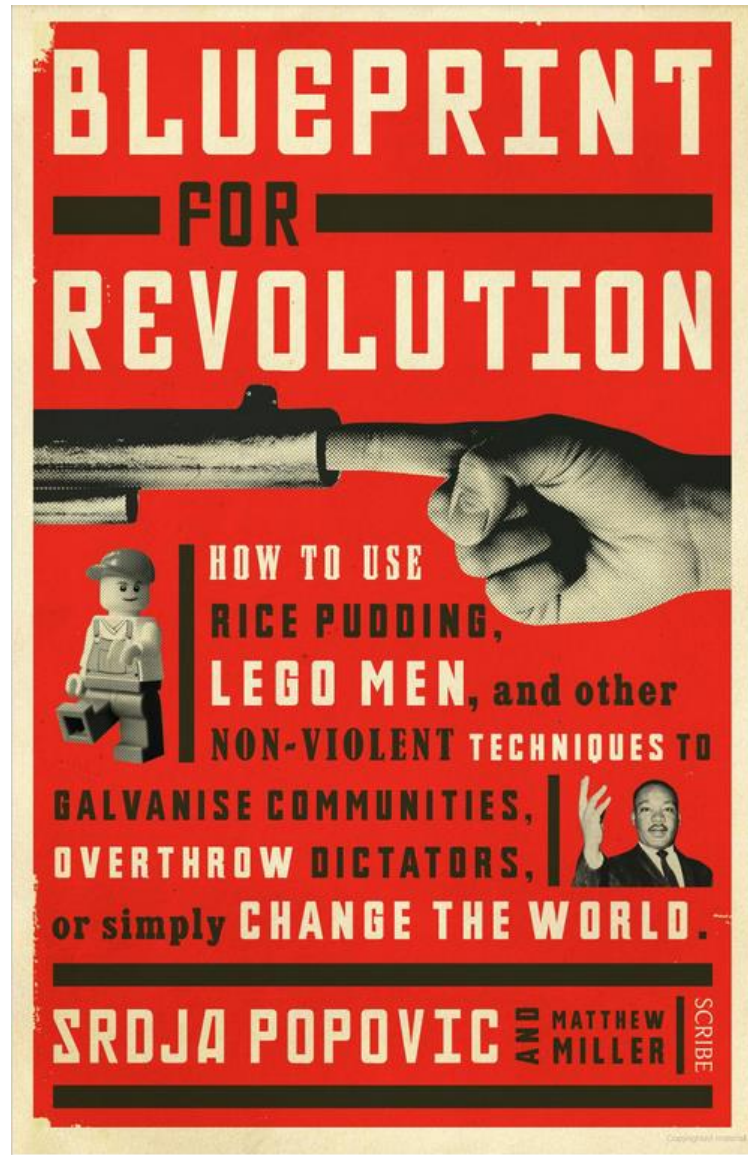


Science supply paradigm

Efficient communication...
... a need for a new strategy

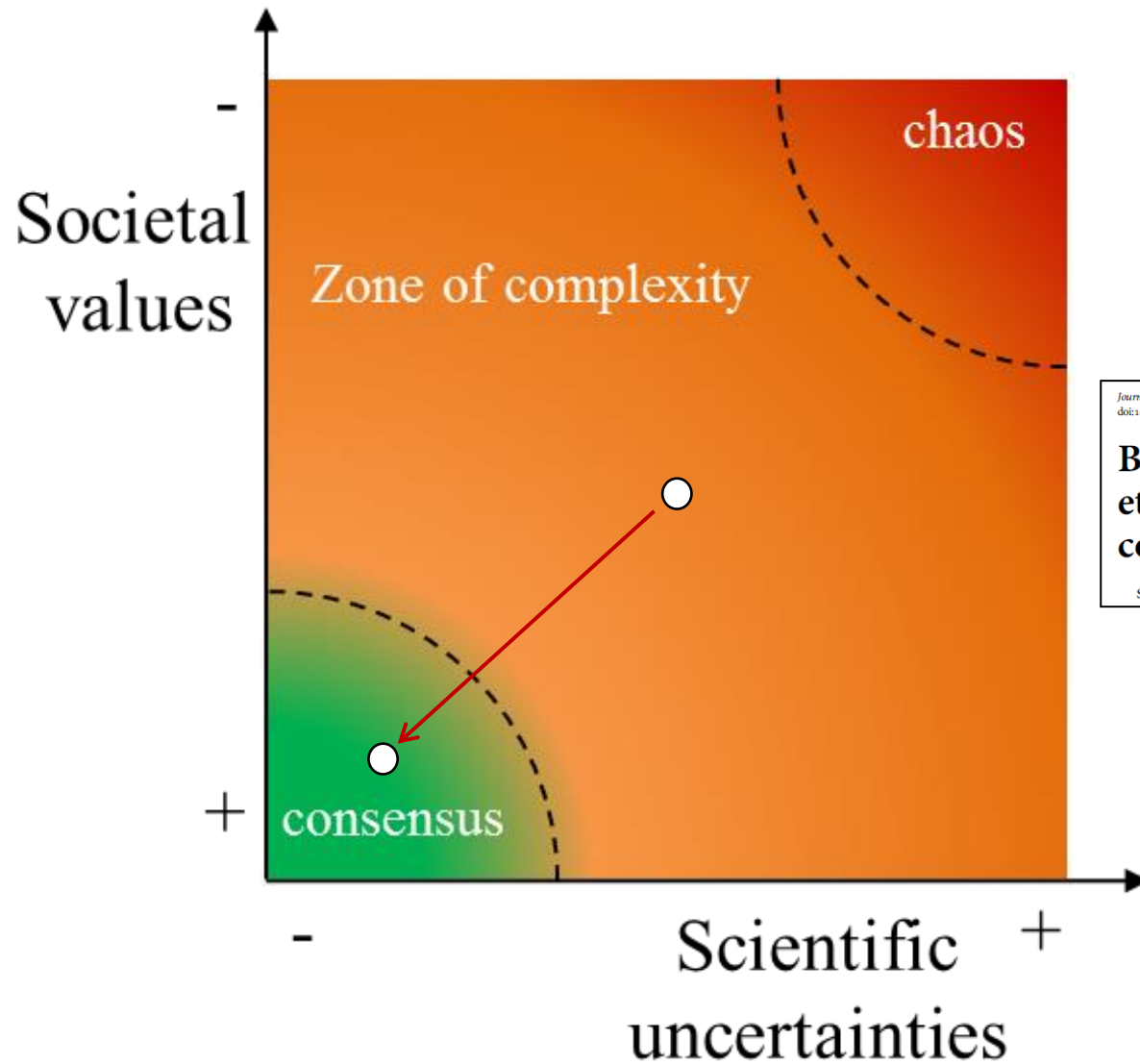


Blueprint for revolution



Same approach to ocean?

1. Focus on value



Journal of the Marine Biological Association of the United Kingdom, page 3 of 2. © Marine Biological Association of the United Kingdom, 2015
doi:10.1017/S0025315415000193

Bird is the word – on the importance of ethical and effective scientific communication

SAM DUPONT¹, GREGORY PUNCHER² AND PIERO CALOSI³

2. Connect with the issue through physical experience



Dupont (2017) I am the ocean – arts and sciences to move from ocean literacy to passion for the ocean. Submitted JMBA UK

Case study 1: Shrimp tasting



Why: Increase citizen willingness to change



Society relevant science



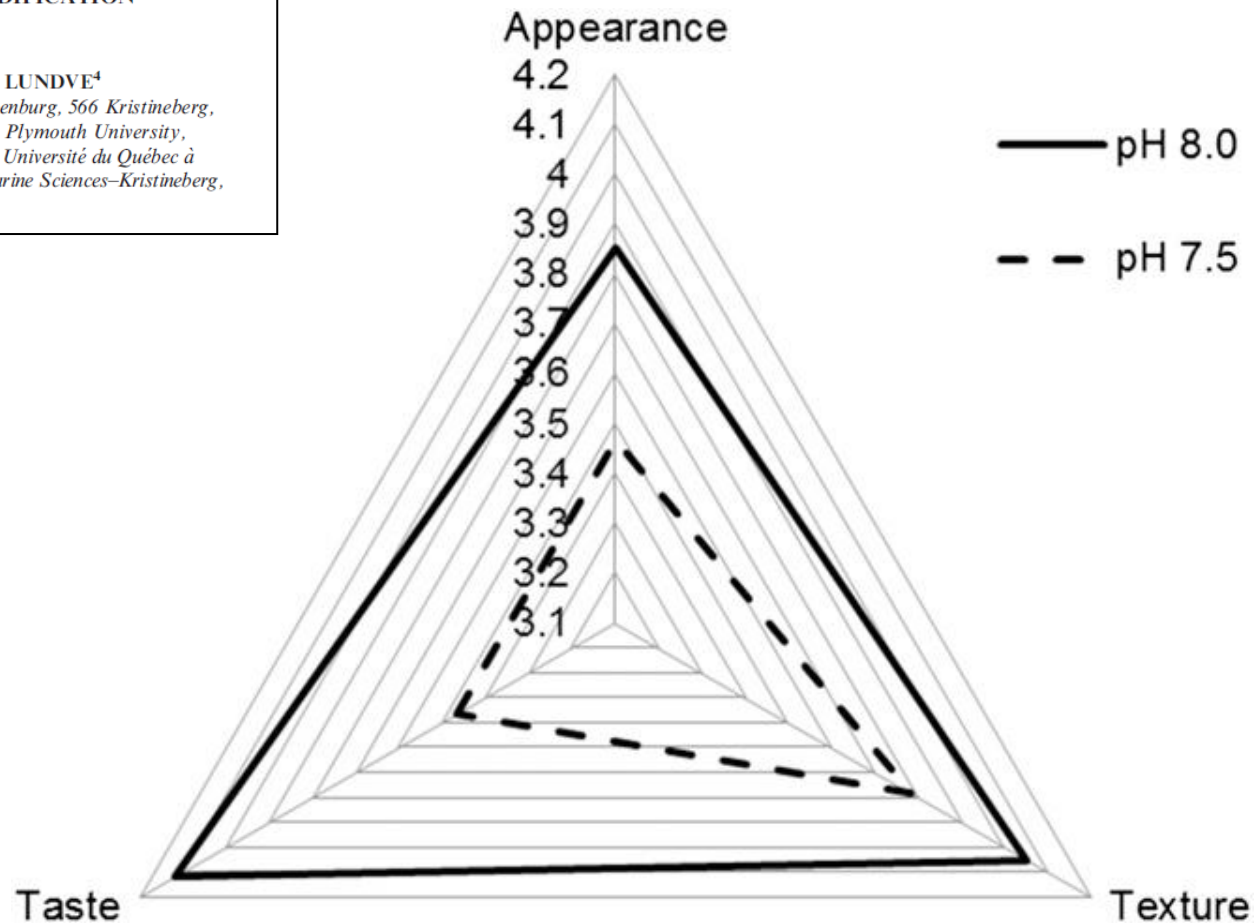
Step1: society relevant science

Journal of Shellfish Research, Vol. 33, No. 3, 857–861, 2014.

FIRST EVIDENCE OF ALTERED SENSORY QUALITY IN A SHELLFISH EXPOSED TO DECREASED pH RELEVANT TO OCEAN ACIDIFICATION

SAM DUPONT,^{1*} EMILIE HALL,² PIERO CALOSI^{2,3} AND BENGT LUNDVE⁴

¹Department of Biological and Environmental Sciences, University of Gothenburg, 566 Kristineberg, Fiskebäckskil 45178, Sweden; ²School of Marine Science and Engineering, Plymouth University, Plymouth PL4 8AA, UK; ³Département de Biologie, Chimie et Géographie, Université du Québec à Rimouski, Rimouski QC G5L 3A1, Canada; ⁴The Sven Lovén Centre for Marine Sciences–Kristineberg, University of Gothenburg, 566 Kristineberg, Fiskebäckskil 45178, Sweden



Step2: make some noise

**Ocean acidification can alter
the taste of shrimps**



“Ocean acidification is often referred as the silent storm because you can’t see it, you can’t hear it, and you can’t smell it, but our research suggests that you just may be able to taste it.”

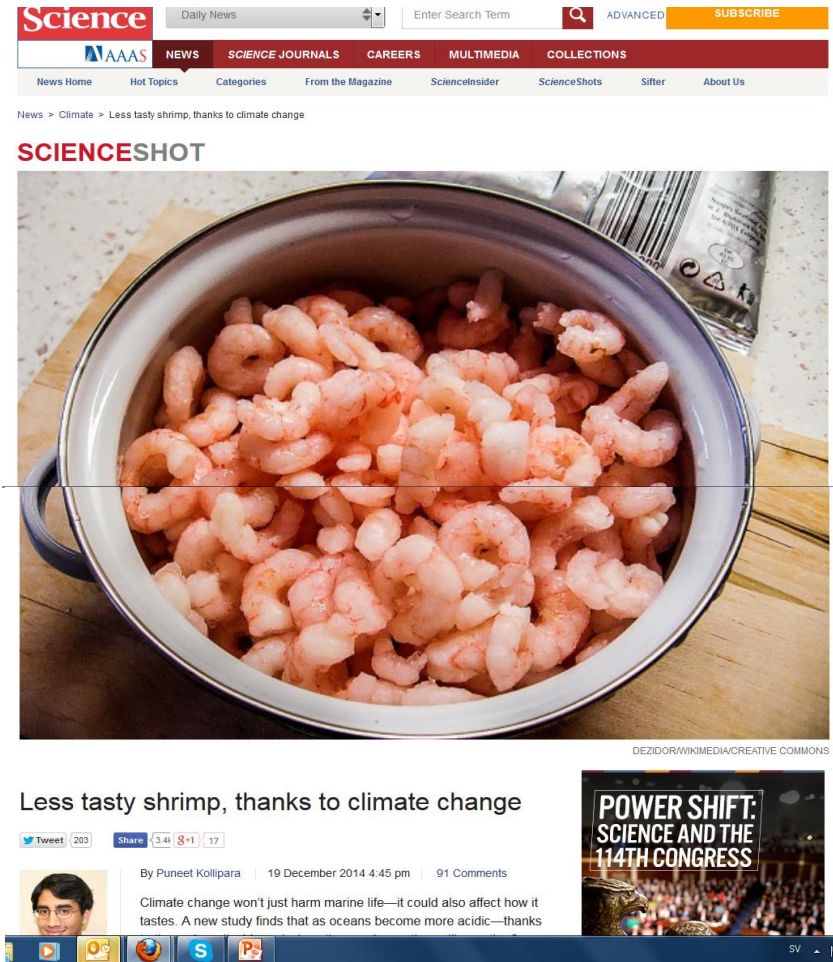
CÔMPASS



GÖTEBORG
UNIVERSITY



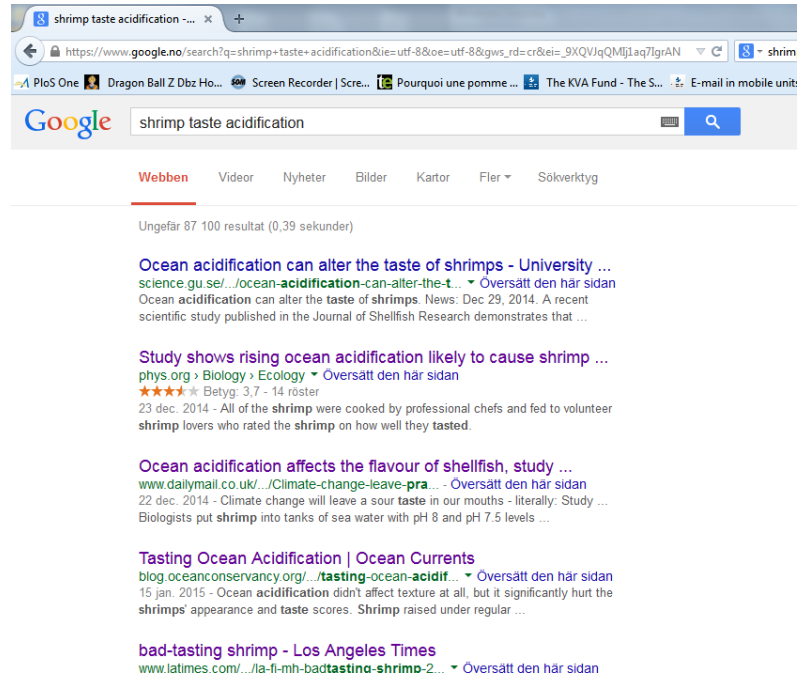
Step2: make some noise



Stimulate research:

- China
- USA
- Chile
- etc

Step2: make some noise



Через сто лет креветки станут невкусными

текст: Анна Говорова/infox.ru

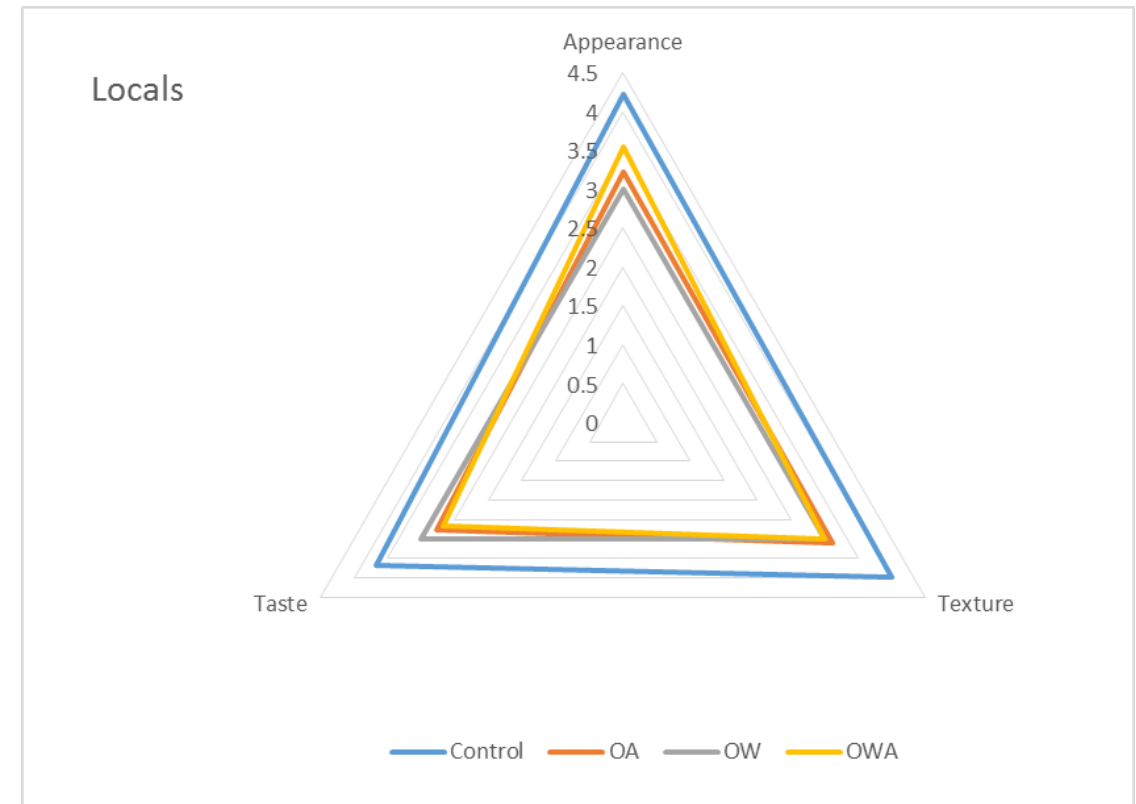
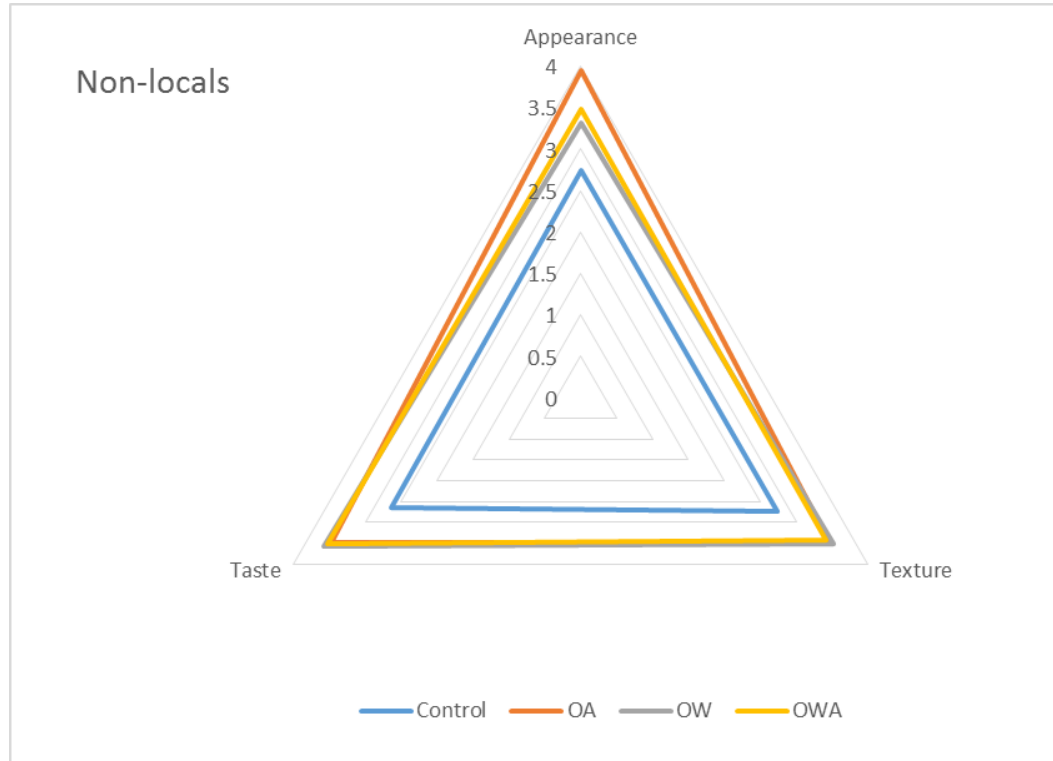
опубликовано: 22.06.14 17:52



Группа ученых из Великобритании, Канады и Швеции пришла к выводу, что в будущем (к 2100 году) креветки станут менее вкусными. Причиной ухудшения их вкусовых качеств, считают авторы, станет глобальное потепление климата и повышение уровня кислотности Мирового океана.



Side note: think it through !



Step3: Implement & Evaluate



Evaluation: Are you willing to take a pledge for the environment? Interview after 6 months



Case study 2: I am the ocean

Henrik Wallgren är musiker, allkonstnär och äventyrare. Han arbetar med musik, film, teater, som författare, tidningskrönikör med mera. Henrik har samarbetat med TILLT kring en rad olika utvecklingsprojekt av olika längd och innehåll.

Sam Dupont är forskare vid Institutionen för biologi och miljövetenskap vid Göteborgs Universitet. Han forskar framför allt på den ökade mänskliga aktiviteten på de marina ekosystemen.



Henrik Wallgren



Sam Dupont



**No limit:
think out of the box**



Tim Minchin

Please don't make the mistake of thinking the arts and sciences are at odds with one another. That is a recent, stupid, and damaging idea.

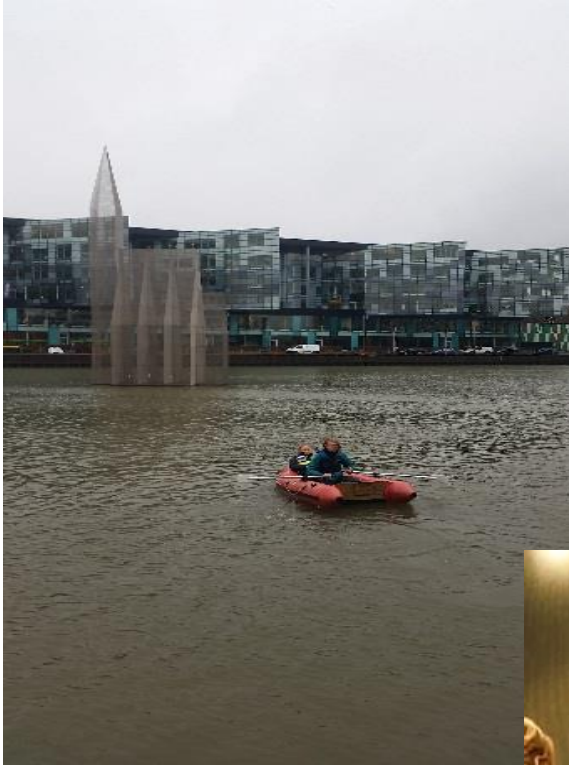
(...)

The arts and sciences need to work together to improve how knowledge is communicated.

Day 1: magic and the blue pill



Day 2: Fish for ideas



Different audiences



Designing a (biological) experiment?

1. What is your question? Your hypothesis?

} Why? What? ←

2. How can I test this?

- What is the best model?

} Who?

- What are my limitations?

- What are the best endpoints?

- What are the best design/stats?

- What are my controls?

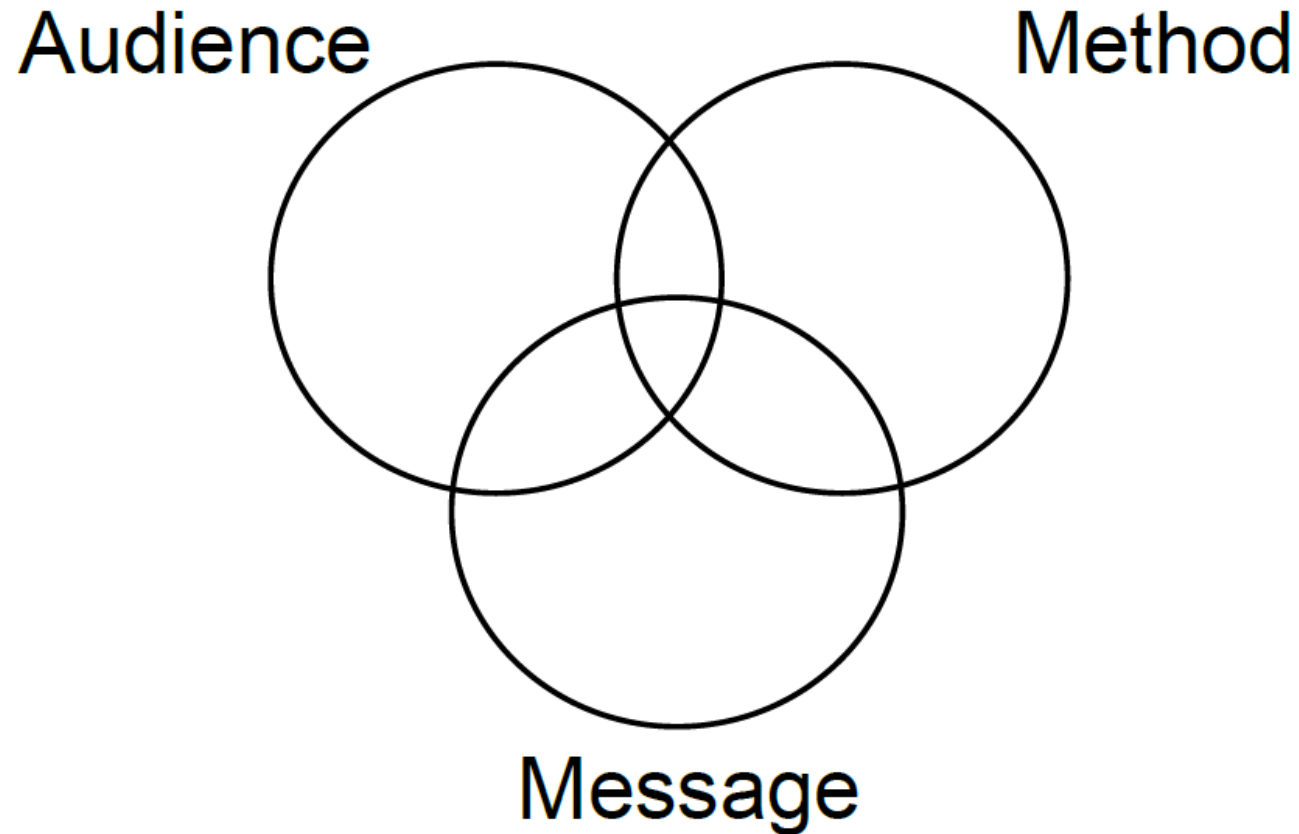
} How? *New?*
Pilot studies
Collaboration

- etc.

Can I REALLY answer my question with the collected data? } *Evaluation* —

3 key aspects to consider

What is the IMPACT?



1. The audience

- ✓ Different cultures / languages
- ✓ Different needs

Need to build some mutual understanding and trust



Kids



Economists



Policy makers



Citizens

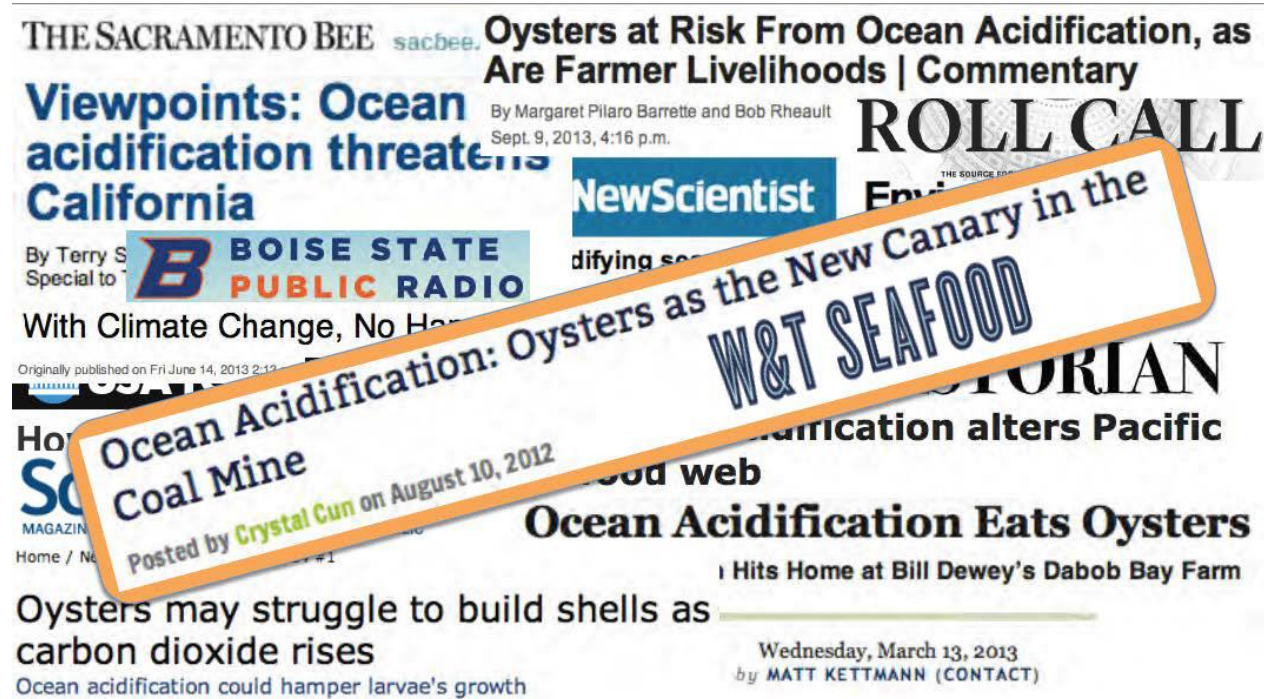


Scientists



Journalists

What does a journalist want?



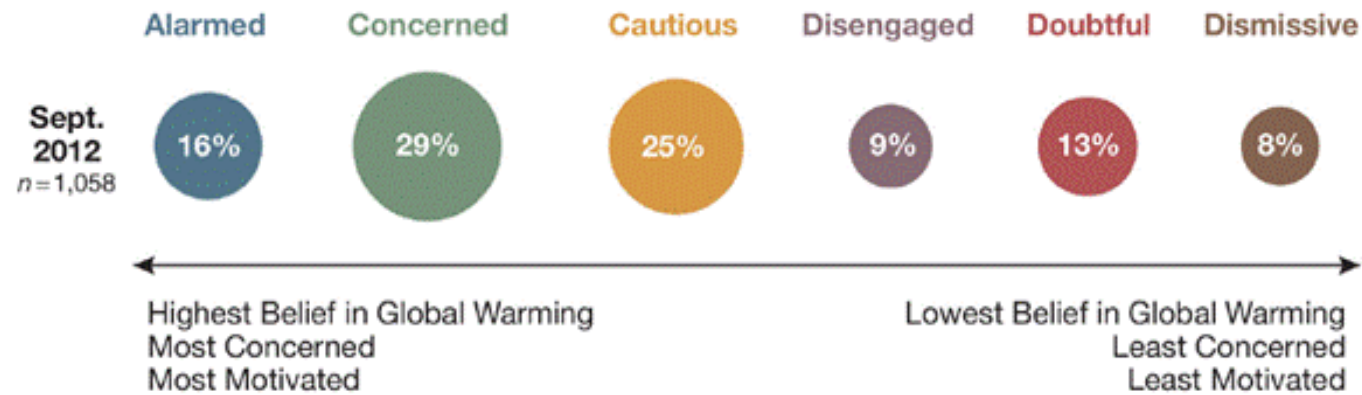
Stories

What does a policy maker want?



Solutions... to take decisions

What is a citizen?



(6 Americas)

Chose your fight...

2. The method

- ✓ Formal education
- ✓ Informal education / Outreach / Communication
 - ✓ Scientific literature
 - ✓ Talks
 - ✓ Meetings
 - ✓ Internet / Social Medias
 - ✓ Press
 - ✓ Art
 - ✓ Documents
 - ✓ Ambassadors
 - ✓ etc.

Need to be
adaptated to your
audience !

Example: social medias

Computers & Education 82 (2015) 60–73



Contents lists available at ScienceDirect

Computers & Education

journal homepage: www.elsevier.com/locate/compedu



Can Facebook be used to increase scientific literacy? A case study of the Monterey Bay Aquarium Research Institute Facebook page and ocean literacy



G. Fauville ^{a,*}, S. Dupont ^b, S. von Thun ^c, J. Lundin ^d

3. The message

- ✓ Simple
- ✓ Adapted to the audience
- ✓ Accurate (no over-simplification)



RESEARCH ARTICLE

Simple Messages Help Set the Record Straight about Scientific Agreement on Human-Caused Climate Change: The Results of Two Experiments

Teresa A. Myers¹, Edward Maibach^{1*}, Ellen Peters², Anthony Leiserowitz³

Psychology: Ostrich policy

Wisconsin Agency Bans Talk of Climate Change

State treasurer convinces commissioners to pass the rule

ClimateWire

April 10, 2015 | By Evan Lehmann and ClimateWire

The state treasurer in Wisconsin declined to explain his views about climate change a day after leading the effort to ban a small state agency from talking about rising temperatures.

The ban approved Tuesday sharply divided elected officials overseeing the obscure Board of Commissioners of Public Lands, prompting the only Democrat on the three-person panel to say it symbolizes "a very dangerous trend" in state politics.

The restriction, approved by a 2-1 vote, prevents 10 staff members at the BCPL from



The restriction, approved by a 2-1 vote, prevents 10 staff members at the BCPL from communicating about climate change, including about its potential impacts on 77,000 acres of state timberland. The board uses the income from it for public education projects.

Credit: Tori Rector/Flickr



Damn you evolution !



- ✓ Humans are social animals
- ✓ Natural selection to compute and seek social balance
- ✓ Apply this heuristic to environmental issues
- ✓ One “good” action balances one “bad” action
(*I recycle plastic so I can fly*)

Catastrophisms

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Climate change

We have 12 years to limit climate change catastrophe, warns UN

Urgent changes needed to cut risk of extreme heat, drought, floods and poverty, says IPCC

Overwhelmed by climate change? Here's what you can do

Jonathan WattsGlobal environment editor

Mon 8 Oct 2018 07.23 BST

f

117,562

syndication.com...



most viewed



Khashoggi killing: Trump says Saudi crown prince could have been involved

Psychology of change

Morality, fear, shame,
etc.



Drive a positive
attitude toward
change and a
commitment to
change (empathy,
solution, etc.)

Miller 1999



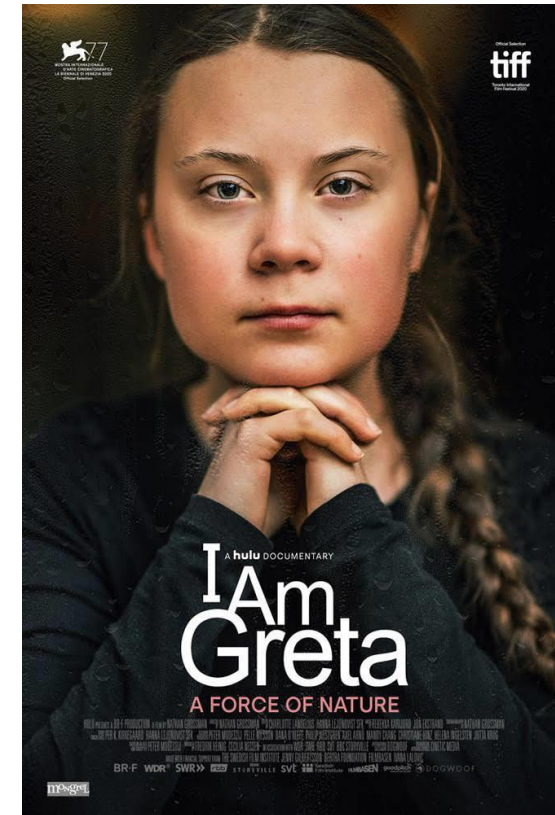
Alexander's rat park

Anger and change

"HOW DARE YOU?"
GRETAEFFEKTER PÅ SVENSK MILJÖ- OCH
KLIMATOPINION

SVERKER C JAGERS, SIMON MATTI,
HENRIK OSCARSSON OCH SARA PERSSON

✓No...



Climate anxiety

Comment

Climate anxiety in young people: a call to action

Climate change poses a major threat to human health. Emerging studies are elucidating the physical health effects of climate change, such as increased rates of heat-related illnesses and infectious diseases

hottest ever recorded. To compensate, the lifetime carbon dioxide emissions (or carbon budget) of the average young person today will need to be eight times less than that of their grandparents to restrict global warming to

Published Online
September 9, 2020
[https://doi.org/10.1016/S2542-5196\(20\)30223-0](https://doi.org/10.1016/S2542-5196(20)30223-0)

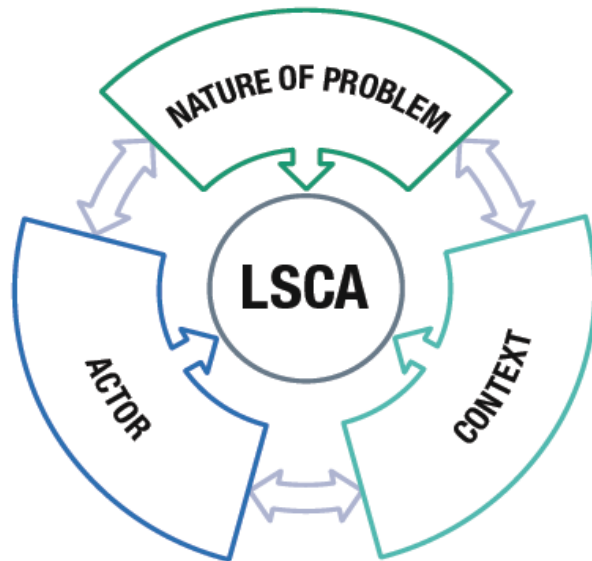
- ✓ Negative effect on health
- ✓ Preclude actions

Why communicating science?

- ✓ Not everyone needs to be a communicator
- ✓ It is important BUT think about yourself too
- ✓ So if you do it... do it well (real impact)
- ✓ **IT IS FUN, REWARDING, CREATIVE
and PASSION CAN LEAD TO CHANGE**

Not a hobby... a real research topic

CENTRE FOR COLLECTIVE ACTION RESEARCH



Social dilemma:

Action, acceptance and compliance linked to psychological factors, values, beliefs, norms, policy-specific beliefs, freedom, fairness, effectiveness, personal outcome, trust and reciprocity, etc.

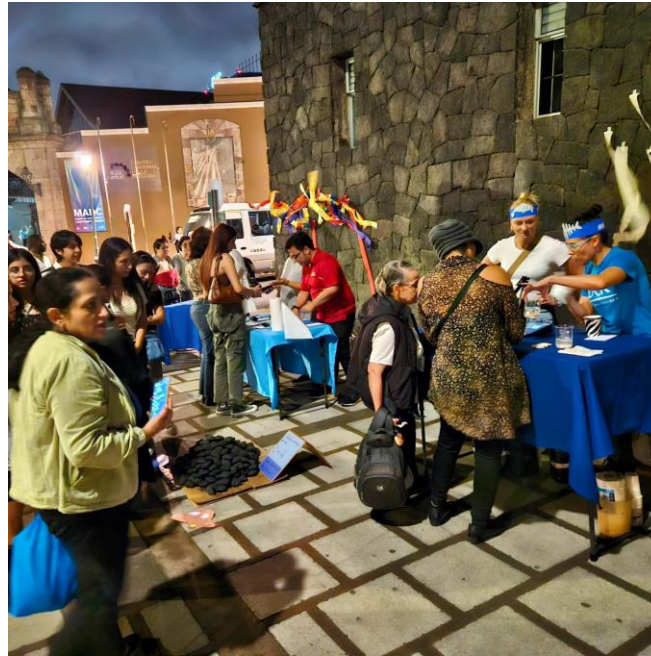
Communicating ocean science



Communication is a science !

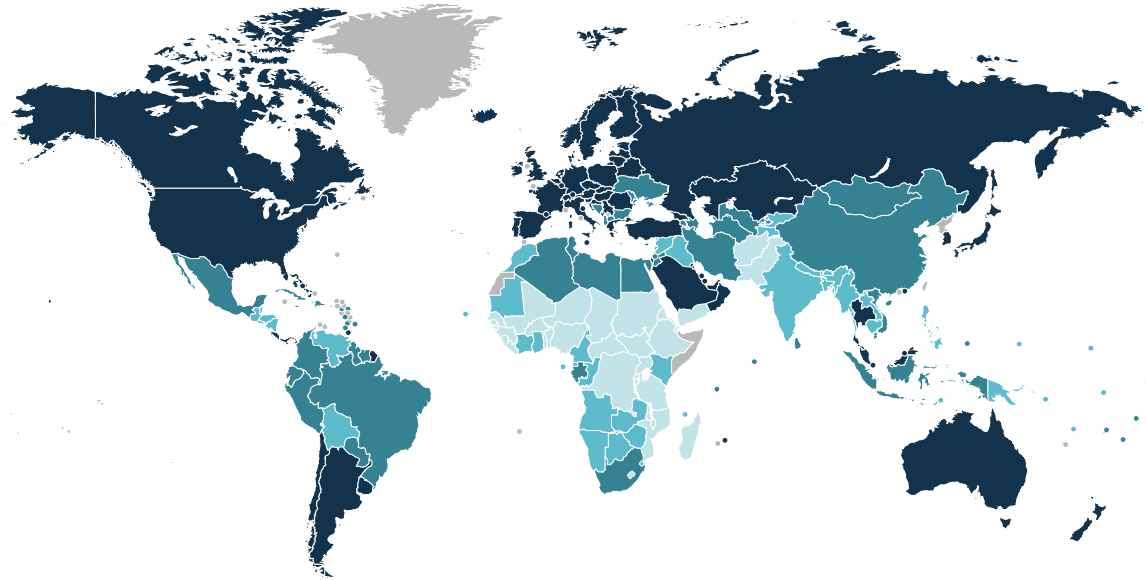
and... no real (tested) strategy yet

Applying the framework Training in Costa Rica (2023)

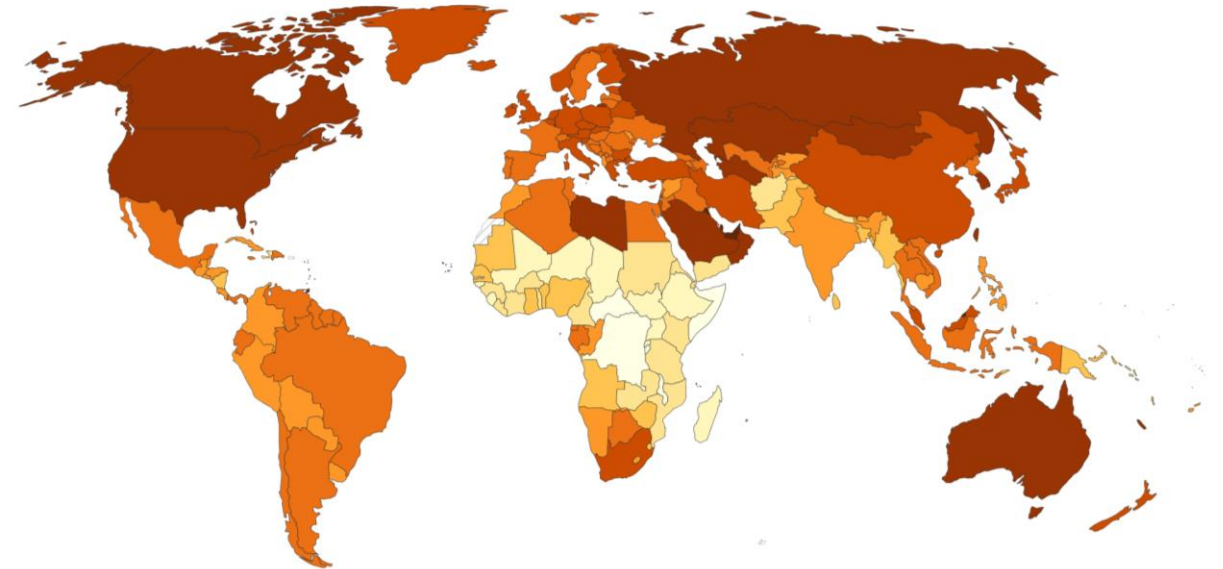


Design, implementation, and evaluation of activities for
policy makers, journalists, school, citizen (art event)

Different recommendations / communication to different regions (ethic, priorities, actions)



Development Index



Carbon footprint per capita

Different regions = Different responsibilities = Different priorities

Different recommendations / communication to different regions (ethic, priorities, actions)

- ✓ Developed countries High responsibility (CO₂, colonialism, etc.)
Democracy, trust in authorities, etc.



Mitigation (society, individual), Adaptation,
support development and science

Priority: "Local" communication

- ✓ Less developed countries Lower responsibility, higher vulnerability,
corruption, low trust, need development



Societal development + local adaptation science

Priority: "Global" communication

In what context **OA** is the best story?

Developped countries

Why?

Research money

Mitigation

- Reduce emission
- Capture carbon

Adaptation

- Conservation
- Restoration
- Societal adaptation

Who?

Citizen (change/acceptance)
Policy (legislation)
Industry (change practices)

No need for new science !

How?

Local press
Social medias
etc.

What?

Responsability
Need to change
Give back

In what context **OA** is the best story?

Developping countries

Why?

Research money

Mitigation

- Reduce emission
- Capture carbon

Adaptation

- Conservation
- Restoration
- Societal adaptation

Who?

Coastal communities
Policy (legislation)

How?

International Press
Social media
Policy arenas

What?

Consequences for vulnerable communities
Need for support for development



Conclusions

- ✓ Science of climate change is strong
- ✓ Some solutions are available
- ✓ Not enough meaningful actions
- ✓ Miscommunication and lobbying (even from scientists)
- ✓ Inefficient and disorganized science communication
- ✓ Development and implementation of a blueprint for ocean revolution: targeted, efficient, action-driven and evaluated communication strategy



Thanks