Views of, knowledge about, and skills in science communication (VoKaSS)

Full survey (pre-test/baseline version)

Science Communication: Scientists' Views and Skills

The purpose of this questionnaire is to study scientists' views of science in the media, their science communication skills, and what they learn in various media training activities. Thank you for taking part in our effort to establish evidence-based science communication policy.

[Electronic survey here presented a formal consent form]

SECTION 1: Background and Experience

- My highest level of education in the natural sciences, technology, engineering or mathematical sciences is:

❍ Undergraduate courses
❍ Undergraduate major
❍ Graduate courses
❍ Master's degree
❍ PhD
❍ Other graduate degree

- My current primary position is:

❍ Undergraduate student
❍ Graduate student
❍ Post-doctoral researcher
❍ Assistant professor
❍ Associate professor
❍ Full professor
❍ Research-only professor
❍ Researcher in industry
❍ Program administrator
❍ Communications office
❍ Extension staff
❍ Other

- What is your current field of work?
  [Respondents indicated primary and secondary fields from a drop-down list of sciences]

- Optional: Gender

❍ Male
❍ Female

- Optional: Age

❍ 18-22
❍ 23-25
❍ 26-30
❍ 31-35
❍ 36-40
❍ 41-45
❍ 46-50
❍ 51-55
❍ 56-60
❍ 61-65
❍ 66-70
❍ Over 70

- Nationality
  [Respondents were asked to indicate their nationality from a drop-down list]

- In the questions that follow, we will be concerned with "public engagement" activities, by which we mean science-related activities for non-science audiences. In which public engagement activities have you taken part during your professional life (including your undergraduate or graduate education)? Please mark all that apply.

❑ Worked with the formal education system (visiting elementary/secondary schools, preparing educational materials/professional development for teachers)
❑ Worked with informal educational programs (e.g. visit to the lab, answering a question on an Ask-A-Scientist site, leading a science camp)
❑ Participated in an institutional open house for family, friends
❑ Participated in public dialogue/debate
❑ Gave a public lecture to non-scientists (including science cafe)
❑ Prepared a website especially for the general public (or have a section on your website that is aimed at the general public)
❑ Engaged with policy-makers (face to face or in writing)

- ❑ Engaged with policy-oriented nongovernmental organizations (NGOs)
- ❑ Worked with science centers/museums
- ❑ Judged science fair competitions
- ❑ Wrote a non-technical summary of my research for distribution
- ❑ Worked on a press release with an institutional public information officer
- ❑ Have been interviewed by a journalist on radio or TV (including a panel)
- ❑ Gave a press conference (individual or in a group)
- ❑ Have been interviewed by a journalist for newspapers or magazines
- ❑ Provided background information for a popular article or program
- ❑ Have written myself for the general public (print or broadcast)
- ❑ Have published a science blog/podcast

- This questionnaire will focus on science communication using the media. Please estimate: How many science communication activities involving the media have you participated in during the last three years?

- ❍ 0
- ❍ 1
- ❍ 2
- ❍ 3-5
- ❍ 5-9
- ❍ 10 or more
- ❍ 10 or more, because it is part of my job

- If none, please indicate which statement best describes the reason:

- ❍ I have declined to participate
- ❍ I did not have an opportunity to participate

- Do you have any training in communicating science to the non-specialist public? (not including teacher or TA training)

- ❍ Yes
- ❍ No

- If you do, please describe its type and length:

- Please tell us what you think:

	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
Media skills training is valuable for scientists	❍	❍	❍	❍	❍	❍
You either have it or you don't, training won't help much	❍	❍	❍	❍	❍	❍

SECTION 2: Science Communication Skills

- In your opinion, which of the following science concepts should be defined when writing to a non-technical audience?

- ❑ Mitochondria
- ❑ Angle
- ❑ Pulsar
- ❑ Quantum
- ❑ Meiosis
- ❑ Dark matter
- ❑ Polymer
- ❑ Epigenetic
- ❑ Isotope
- ❑ Kinetic energy
- ❑ Density
- ❑ DNA
- ❑ Cell
- ❑ Decomposers
- ❑ The Standard model

- Please describe your research, its context and implications for a general audience in 150-200 words (you can pick a specific project in progress or research that has already been completed).

- Imagine you are talking to members of your family, who do not have a science background. Knowing that you have general science knowledge, they ask you one of the following questions about science in their lives. Choose one question and answer in 75-150 words.
    - o Why doesn't the doctor prescribe antibiotics for flu?
    - o If there is no oxygen in space, how does the sun burn?
    - o Why can't I use metal in a microwave?
    - o What is the Internet and how does it work?
    - o Why does a white shirt becomes transparent when it's wet?
    - o How do the police identify people based on their DNA?
    - o How come grandfather, who smoked a pack a day for 72 years, is alive and well at the age of 91, while his vegetarian nonsmoking doctor died of cancer?

Please respond in your own words, based on your existing knowledge. You do not need to use any other resources in answering these questions (such as textbooks, reference books, websites, Wikipedia, etc.). We are interested in the way you are communicating science.

- Happy with your answer, they now ask one of the following questions, about science's interaction with society. Choose one question and answer in 100-200 words.
    - How can you believe that humans developed from monkeys, when the Bible says God made us?
    - How can you believe that the universe is 13 billion years old, when the Bible says God created it less than 6000 years ago?
    - Are humans responsible for the Earth getting warmer or not? Why can't scientists agree on that?
    - Is genetically modified food safe? How come the Europeans don't use it but people in America do?
    - Why do we spend all this money on giant particle accelerators and journeys to Mars, when there are hungry people in the world?

Please respond in your own words, based on your existing knowledge. You do not need to use any other resources in answering these questions (such as textbooks, reference books, websites, Wikipedia, etc.). We are interested in the way you are communicating science.

SECTION 3: Your Views on Science in the media

- I feel:

	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
Well equipped to directly engage with non-specialists about my research	❍	❍	❍	❍	❍	❍
Well equipped to engage with the media about my research	❍	❍	❍	❍	❍	❍
In control over my appearance in the media	❍	❍	❍	❍	❍	❍
Comfortable working with the media	❍	❍	❍	❍	❍	❍

- I think:

	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
It is important that the media covers science related issues	❍	❍	❍	❍	❍	❍
Overall, there is enough coverage of science by media	❍	❍	❍	❍	❍	❍
Overall, the coverage quality of science by the media is satisfactory	❍	❍	❍	❍	❍	❍

- Communicating with the public should ideally be:

❍ Not at all part of a scientist's work
❍ An optional activity for a scientist, not a basic part of a scientist's work
❍ An integral part of a scientist's work if he or she receives grants from public funds
❍ An integral part of a scientist's work
❍ Other: _____

- What are your thoughts about scientists who speak in the media?

	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
Only senior researchers should speak to the media	❍	❍	❍	❍	❍	❍
Good scientists don't have time to speak to journalists because they are busy doing research	❍	❍	❍	❍	❍	❍
Scientists who allow themselves to be interviewed for stories (not just their own research) are just seeking publicity	❍	❍	❍	❍	❍	❍
Scientists who speak in the media contribute to science and society	❍	❍	❍	❍	❍	❍

- A list of potential benefits of working with the media follows below. Please mark 3 items in each column to show their importance to you.

most important	moderately important	least important
_____ Support for research funding	_____ Support for research funding	_____ Support for research funding
_____ Influencing the public image of science and scientists	_____ Influencing the public image of science and scientists	_____ Influencing the public image of science and scientists
_____ Educating the public	_____ Educating the public	_____ Educating the public
_____ Public accountability (helping communicate how public funds are being spend)	_____ Public accountability (helping communicate how public funds are being spend)	_____ Public accountability (helping communicate how public funds are being spend)
_____ Personal satisfaction	_____ Personal satisfaction	_____ Personal satisfaction
_____ Stimulating the next generation of young scientists	_____ Stimulating the next generation of young scientists	_____ Stimulating the next generation of young scientists
_____ Prestige that may help in future job hunt or grant application	_____ Prestige that may help in future job hunt or grant application	_____ Prestige that may help in future job hunt or grant application
_____ Informing my science by creating a dialogue with the public	_____ Informing my science by creating a dialogue with the public	_____ Informing my science by creating a dialogue with the public
_____ Influence on public debate	_____ Influence on public debate	_____ Influence on public debate

- A list of potential impediments to working with the media follows below. Please mark at least 2 items in each column to show their importance to you.

most important	moderately important	least important
_____ Lack of media contacts	_____ Lack of media contacts	_____ Lack of media contacts
_____ Lack of access to skilled communicators to help release the stories	_____ Lack of access to skilled communicators to help release the stories	_____ Lack of access to skilled communicators to help release the stories
_____ Pressure of time	_____ Pressure of time	_____ Pressure of time
_____ Lack of recognition or institutional reward	_____ Lack of recognition or institutional reward	_____ Lack of recognition or institutional reward
_____ The media's attitude to science	_____ The media's attitude to science	_____ The media's attitude to science
_____ Lack of training in speaking with the media	_____ Lack of training in speaking with the media	_____ Lack of training in speaking with the media
_____ Institutional discouragement	_____ Institutional discouragement	_____ Institutional discouragement
_____ Lack of control over my message	_____ Lack of control over my message	_____ Lack of control over my message

- Speaking with the media is…

❍ A good idea to help one's promotion
❍ Unlikely to affect one's promotion
❍ Not worth the risk

- My organization…

❍ Supports and values engagement with the public
❍ Is ambivalent about media interaction
❍ Views interactions with the media negatively

- My peers' reaction is… (mark all the statements that reflect your opinion):

❑ My colleagues may be judgmental of a simplified explanation of my work in the media
❑ My colleagues support and value engagement with the public
❑ My colleagues are indifferent whether or not the public knows about their work
❑ My colleagues may be envious of my high profile in the media
❑ My colleagues view communicating with the public as a waste of research time
❑ Other: _____

- In your experience, mainstream media coverage of scientific topics in general is:

	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
Accurate	❍	❍	❍	❍	❍	❍
Based on credible sources	❍	❍	❍	❍	❍	❍
Comprehensive	❍	❍	❍	❍	❍	❍
Hostile	❍	❍	❍	❍	❍	❍
Manipulative	❍	❍	❍	❍	❍	❍
Trustworthy	❍	❍	❍	❍	❍	❍
Biased	❍	❍	❍	❍	❍	❍

- At its best, popular science writing is a process of:

❍ Simplification
❍ Adaptation
❍ Vulgarization
❍ Translation
❍ Recontextualization

- The following quotes come from scientists discussing science in the media. Please mark all those which express your opinion.

❑ "Most of the stories you read in the press are either full of factual errors or just simply wrong."
❑ "One should get across the main parts of the story, and tolerate it if the details are wrong."
❑ "Stories are trivialized to the point where any information content is removed."
❑ "Science reporting centers too much on personalities and not enough on the actual findings."
❑ "In the era of the new media, scientists don't need journalists in order to speak to the general public."

- Please tell us, what is your overall view regarding science in the media?

- To the best of your knowledge:

	Yes	No	I'm not sure
A newspaper's/TV station's function is to educate the public	❍	❍	❍
Reporters sometimes have less than an hour to work on a science news item	❍	❍	❍
Most journalists who report on science-related issues have a science degree at the college level	❍	❍	❍
The editor (not the reporter) chooses the article's title	❍	❍	❍
A research article that was published today might make it to the news today, but not in two weeks	❍	❍	❍
For most adults, the media is the primary source of information about science	❍	❍	❍
An interviewee usually has a chance to see the article before it is printed	❍	❍	❍

- Please estimate: What is the percentage of adult Americans who know...

	90%	80%	70%	60%	50%	40%	30%	20%	10%
how long it takes for the Earth to go around the Sun	❍	❍	❍	❍	❍	❍	❍	❍	❍
that electrons are smaller than atoms	❍	❍	❍	❍	❍	❍	❍	❍	❍
that if a couple have one in four chances of having a child with an inherited illness, each of the couple's children will have the same risk of illness	❍	❍	❍	❍	❍	❍	❍	❍	❍

- Different people have very different views about the relationship between science and society. Please indicate your level of agreement with the following statements:

	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
People who are skeptical about modern science lack adequate knowledge about science (e.g. evolution, climate change)	❍	❍	❍	❍	❍	❍
People who are skeptical about technological applications of modern science lack adequate knowledge about science (e.g. GMOs, nuclear power)	❍	❍	❍	❍	❍	❍
A more scientifically informed public will more frequently side with scientists in controversies (e.g. vaccination, climate change)	❍	❍	❍	❍	❍	❍
Most members of the public are so ill-informed about science that their opinions about science and technology should not influence policy (e.g. stem cells, GMOs)	❍	❍	❍	❍	❍	❍
Public involvement in science related policy making threatens the research autonomy of scientists (e.g. stem cells)	❍	❍	❍	❍	❍	❍
Even if public involvement threatens the research autonomy of scientists, the public should be involved in science related policy making	❍	❍	❍	❍	❍	❍
The public will lose trust in science if they are exposed to disagreements between scientists	❍	❍	❍	❍	❍	❍
Even if the public will lose trust by being exposed to disagreements between scientists, disagreements should be made public	❍	❍	❍	❍	❍	❍
Explaining science to people and	❍	❍	❍	❍	❍	❍

involving them in discussion of controversial issues is important for civic life Just as the public must be educated on scientific topics, so must the scientific community be educated on public attitudes and opinions	❍	❍	❍	❍	❍	❍

- In an ideal world (please mark all those which express your opinion):

❑ I would not need to do any science communication, because the media would do its job properly
❑ I would write a blog and communicate directly with the public
❑ There would be more science reporting in the mainstream media
❑ Researchers would be rewarded for speaking with the public
❑ All science journalists would be trained scientists
❑ All science graduates would take a science communication course
❑ Other: _____

- Finally, please feel free to add any additional comments you have on the issue of science communication with the non-specialist public.

Thank you for your help!

Views of, knowledge about, and skills in science communication (VoKaSS)

Post –test version of survey, for use after respondents have already taken pre-test

Science Communication: Scientists' Views and Skills

The purpose of this questionnaire is to study scientists' views of science in the media, their science communication skills, and what they learn in various media training activities. Thank you for taking part in our effort to establish evidence-based science communication policy.

[Electronic survey here presented a formal consent form]

SECTION 1: Background and Experience

[a unique identifier was used to match post-test respondents with their pre-test surveys]

- Please tell us what you think:

	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
Media skills training is valuable for scientists	❍	❍	❍	❍	❍	❍
You either have it or you don't, training won't help much	❍	❍	❍	❍	❍	❍

SECTION 2: Science Communication Skills

- In your opinion, which of the following science concepts should be defined when writing to a non-technical audience?

❑ Mitochondria
❑ Angle
❑ Pulsar
❑ Quantum
❑ Meiosis
❑ Dark matter
❑ Polymer
❑ Epigenetic
❑ Isotope
❑ Kinetic energy
❑ Density
❑ DNA
❑ Cell
❑ Decomposers
❑ The Standard model

- [In the pre-test, respondents were asked to write answers to three questions. In the post-test, they received the following item]
  The email which had the link to this survey also contained a Word attachment with your responses to these three questions:
    - Please describe your research, its context and implications for a general audience.

- Imagine you are talking to members of your family, who do not have a science background. Knowing that you have general science knowledge, they ask you a question about science in their lives.
- Happy with your answer, they now ask a question about science's interaction with society.

Please review your answers and make any changes that you feel will make them clearer and more useful. Please use Track Changes or highlight the changes that you make. You can also add comments to the text. When you are finished, please upload your file

SECTION 3: Your Views on Science in the media

- I feel:

	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
Well equipped to directly engage with non-specialists about my research	❍	❍	❍	❍	❍	❍
Well equipped to engage with the media about my research	❍	❍	❍	❍	❍	❍
In control over my appearance in the media	❍	❍	❍	❍	❍	❍
Comfortable working with the media	❍	❍	❍	❍	❍	❍

- I think:

	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
It is important that the media covers science related issues	❍	❍	❍	❍	❍	❍
Overall, there is enough coverage of science by media	❍	❍	❍	❍	❍	❍
Overall, the coverage quality of science by the media is satisfactory	❍	❍	❍	❍	❍	❍

- Communicating with the public should ideally be:

❍ Not at all part of a scientist's work
❍ An optional activity for a scientist, not a basic part of a scientist's work
❍ An integral part of a scientist's work if he or she receives grants from public funds
❍ An integral part of a scientist's work
❍ Other: _____

- What are your thoughts about scientists who speak in the media?

	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
Only senior researchers should speak to the media	❍	❍	❍	❍	❍	❍
Good scientists don't have time to speak to journalists because they are busy doing research	❍	❍	❍	❍	❍	❍
Scientists who allow themselves to be interviewed for stories (not just their own research) are just seeking publicity	❍	❍	❍	❍	❍	❍
Scientists who speak in the media contribute to science and society	❍	❍	❍	❍	❍	❍

- A list of potential benefits of working with the media follows below. Please mark 3 items in each column to show their importance to you.

most important	moderately important	least important
_____ Support for research funding	_____ Support for research funding	_____ Support for research funding
_____ Influencing the public image of science and scientists	_____ Influencing the public image of science and scientists	_____ Influencing the public image of science and scientists
_____ Educating the public	_____ Educating the public	_____ Educating the public
_____ Public accountability (helping communicate how public funds are being spend)	_____ Public accountability (helping communicate how public funds are being spend)	_____ Public accountability (helping communicate how public funds are being spend)
_____ Personal satisfaction	_____ Personal satisfaction	_____ Personal satisfaction
_____ Stimulating the next generation of young scientists	_____ Stimulating the next generation of young scientists	_____ Stimulating the next generation of young scientists
_____ Prestige that may help in future job hunt or grant application	_____ Prestige that may help in future job hunt or grant application	_____ Prestige that may help in future job hunt or grant application
_____ Informing my science by creating a dialogue with the public	_____ Informing my science by creating a dialogue with the public	_____ Informing my science by creating a dialogue with the public
_____ Influence on public debate	_____ Influence on public debate	_____ Influence on public debate

- A list of potential impediments to working with the media follows below. Please mark at least 2 items in each column to show their importance to you.

most important	moderately important	least important
_____ Lack of media contacts	_____ Lack of media contacts	_____ Lack of media contacts
_____ Lack of access to skilled communicators to help release the stories	_____ Lack of access to skilled communicators to help release the stories	_____ Lack of access to skilled communicators to help release the stories
_____ Pressure of time	_____ Pressure of time	_____ Pressure of time
_____ Lack of recognition or institutional reward	_____ Lack of recognition or institutional reward	_____ Lack of recognition or institutional reward
_____ The media's attitude to science	_____ The media's attitude to science	_____ The media's attitude to science
_____ Lack of training in speaking with the media	_____ Lack of training in speaking with the media	_____ Lack of training in speaking with the media
_____ Institutional discouragement	_____ Institutional discouragement	_____ Institutional discouragement
_____ Lack of control over my message	_____ Lack of control over my message	_____ Lack of control over my message

- Speaking with the media is…

❍ A good idea to help one's promotion
❍ Unlikely to affect one's promotion
❍ Not worth the risk

- My organization…

❍ Supports and values engagement with the public
❍ Is ambivalent about media interaction
❍ Views interactions with the media negatively

- My peers' reaction is… (mark all the statements that reflect your opinion):

❑ My colleagues may be judgmental of a simplified explanation of my work in the media
❑ My colleagues support and value engagement with the public
❑ My colleagues are indifferent whether or not the public knows about their work
❑ My colleagues may be envious of my high profile in the media
❑ My colleagues view communicating with the public as a waste of research time
❑ Other: _____

- In your experience, mainstream media coverage of scientific topics in general is:

	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
Accurate	❍	❍	❍	❍	❍	❍
Based on credible sources	❍	❍	❍	❍	❍	❍
Comprehensive	❍	❍	❍	❍	❍	❍
Hostile	❍	❍	❍	❍	❍	❍
Manipulative	❍	❍	❍	❍	❍	❍
Trustworthy	❍	❍	❍	❍	❍	❍
Biased	❍	❍	❍	❍	❍	❍

- At its best, popular science writing is a process of:

❍ Simplification
❍ Adaptation
❍ Vulgarization
❍ Translation
❍ Recontextualization

- The following quotes come from scientists discussing science in the media. Please mark all those which express your opinion.

❑ "Most of the stories you read in the press are either full of factual errors or just simply wrong."
❑ "One should get across the main parts of the story, and tolerate it if the details are wrong."
❑ "Stories are trivialized to the point where any information content is removed."
❑ "Science reporting centers too much on personalities and not enough on the actual findings."
❑ "In the era of the new media, scientists don't need journalists in order to speak to the general public."

- Please tell us, what is your overall view regarding science in the media?

- To the best of your knowledge:

	Yes	No	I'm not sure
A newspaper's/TV station's function is to educate the public	❍	❍	❍
Reporters sometimes have less than an hour to work on a science news item	❍	❍	❍
Most journalists who report on science-related issues have a science degree at the college level	❍	❍	❍
The editor (not the reporter) chooses the article's title	❍	❍	❍
A research article that was published today might make it to the news today, but not in two weeks	❍	❍	❍
For most adults, the media is the primary source of information about science	❍	❍	❍
An interviewee usually has a chance to see the article before it is printed	❍	❍	❍

- Please estimate: What is the percentage of adult Americans who know...

	90%	80%	70%	60%	50%	40%	30%	20%	10%
how long it takes for the Earth to go around the Sun	❍	❍	❍	❍	❍	❍	❍	❍	❍
that electrons are smaller than atoms	❍	❍	❍	❍	❍	❍	❍	❍	❍
that if a couple have one in four chances of having a child with an inherited illness, each of the couple's children will have the same risk of illness	❍	❍	❍	❍	❍	❍	❍	❍	❍

- Different people have very different views about the relationship between science and society. Please indicate your level of agreement with the following statements:

	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
People who are skeptical about modern science lack adequate knowledge about science (e.g. evolution, climate change)	❍	❍	❍	❍	❍	❍
People who are skeptical about technological applications of modern science lack adequate knowledge about science (e.g. GMOs, nuclear power)	❍	❍	❍	❍	❍	❍
A more scientifically informed public will more frequently side with scientists in controversies (e.g. vaccination, climate change)	❍	❍	❍	❍	❍	❍
Most members of the public are so ill-informed about science that their opinions about science and technology should not influence policy (e.g. stem cells, GMOs)	❍	❍	❍	❍	❍	❍
Public involvement in science related policy making threatens the research autonomy of scientists (e.g. stem cells)	❍	❍	❍	❍	❍	❍
Even if public involvement threatens the research autonomy of scientists, the public should be involved in science related policy making	❍	❍	❍	❍	❍	❍
The public will lose trust in science if they are exposed to disagreements between scientists	❍	❍	❍	❍	❍	❍
Even if the public will lose trust by being exposed to disagreements between scientists, disagreements should be made public	❍	❍	❍	❍	❍	❍
Explaining science to people and	❍	❍	❍	❍	❍	❍

involving them in discussion of controversial issues is important for civic life Just as the public must be educated on scientific topics, so must the scientific community be educated on public attitudes and opinions	❍	❍	❍	❍	❍	❍

- In an ideal world (please mark all those which express your opinion):

❑ I would not need to do any science communication, because the media would do its job properly
❑ I would write a blog and communicate directly with the public
❑ There would be more science reporting in the mainstream media
❑ Researchers would be rewarded for speaking with the public
❑ All science journalists would be trained scientists
❑ All science graduates would take a science communication course
❑ Other: _____

- Finally, please feel free to add any additional comments you have on the issue of science communication with the non-specialist public.

Thank you for your help!