

Appendix A. Website characteristics

| | | A | B | C | D |
|--|---------------|--|--|-------------------------|--|
| Owner | | A prestigious organization that provides solid financial support | A prestigious organization that provides solid financial support | Scientists' association | Owned privately by the founder and lead writer |
| Subject areas | | Various science topics | Primarily environmental sciences and ecology | Various science topics | Various science topics |
| Staff /Administrators | | The staff all have advanced degrees in science. They include writers and scientific & language editors. Most of the writers are graduate students. | | | Run by the owner who has experience in journalism; other contributors have advanced degrees in science |
| Employment status | | Paid staff | Paid staff | Volunteers | Volunteers |
| Items published in 2018 written by: | Website staff | 507 | 233 | 203 | 421 |
| | University PR | 14 | - | - | 300 |
| Items published in 2019 written by: | Website staff | 532 | 208 | 232 | 345 |
| | University PR | 48 | - | - | 258 |
| # of followers as of December 2019 (data collection) | Facebook | 49,203 | 10,436 | 138,711 | 16,522 |
| | Instagram | 1,798 | 657 | 9,102 | - |
| | Twitter | 1,813 | 296 | 3,799 | - |
| # of followers as of October 2022 | Facebook | 66,195 | 11,698 | 154,234 | 18,000 |
| | Instagram | 5068 | 1105 | 11,900 | - |
| | Twitter | 4544 | 387 | 7631 | - |

Appendix B. Reader demographics (%) of responders from the four Science News Websites

| | | Questionnaires on the Facebook pages | | | | Questionnaires on the website | Total | Israeli general population* |
|--|-------------------------------------|---|-------------|-------------|-------------|----------------------------------|---------|-----------------------------------|
| | | A (n=211) | B (n=14) | C (n=38) | D (n=51) | D (n=201) | (n=515) | |
| Gender | Male (%) | 53 | 64 | 74 | 72 | 70 | 63 | 49 |
| | Female (%) | 47 | 36 | 26 | 28 | 30 | 37 | 51 |
| Age | 18-24 (% Gen Z) | 16 | 7 | 26 | 2 | 28 | 20 | 16 |
| | 25-39 (% Gen Y) | 49 | 50 | 55 | 45 | 24 | 39 | 30 |
| | 40-54 (% Gen X) | 26 | 36 | 19 | 29 | 18 | 23 | 26 |
| | 55-80 (% Baby Boomers) | 9 | 7 | 0 | 24 | 30 | 18 | 28 |
| Education level | High school studies (%) | 9 | 14 | 16 | 10 | 27 | 17 | 62 |
| | Non-degree professional studies (%) | 6 | 0 | 3 | 2 | 10 | 7 | 7 |
| | Academic degree (%) | 85 | 86 | 81 | 88 | 63 | 76 | 31 |
| Work or study in STEM ¹ fields | | 67 | 43 | 82 | 71 | 67 | 60 | - |
| Internet browsing frequency is every day or almost every day | | 100 | 100 | 100 | 100 | 95 | 98 | 81 |
| Keep up with science news using other online sources as well | | 41 | 50 | 55 | 57 | 57 | 50 | - |

Note – 35% of respondents reported alternately reading articles on both the website and Facebook platforms

¹ STEM – Science (Biology, Physics, Earth sciences), Technology, Engineering, and Mathematics.

* (1) Central Bureau of Statistics. (2018). *Demographic characteristics of the Israeli society. Report No. 12, chapter 1, p. 50.*

<https://www.cbs.gov.il/he/publications/Pages/2021/2021-פני-החברה-בישראל-12-דוח.aspx> (2) Central Bureau of Statistics. (2019). *Persons aged 20 and over, by use of computer and Internet, and by selected characteristics. Report No. 17, File 17.19.* (3) Central Bureau of Statistics. (2021). *Population, by population group, religion, sex and age. File 2.3.* <https://www.cbs.gov.il/he/publications/Pages/2021/72-מספר-2021-לישראל-סטטיסטי-לישראל-2021-מספר-72.aspx>

Appendix C. Methods to examine the website practices regarding specific objectives

| Sci-comm objectives | | Methods | | | | |
|---------------------|---|------------------------------------|-----------------------------|----------------------|--------------------------------|--|
| | | Interviews with the administrators | Interviews with the readers | Reader questionnaire | Content analysis of news items | Content analysis of discussion threads |
| Dissemination | Enhance the public's scientific literacy to be able to make informed decisions | ✓ | ✓ | ✓ | | |
| | Contradict science misinformation, disinformation, and fake news | ✓ | ✓ | ✓ | | ✓ |
| | Inform the public about science and distribute scientific content | ✓ | ✓ | ✓ | ✓ | |
| | Make scientific content accessible | ✓ | ✓ | ✓ | ✓ | |
| | Excite the public about science | ✓ | ✓ | ✓ | | |
| | Gain the public's support and government funding for science | ✓ | ✓ | ✓ | | |
| | Tailor messages to specific audiences | ✓ | ✓ | ✓ | | |
| Dialogue | Find out the public opinion and needs to better communicate science | ✓ | ✓ | ✓ | | ✓ |
| | Stimulate the public to be involved in public science discourse, express concerns and raise questions that stem from science and its applications | | | | | |
| Participation | Foster the public to help set the agenda for science by actively deliberate in public debates on the "why" and "why not" of science as part of democratic policymaking | ✓ | ✓ | ✓ | | |
| | Enable responsible innovations – Acknowledge the public critique on the science research enterprise priority list, and strive to maximize possible societal returns from investments in science for the larger social good | | | | | |
| | Encourage the public to participate in research endeavors with scientists, encompassing the real-life experiences of non-experts and their socially informed scientific knowledge as part of the collaborative knowledge creation process | | | | | |

Appendix D. Readers' ratings of the websites' practices to achieve the objectives of science communication and illustrative quotes

| <i>Model</i> | <i>Objective</i> | <i>Readers' questionnaire (n=89) Mean (SD)</i> | <i>Illustrative quotes from readers' interviews (n=20)</i> | |
|----------------------|--|--|--|--|
| | | | <i>Perceive the objective as pursued</i> | <i>Perceive the objective as less often pursued</i> |
| <i>Dissemination</i> | Inform the public about science and distribute scientific content | 5.33 (1.06) | "In addition to covering a wide range of high-quality scientific topics, the post is very close to the date of the original publication. They are the first to publish science news" (#20) | |
| <i>Dissemination</i> | Make scientific content accessible | 5.27 (1.16) | "In general, I think the items are understandable. It contains many interesting topics that even those without a background in the field can read and understand. When complex terms are used, they provide explanations...this is what makes it so great. For example: making quantum theory accessible to the public...it is not an intuitive concept, but when I read their texts, I understand them even though I am not a physicist" (#6) | |
| <i>Dissemination</i> | Enhance the public's scientific literacy to be able to make informed decisions | 4.89 (1.34) | "Their coverage of environmental issues inspired me to volunteer at a great environmental organization. I apply these principles in every day, for example the cleaning agents I use are made from substances that are not harmful to the environment" (#3) | |
| <i>Dissemination</i> | Contradict science misinformation, disinformation, and fake news | 4.87 (1.23) | "During COVID-19, it was quite important for the site to refute incorrect information. In this era of information overload, this is quite important. This is important...I have seen it happen" (#2) | "Contradictory information is rarely discussed in the items. It typically appeared in readers' comments. However, the site just presents the scientific truth...it does not seem to be actively combatting fake news" (#4) |
| <i>Dissemination</i> | Excite the public about science and increase appreciation for science | 4.58 (1.37) | "I certainly find them exciting" (#14) | "People like me who enjoy science will read it anyway since they are motivated ... but I am not sure whether they try to boost enthusiasm in people who are not very interested in science in the first place" (#15) |
| <i>Dissemination</i> | Tailor messages to specific audiences | 3.74 (1.36) | "I do feel that they are trying to build trust because they present all sides...they do not take a side, but rather simply tell the story" (#9) | "I guess it is tailored for those who are interested in science...I do not think it is tailored for specific audiences" (#1) |

Appendix D. (Continued)

| | | | | |
|----------------------|---|-------------|--|---|
| <i>Dialogue</i> | Encourage the public to be involved in public science discourse, express concerns and raise questions that stem from science and its applications | 3.64 (1.38) | <i>"Incorporated questions into the content prompted me to respond and express my thoughts...the manner in which information was presented occasionally inspired me to ask questions" (#15)</i> | <i>"I am not sure whether they actively prompt readers to share their thoughts and comments. On several occasions, readers contributed their thoughts, but received no responses" (#17)</i> |
| <i>Dissemination</i> | Gain the public's support and government funding for science | 3.35 (1.55) | | <i>"I think it is a very positive side effect of what they do, but they don't do it internally...it is not their direct goal but an outgrowth of their actions" (#19)</i> |
| <i>Dialogue</i> | Find out the public opinion and needs to better communicate science | 3.25 (1.39) | <i>"...the audience who reads these items does not represent the general population, but rather a segment of the public that is interested in science. Once the website expands their distribution to a larger audience, they will start to see the point of views of people who have only recently become interested in science" (#7)</i> | <i>"I am not sure since there are not many comments on these sites readers' primary interest is with the item itself rather than the comments" (#10)</i> |
| <i>Participation</i> | Foster the public to help set the agenda for science by actively deliberate in public debates on the "why" and "why not" of science, as part of democratic policymaking | 3.03 (1.48) | <i>"Climate change has been part of the public call to wake up to this issue, but I am not sure if they have been successful. This information does not seem to get passed along even when people are exposed to these items" (#11)</i> | <i>"To the best of my knowledge, they do not proactively engage in any steps to encourage readers' participation in policymaking in the context of science..." (#4)</i> |
| <i>Participation</i> | Encourage the public to participate in research endeavors with scientists, encompassing the real-life experiences of non-experts and their socially informed scientific knowledge as part of the collaborative knowledge creation process | 2.99 (1.45) | <i>"Recently, they published an item about birdwatching, which might be sort of an invitation to the public to try this " (#16)</i> | <i>"It is not something I recall coming across...actually, it would have been quite interesting" (#19)</i> |
| <i>Participation</i> | Enable responsible innovations – Acknowledge the public critique of the science research enterprise priority list, and strive to maximize possible societal returns from investments in science for the larger social good | 2.94 (1.41) | | <i>"I have not seen any attempt to address it...I suppose that in an economic paper it would have been addressed but not on scientific sites" (#13)</i> |

Appendix E. Science communication objectives were reorganized into Operational objectives, Desired impacts, and Endpoints based on the interviews with science news websites' administrators (n=8)

| | | Administrators' illustrative quotes |
|-------------------------------|---|---|
| <i>Operational objectives</i> | Contradict science misinformation, disinformation, and fake news (Dissemination) | <i>"The fight against unsupported and misleading arguments relating to issues such as evolution and climate change is an integral part of our science communication work" (D)</i> |
| | Inform the public about science and distribute scientific content (Dissemination) | <i>"This is what we do 98% of the time" (C); "We are working to enhance the consumption of scientific content in Israel...so that people will regularly consume scientific content" (A)</i> |
| | Make scientific content accessible (Dissemination) | <i>"Making science accessible is what we actually do!" (A); "There are two language editors on our team who are not scientists, which gives them an advantage... they simply edit the texts to make them more readable for laypeople" (C)</i> |
| | Tailor messages to specific audiences (Dissemination) | <i>"In many cases, science involves other aspects of life: economics, transportation, agriculture. So, we ask ourselves what the best angle is to engage people and the most interesting way of telling this story" (B)</i> |
| | Find out the public opinion and needs to better communicate science (Dialogue) | <i>"A bunch of people on social networks provide us with input on what interests the public...and based on this, we write science items" (A)</i> |
| | Encourage the public to be involved in science discourse, express concerns and raise questions that stem from science and its applications (Dialogue) | <i>"I interact with comments from readers, although not consistently. There are also occasions when fellow readers offer responses" (D)</i> |
| | Foster the public to help set the agenda for science by actively deliberate in public debates on the "why" and "why not" of science, as part of democratic policymaking (Participation) | <i>"We try to connect the public with members of the scientific community in ecology and environmental fields to reach decision-makers" (B)</i> |
| | Enable responsible innovations – Acknowledge the public critique of the science research enterprise priority list, and strive to maximize possible societal returns from investments in science for the larger social good (Participation) | <i>"This is something we do not do" (A)</i> |
| | Encourage the public to participate in research endeavors with scientists, encompassing the real-life experiences of non-experts and their socially informed scientific knowledge as part of the collaborative knowledge creation process (Participation) | <i>"We touch upon citizen science projects occasionally... and that's essentially the extent of it" (C)</i> |

Appendix E. (Continued)

| | | |
|--------------------------------------|---|--|
| <i>Desired impacts on the public</i> | Improve the public's scientific literacy (Dissemination) | <i>"Our mission is to raise public awareness and scientific literacy" (A)</i> |
| | Excite the public about science (Dissemination) | <i>"We hope to inspire a greater appreciation for science" (A)</i> |
| | Increase the public's appreciation for science (Dissemination) | <i>"We hope to inspire a greater appreciation for science by demonstrating the benefits and contributions of science to life, such as in medicine and chemistry" (D)</i> |
| <i>Endpoints</i> | The public making informed decisions about science-related issues (Dissemination) | <i>"The ultimate goal is for individuals to be able to make science-related decisions based on evidence" (A)</i> |
| | The public's support and government funding for science (Dissemination) | <i>"We may indirectly, eventually, contribute to this" (D)</i> |
| | The public's involvement in science-related democratic policymaking (Participation) | <i>"It is not explicit in our deeds, but rather a long-term vision embedded in what we do" (C)</i> |
| | The public critique of the science research enterprise priorities (Participation) | <i>"We do not consider it a part of our role, though it is a long-term mission of science communication" (B)</i> |
| | Towards creating new scientific knowledge (Participation) | <i>This is not a stated goal of ours, but since many extensive studies call for the public's participation in helping them in the co-creation of scientific knowledge, we report about them" (C)</i> |

Note: The interviewees were not aware of the origins or classification of the objectives regarding the three theoretical models.