Exploring the Arctic: An Awareness Experiment in Science Journalism and Personal Narrative

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A Research-Creation Thesis in the Department of Journalism

Presented in Partial Fulfillment of the Requirements for the Degree of

Master of Arts

Digital Innovation in Journalism Studies

at Concordia University

Montréal, Quebec, Canada

January 2023

CONCORDIA UNIVERSITY
School of Graduate Studies

This is to certify that the thesis prepared

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Entitled: Exploring the Arctic: An Awareness Experiment in Science Journalism and Personal Narrative

and submitted in partial fulfillment of the requirements for the degree of

Master of Arts Digital Innovation in Journalism Studies

complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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Abstract

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in Science Journalism and Personal Narrative

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Journalism coverage of the Canadian Arctic is limited and often inconsequential, or inaccessible to the broader public due to highly specialized content, e.g. information locked in scientific papers. This is despite the fact that the Arctic is of national as well as global importance. This discrepancy may be attributed to a general deficit of journalism coverage of climate issues, which are closely linked to the Arctic region. Furthermore, as a remote and unique location, an "out of sight, out of mind" mentality both physically and conceptually removes the region from public awareness. Very few non-Arctic residents are able to experience the region first-hand, and the true vividness of the area is often lost in traditional scientific publications. However, innovations in digital storytelling and narrative could open the Arctic to increased awareness, thereby bringing climate and polar science to the forefront of tomorrow's journalism. This Research-Creation Project combined in-person experiences on a scientific Arctic cruise with traditional reporting methods to create a catalogue of innovative multimedia pieces in a dedicated online Story Hub. Inspired by the works of Robin Wall Kimmerer and the ideas of Randy Olson, the project aimed to increase the awareness of the region with approachable and engaging narratives, sharing knowledge and personal observations through storytelling. Designed to foster passion and interest, not scientific expertise, the Research-Creation Project is a blueprint for interweaving scientific journalism with personal narrative reporting as a stepping stone to more in-depth science communication.

Acknowledgements

I thank my supervisor, Dr. David M. Secko, and committee member Prof. Aphrodite Salas, for their support, suggestions, and guidance over the course of this project.

Furthermore, I thank Sarah Zimmermann and Dr. Bill Williams at the Department of Fisheries and Oceans for the opportunity to participate in the 2021 Beaufort Gyre Exploration Project Arctic research cruise. This project would not have been possible without the support from the entire crew and science team on the *CCGS Louis S. St-Laurent*, whose knowledge, support, and enthusiasm drive this work.

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1 Introduction

A unique and compelling research area, the Arctic attracts numerous scientists – some of the few non-Arctic residents to bear witness to the realities of climate change in the region. However, their observations often lose their vividness in translation from experience to traditional scientific communication (Green et al, 2018). This Awareness Experiment explored the intersection between science and storytelling, where research and personal experiences work together to share the passions that these scientists are pursuing in their investigative projects. This report is an accompaniment to various research creation activities and production that are described in the following sections and can be viewed at https://arcticstoryhub.exposure.co/. The goal of this project was to explore different storytelling formats to raise awareness of the Canadian Arctic and particularly the scientific projects currently underway in the region. This was achieved through the merger of first-person storytelling and traditional science journalism with multimedia elements.

2 Statement of Research-Creation Project

The Arctic is central to Canada's economy, environment, society, sovereignty and national identity (e.g. "The True North strong and free") and plays a vital role in the global climate system (e.g. WHOI, 2019; NRCAN, 2019). Yet, there is a strong disconnect between the North and the rest of the country, fuelled by a general lack of awareness and inconsequential news reporting. Substantive local news, especially in underrepresented environments such as the Arctic, is a rare commodity, and hyperlocal reporting is predominantly negative. In particular, the work in Wenzel et al (2016) reveals that "there is a professional bias in favor of reporting on violence, crime, police brutality, and other negative tropes" and that a lack of local-level news reflecting the concerns of residents "poses barriers not only to residents' access to information, but also to their sense of community belonging and engagement." The work suggests that strong, shared storytelling networks, where "residents, local and ethnic

media, and community organizations are connected to each other and share an understanding about what is happening in their area," lead to higher levels of community engagement and a sense of belonging (Wenzel et al, 2016).

Inspired by Robin Wall Kimmerer's *Braiding Sweetgrass* and Randy Olson's *Houston, We Have a Narrative*, this journalistic Awareness Experiment highlights the Canadian Arctic through the lenses of both science and storytelling. An investigation into both format and content, the Experiment explored how cross-pollination of science and personal narrative can increase awareness of the Arctic region and ultimately lead to better journalism coverage of the area. I approached the project as both a scientist and a journalist, blending elements of both science journalism and personal storytelling (e.g. Barel-Ben, 2020; Lindgren, 2016; Lassila-Merisalo, 2014; Secko et al, 2013).

In a newsroom culture mainly built around "nowness and firstness" (Zelizer, 2021), traditional science journalism struggles to compete against stories such as breaking news, sports, and daily politics. For example, climate change has been a topic of discussion since the mid-1980s, though at the time, the issue seemed distant, and media coverage lacked the urgency the crisis demands. A problem deemed 50 years away was "boring" and easily dismissed (Harvey, 2021). In addition, scientific studies can take years and results are constantly being revisited, causing drawn-out stories or many revisions. Properly parsing scientific papers, often inaccessible to those outside the field due to heavy technical jargon, takes proper training and time, a luxury many journalists do not have. Science is based heavily on what came before, and neglecting temporality in journalism can lead to incomplete, superficial and misleading reporting (Zelizer, 2021). Combining science with storytelling provides vital context, and can help inform new forms of science journalism.

The output is a collection of multimedia storytelling pieces centred on the Canadian Arctic, shared in an online Arctic Story Hub. The journalism created as part of this thesis is intended as a catalogue guide to creating engaging and informative stories around remote

and unique study areas. Content was collected through traditional reporting methods as well as an in-person scientific expedition.

Grounded in Olson's concept of narrative intuition, Kovach and Rosenstiel's Elements of Journalism, and innovations in personal narrative and digital multimedia formats (e.g. Newman, 2021; Lindgren, 2016; Usher, 2016; Lassila-Merisalo, 2014), the online Arctic Story Hub focuses on approachability and versatility. Audiences expect to interact with information in a non-linear, non-traditional, user-driven way, and innovations around multimedia and technology offer a deeper experience with news than ever before (Newman, 2021). By blending digital creation with the human element and sharing knowledge through science and storytelling, the Experiment aims to increase awareness of the Canadian Arctic, opening the region to increased engagement and impacting future reporting on issues such as polar science and climate change.

3 Literature Review

A well-told story commands attention. A book that is impossible to put down; a TV series binged in quick succession; a podcast that keeps listeners hanging on every word – regardless of the medium, a compelling narrative captivates its audience and creates a connection between story and self. A unique and dynamic environment with a rich natural, cultural and research presence, the Arctic bursts with the potential for compelling stories. However, journalism coverage of the region is limited and often misrepresentative (Callison, 2022). Much of the information gathered in the region is locked in highly specialized content, e.g. scientific papers, with inadequate reference to circumpolar issues and the Indigenous communities that live there. In *Gathering Sweetgrass: Indigenous Wisdom, Scientific Knowledge, and the Teachings of Plants*, one of the main inspirations for this Research-Creation Project, Robin Wall Kimmerer states that "conventions for efficiency and precision make reading scientific papers very difficult" for the general public and even for other scientists (pp. 344-345). She

writes that this has serious consequences for public dialogue and therefore for democracy, as scientists are key players in translating the world around us into something we can understand, and hence care for. "For what good is knowing unless it is coupled with caring? Science can give us knowing, but caring comes from someplace else" (pp. 345-346).

Journalism relies on storytelling's ability to "facilitate audience engagement and understanding" (Wahl-Jorgensen and Schmidt, 2019) to make news and information relevant and interesting, and yet Arctic journalism fails to share the region in any manner of consequence (Callison, 2022). Drawing on elements of binge-worthy storytelling and information from residents and scientists forms the backdrop of the Research-Creation Project's exploration into rethinking how the Arctic's stories are told.

3.1 The Arctic

The Canadian Arctic is a unique environment, highly susceptible to climate change and home to more than 200,000 people and innumerable plants and animals. In area, the region makes up roughly 40 per cent of Canada's territory, and over 70 per cent of the country's coastline lies in Arctic waters. However, Canadian media coverage fails to reflect the region's importance in its reporting, nor does it acknowledge the disproportionate impacts that the region will experience because of the changing climate (Callison and Tindal, 2017). The Arctic is warming nearly four times as fast as the rest of the planet (Rantanen et al, 2022), experiencing above-average ocean acidification, and a substantial decline in multi-year sea ice (e.g. NOAA, 2021). Additionally, global circulation patterns ensure that changes observed in the Arctic are felt in local weather patterns across the planet. These changes endanger not only the fragile Arctic ecosystems but also threaten to irrevocably alter the traditions of Canada's Arctic communities.

Arctic science reporting is generally limited to covering climate change, and predominantly paints a picture of tragedy and hopelessness. This approach propagates an overwhelming

sense of paralysis and subsequent disengagement of the public towards the topic (Arnold, 2018), and, being focused on the national level, caters to Canada's urban south (Callison and Tindal, 2017). However, recent work by Mathisen and Morlandstø (2022) on audience participation in the mediated Arctic public sphere in Norway indicates that citizens desire a common, informal space where they can discuss and debate other Arctic topics. Their work found that an easily-accessible digital space is well-suited to increase engagement and "contribute to dialogue and diversity in public debate, regarding both which voices that participate, which topics they bring in, and who's viewpoints that are shared in social media."

3.2 Narrative Intuition and the Personal Reporter

Just as the melting ice and permafrost are giving way to new realities in the Arctic, peeling back the reporting methods of the past allow for new, innovative approaches to telling the region's stories to grow in their place. In his book, *Houston, We Have a Narrative*, Randy Olson draws on Hollywood blockbusters and examples from the scientific community to explore the role of storytelling in communicating complex information and raising awareness of important discoveries. Science generates new ideas every day, and scientists bear witness to wonders and discoveries far removed from the average citizen's reach. However, these experiences often get lost during the rigorous transformation from observation to traditional scientific communication (Green et al, 2018; Kimmerer, 2013). Olson credits *narrative intuition*, the ability to command attention naturally when sharing information, for driving impactful stories. The concept draws on the triadic situation-complication-resolution ("and-but-therefore") story structure, echoed from Hollywood to the tales of the ancient Greeks, as central to advancing the narrative and getting the point across (Olson, p. 16). Olson writes that the power of storytelling rests in the specifics, and argues that specificity comes hand in hand with simplicity. Narrative intuition uses the core building blocks of a science story to create a narrative that naturally guides its audience into a more complete and compre-

hensive understanding of the issue. In addition, emphasising simplicity and specificity leaves little room for the half-truths that often fuel hype and over-dramatization. Adding story to science helps communicate complicated things in simple ways (Olson, p. 41).

Storytelling is inherent to journalistic practice. Journalism uses storytelling elements to make news interesting and relevant, and effective reporting needs both information and story to be engaging (Kovach and Rosenstiel, p. 213). In recent years, there has been a shift towards story through an increase in personal narrative reporting (Lindgren, 2016). Grounded in the traditional elements of journalism (e.g. Kovach and Rosenstiel, 2001), personal narrative reporting embraces techniques typical of narrative-literary journalism, e.g. scene-by-scene construction, full dialogue, and symbolic details, and transforms the journalist from observer to participant (Lindgren, 2016; Lassila-Merisalo, 2018; Van Krieken and Sanders, 2021). The journalist becomes a part of the story, and the narrative emphasizes personal perspective and experiences of the story subjects. This subjective, personalized reporting allows for a more intimate connection with the audience (Lindgren, 2016), especially when coupled with a user-driven digital space (Batsell, 2015; Usher, 2016). In addition, personalisation reinforces the importance of the story and allows the reader to think about news as it applies to themselves as well as to the wider public (Usher, 2016). For the Arctic and for scientific research, which struggle with geographical and conceptual remoteness, this near-far perspective offers the audience both personal experience and social context, increasing their awareness of the field on multiple levels.

3.3 Storytelling Across Fields and Formats

Science reporting and personal narrative journalism both strive to balance information delivery and public engagement, though arguably excel in opposing ends of this communication spectrum. Combining elements of both ensures the story's greatest impact in identifying problems and proposing solutions – Olson's second and third elements in the ideal story structure (Green et al, 2018; Olson, 2015).

Human-centered storytelling has the ability to push against the "doom and gloom" communications around environmental narratives and Arctic climate change reporting (Gustavson et al, 2020; Arnold, 2018). It adds an element of transparency and openness to the news, a key trait of journalistic practice in the age of rising misinformation (Usher, 2016). Due to its fluid definition, it integrates seamlessly into established models and goals of science journalism: science literacy, contextual, lay-expertise and public participation (Secko et al, 2013). Combined with the ever-growing diversity in digital storytelling options, from podcasts to virtual reality to multimedia endeavors following the ideals of the New York Times' *Snow Fall* (e.g. Newman, 2021; Lindgren, 2016; Pavlik, 2013), this hybrid form of journalism "can give birth to deeper and more articulated narrative possibilities and better ways to understand the complexity of contemporary reality" (Laghi, 2021).

While I am unaware of any research works focusing specifically on blending science journalism and personal narrative in a multimedia sphere, blending storytelling and general news is not a new undertaking. However, the genre is generally poorly studied and little consensus exists on its hard definitions (van Krieken and Sanders, 2021).

In fact, in their systematic review of scientific literature on narrative journalism, van Krieken and Sanders found that there was a "fuzziness surrounding the genre" ranging from its history to its present applications and future impacts. Most studies traced the genre's origins back to the early nineteenth century, in the literary movement of sentimentalism. When literary style moved more towards realism in the latter half of the century, some writers "held on to the personalized, emotional writing style in their journalistic work, thus creating a hybrid style that can be seen as a precursor of the style of literary journalism." However, van Krieken and Sanders make note of an exception in Marsh (2010), who traces the narrative style back to the ancient Greeks. This is particularly interesting, as Olson (2015) also traces his narrative structures to this time. In addition, van Krieken and Sanders found that most works they considered in their review was qualitative or in essay format, rather than empirical, and that

most research was focused on text-based, traditional news reporting styles.

Nevertheless, there is an overall consensus in the impacts of journalistic narratives when compared to non-narrative (often inverted pyramid) journalism forms (e.g. van Krieken and Sanders, 2021; Kulkarni et al, 2022). Pieces with more obvious linear narrative forms were found to have a stronger engaging effect on audiences, "both in terms of feeling 'present' at the described scenes and in terms of identifying and empathizing with the story characters" (van Krieken and Sanders, 2021). Linear forms of storytelling are also "more effective in transferring knowledge" (Kulkarni et al, 2022) and "stimulating audience's comprehension, retention, and recognition of the information provided" (van Krieken and Sanders, 2021) than the traditional inverted pyramid format. Both works found that narrative-driven journalism was seen to be more engaging and persuasive than non-narrative articles.

Many of the benefits of narrative journalism are also closely linked to those of solutions journalism, which "explores responses to systemic social problems – critically examining problem solving efforts that have the potential to scale" (Wenzel et al, 2016). Particularly when covering topics relating to underreported communities and regions, such as the Arctic, solutions journalism can offer a portal to engaging audiences, as "readers of solutions-oriented stories are more likely to share articles and seek related information" (Wenzel et al, 2016).

Adding a third dimension, Midberry and Dahmen expanded the discussion by specifically considering visually-driven solutions journalism. Midberry and Dahmen argue that photographs and other visual journalism must be regarded as storytelling tools in and of themselves, rather than simply illustrations to accompany a text-based story. Research has shown that images and other visual content are key components to fostering audience engagement as they are processed faster and more automatically than text-based or even auditory content. In addition, people often react more strongly to images than to text alone, allowing visual cues to quickly influence how the audience perceives the topic being reported on (Midberry and Dahmen, 2020). Visual content is also effective for immediately presenting

a lot of information with some context, as exemplified in "photojournalism's rich tradition of documenting complex social issues" (Midberry and Dahmen, 2020). One goal of this Research-Creation Project was to see if this mentality could be transferred to scientific issues as well, as they are also usually quite complex.

3.4 Learning from the Bees

Gathering Sweetgrass by Robin Wall Kimmerer is a testament to the power of narrative for passing along information and initiating meaningful debate. Kimmerer weaves Indigenous wisdom and scientific knowledge into a single story, collecting elements of both to strengthen her message. In a series of anecdotes and personal reflections, she introduces the reader to people, places, and plants through the hybrid tools of science and the teachings of Elders. The novel is a beginner's field guide to North American botany, a celebration of the natural world, and an invitation for deeper discussion of our relationship with the planet.

> "It was the bees that showed me to move between different flowers – to drink the nectar and gather pollen from both. It is this dance of cross-pollination that can produce a new species of knowledge, a new way of being in the world" (Kimmerer, p. 47).

The Arctic is a remote, unique, and incredibly vulnerable region that is experiencing devastating change at a rate nearly unfathomable in non-northern communities. Both Olson and Kimmerer advocate for the union of the different ways of thinking to address such a challenge. The existing relationship between science and journalism shows that research can – and must – be presented truthfully outside of traditional scientific communication, without losing the integrity of the story (e.g. Blum, 2021; Barel-Ben et al, 2020; for a general introduction to issues in science journalism see: Guenther, 2019.) Adding the lens of personal narrative promises a further opportunity to deepen the discussion on Arctic issues, bringing awareness to the region through stories that are relatable and informative. Cross-pollinating

the different reporting fields will help build a starting point for a new species of journalism targeting remote and underreported regions like the Arctic.

4 Methodology

The project was built in three stages: Exploration (Data Collection); Creation (Data Analysis); and Reflection (Data Synthesis). The stages culminated in the creation of an online Arctic Story Hub website. Defined by its experimental nature, the project embraced elements from both personal narrative storytelling and scientific journalism. It explored how to raise awareness of a unique and remote setting, and examined which multimedia formats lend themselves well to different narratives.

4.1 Exploration (Data Collection)

The first stage was open exploration and content collection. The project was in its most fluid state, and the priority was to gather content in as much variety as possible for the following phases.

Most of the project content stems from an in-person trip to Canada's northern waterways. In late summer 2021, I participated in a month-long research expedition aboard the *CCGS Louis S. St-Laurent*, Canada's flagship icebreaker. The trip was a continuation of the Beaufort Gyre Exploration Project, an international research collaboration started in 2003 and led by the Canadian Department of Fisheries and Oceans (DFO) and the Woods Hole Oceanographic Institution (WHOI) in Massachusetts, USA.

Integrated into the scientific team as a research assistant, I experienced first-hand how the Arctic environment translates into unique challenges for the team. I was also able to spend time with members of the crew to learn about their daily routines at sea. In addition, I put together 24 science team dispatches, posted on WHOI's project webpage. The dispatches include short text and photo updates on the project itself, as well as on life and work at sea.

I have obtained permission to include the dispatches in my Research-Creation Project.

The icebreaker expedition allowed for excellent networking opportunities, and I was able to conduct further, in-depth interviews remotely with researchers and crew after my return from the Arctic.

Through the Exploration phase, I collected an extensive pool of material to turn into multimedia journalism pieces. The data collected in the first phase include over 2,000 photos, videos, sound clips, scientific reports, personal reflections, memorabilia, published dispatches, and half a dozen long-form interviews from the icebreaker expedition, as well as stories and interviews on Arctic shipping and community science from external sources.

4.2 Creation (Data Analysis)

The Creation stage constituted the majority of the project work. The project aims to bring awareness of the Arctic region to a broad audience. Reflecting this range, it is composed of different multimedia, journalistic pieces of varying lengths. For example, the project includes text, photo, video and map elements. To explore how different formats can compliment particular narratives, some short narratives exist in two or more storytelling formats.

My focus in this stage was on narrative, approachability, and versatility, and linking sources directly for transparency and interactivity. Inspired by Kimmerer's *Braiding Sweetgrass* and Olson's elements of narrative intuition, I aimed to create a catalogue of pieces that bring together the lenses of personal narrative and scientific journalism in an effort to increase awareness and engagement of the Arctic region. The catalogue explored the potential of a hybrid approach for reporting on remote areas – sharing knowledge through storytelling.

The final project is hosted on exposure.co, a visual storytelling platform that is easy to access and navigate on both browser and mobile devices. From a creator's perspective, the platform offered a vibrant and customisable multimedia experience without having to invest a significant amount of time into back end mechanics.

While most of the work on the site is my own, I also highlighted a few works by others – for example, journalists, scientists and storytellers, – that I encountered during my research and that I believe complement the purpose of the experiment. I acknowledge that I am still learning about the Arctic region; I believe the additional material enriches the awareness experiment by offering opportunities for the audience to engage with new perspectives and further their learning beyond my limited scope.

4.3 Reflection (Data Synthesis)

The reflections in this thesis report completed the Research-Creation Project. The project, by design, was highly fluid – through my research, I was increasing my own awareness of the Arctic, and exploring how I, as both a scientist and a journalist, could effectively communicate a remote and historically underreported region that nevertheless has a global impact. In essence, I was a case study for raising awareness and rethinking how the Arctic's stories can be told. The project evolved organically as I learned more about, and from, Canada's northernmost region.

For the project's online Story Hub, I created a suite of pieces in various storytelling formats, experimenting with narrative elements such as point-of-view, dialogue, and scene creation, and blending traditional science journalism with a more personal narrative. The reflections stage considered the process of researching and creating the Story Hub, and discussed the challenges, limitations, and benefits of the various storytelling formats I chose.

This thesis report, together with the online Story Hub, forms a reference catalogue of multimedia stories (audio-visual and text elements) to guide future journalistic endeavours in creating engaging and informative narratives around remote and unique study areas such as the Arctic.

5 Reflections on the Creation Process

The creation process of this project truly embraced the spirit of experimentation. As with most experiments, the final result, in the form of the online Arctic Story Hub (arcticstoryhub.exposure.co), is a condensed version of the data: over 2,000 photos, videos, reports, and interview sound clips; two filled notebooks; dozens of data spreadsheets; hundreds of open tabs; and months of work. From the initial idea to the final web space, the project's form continually evolved to reflect the data I had and the amount of work I would be able to complete with shifting timelines. I intentionally approached this project with a lot of flexibility, focusing on pinpointing a purpose rather than a fixed format, with the goal of sharing the Arctic region, and the science conducted there, through a personal lens. Intended as a prototype of various formats, some being more technical and some leaning towards a more personal lens, the final Story Hub presents the groundwork from which to expand in blending these two narrative forms.

5.1 Reflections on Content

The project content database consisted of a varied suite of material collected both at sea and remotely, before and after the cruise. In the end, there was too much content to include all of it in the online Arctic Story Hub, while keeping within the time frame of this project. Time is a limiting factor across most journalistic disciplines, and may contribute to historically limited experimentatation with "alternative storytelling techniques" in science journalism (Boesman and Meijer, 2018). I relied on my background in science to assess the information I had available, however, few general journalists have this specialized knowledge (Boesman and Meijer, 2018). Ultimately, I decided to produce nine content pieces, each with a slightly different main focus, tone, and multimedia elements.

5.1.1 Content Overview

Table 1 outlines the nine content pieces visible on the Arctic Story Hub homepage (content is listed alphabetically). Furthermore, Figure 1 shows the range of story types based on their narrative focus, mapped in a two-dimensional matrix.

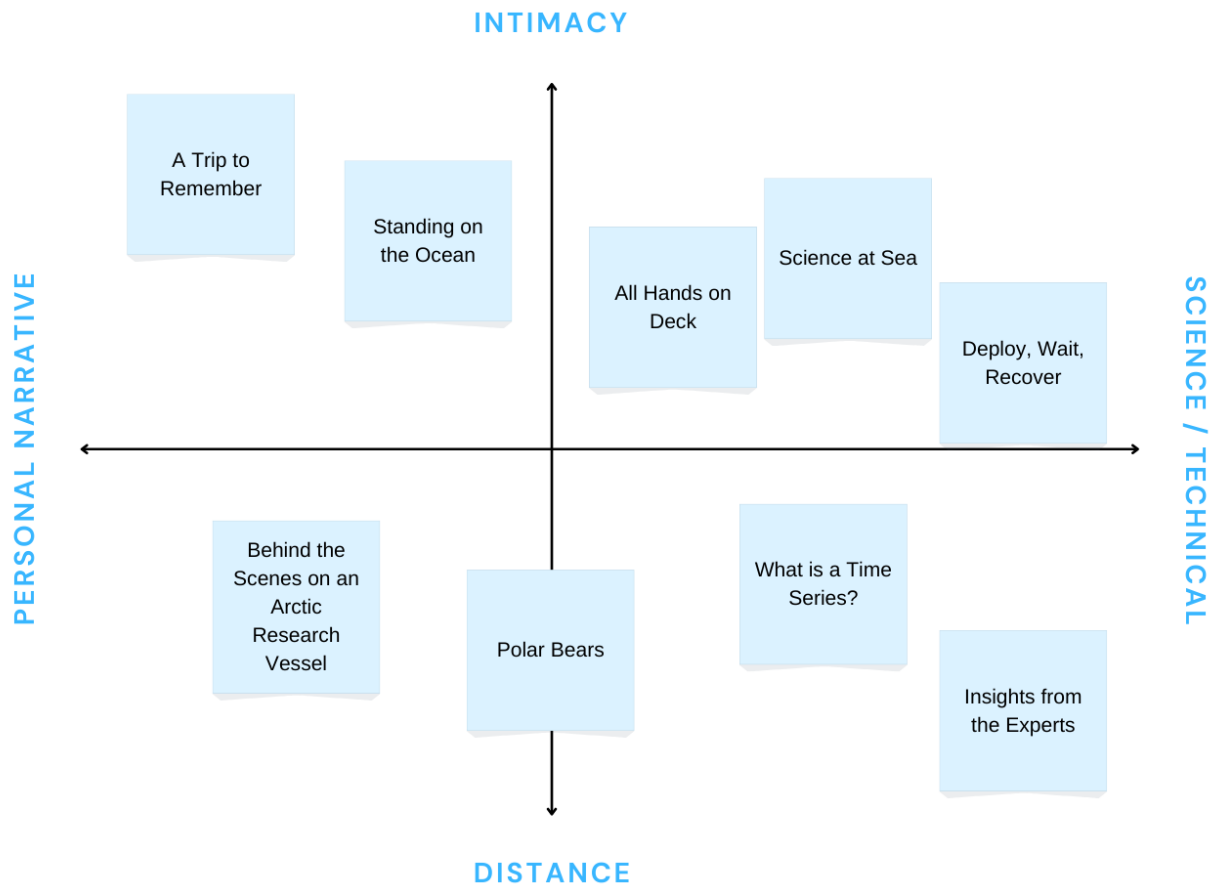

Figure 1: The Arctic Story Hub content is spread across all quadrants of the two-dimensional narrative focus matrix. It is interesting to note that the content naturally falls along a linear ($y = -x$) slope: there is content in both top left and bottom right corners, but not in top right or bottom left corners.

I chose the following axes as narrative cardinal points:

Personal Narrative $\longleftrightarrow$ *Science / Technical*

> The horizontal axis focuses primarily on the subject matter of each story. The leftmost stories ("Personal Narrative") are driven by personal experiences and

recollections. Moving towards the right ("Science / Technical"), the story focus shifts to more technical and/or scientific topics. It is important to note that that these labels are not exclusive; all stories in the Arctic Story Hub have components of both personal narrative and technical content, however, the distribution of each differs from piece to piece.

Intimacy $\longleftrightarrow$ *Distance*

The vertical axis characterises the tone of the content. Stories that fall in the upper ("Intimacy") half of the matrix exhibit a strong connection between the journalist, the audience, and the story itself. For example, this can be through an informal tone and familiar language (e.g. "Standing on the Ocean"), the author firmly inserting themselves in the story (e.g. "A Trip to Remember"), or the story speaking directly to the reader (e.g. "Deploy, Wait, Recover"). As with the horizontal axis, these labels are not exclusive, but rather represent different focus points in each story.

When plotted along these axes, it is interesting to note that all content in the online Arctic Story Hub naturally fell into a linear relationship ranging from "Intimacy and Personal Narrative" (top left) to "Distance and Science / Technical" (top right) corners. This was entirely unintentional and raises the question of whether this specific balance stems from my personal preferences or if there exists a golden ratio to balancing scientific and personal narratives in journalism. It would be worth exploring how far content can be pushed into the extremes of the "Intimacy and Science / Technical" quadrant, and if (and how) this shift has an impact on audience engagement, and on information comprehension and retention.

	Title	Media Type	Experiment Focus
1	A Trip to Remember	• Text • Photo • Interactive map • Video	• Recollections • Personal narrative focus • Informal tone • General audience
2	All Hands on Deck	• Text • Photo	• Short blog style • Synthesis of external material • Blended focus
3	Behind the scenes on an Arctic research vessel	• Text • Photo	• Traditional feature • Blended focus
4	Deploy, Wait, Recover	• Text • Photo	• Visuals-driven • Lists / Quick Guides • Blended focus
5	Insights from the Experts	• Text • Logos	• Synthesis of external material • Technical focus
6	Polar Bears	• Text • Photo • Video	• Visuals-driven • Synthesis of external material • Blended focus
7	Science at Sea	• Text • Photo	• Short blog style • Synthesis of external material • Blended focus
8	Standing on the Ocean	• Text • Photo	• Visuals-driven • Personal narrative focus
9	What is a time series?	• Text • Data	• Explainer article • Technical focus

Table 1: An overview of the content published on the online Arctic Story Hub.

5.1.2 *A Trip to Remember*

"A Trip to Remember" (1) uses the personal voice most strongly. It serves as both an introduction to, and a reflection on, the whole reserach trip. Written in first person, the tone attempts to mimic a story that is read out loud rather than confined to a page. Consider the opening paragraph below:

> "Technically, I was kidding when I offered to help out on an Arctic science expedition for a month. Of course I wanted to go, I had wanted to go to the Arctic for years, ever since my dad went during the International Polar Year in 2007. It seemed like the perfect adventure: ice, ocean, science, polar bears, a really cool ship, and the chance to explore a region only a handful of people will ever get to see in person. I knew I would have to be very, very lucky to get to go someday."

The language is informal and I, as the narrator, have fully inserted myself into the story. The goal of this piece was to both explain how I found myself in the Arctic and also highlight the logistical challenges of getting there. To do so, this piece includes text, photos, an interactive map, and a short video showcasing the ship.

5.1.3 *All Hands on Deck & Science at Sea*

"All Hands on Deck" (2) and "Science at Sea" (7) are a redistribution of the near-daily dispatches that I wrote or helped plan while at sea in the Arctic. These short, blog-style posts were published on the Beaufort Gyre Exploration Project's website. Each dispatch is approximately 400-600 words long. In the online Story Hub, I grouped the dispatches by theme: the different teams on the side of the crew ("All Hands on Deck," eight subsections) and the various science disciplines ("Science at Sea," seven subsections), added a short overall introduction, and wrote a text summary for each of the subsections.

I chose this format as it allows the reader to quickly browse through a lot of content and choose which topic they would like to read more about, as suggested to be most effective

by Kulkarni et al (2022). It also provides context for the particular pieces. I considered linking the reader directly to the Beaufort Gyre Exploration Project's website without the short summaries, but research shows that this would not be as digestible (e.g. Kulkarni et al, 2022). The dispatches on that site are also not grouped by theme, so the reader might get lost in unrelated topics on the way to their original destination.

While most content in the Story Hub also refers to the dispatches, these two pieces are the only ones where the dispatches are the main focus.

5.1.4 *Behind the Scenes on an Arctic research vessel*

"Behind the scenes on an Arctic research vessel" (3) is a traditional long-form feature. It was originally published by The Pigeon in May 2021, and is significantly longer than the other content on the online Story Hub. I chose to include the story in the Research-Creation Project as the story foundation is also the Beaufort Gyre Exploration Project. Furthermore, "Behind the scenes on an Arctic research vessel" fills the role of a comparison piece that follows more traditional journalistic structures, which I felt was important to include as a reference piece.

The format shares the strong human focus, portrayed through two main characters and two supporting characters, with the other pieces in the online Story Hub. However, the language is more formal and the story is told from an outside, third-person viewpoint, which reduces the sense of intimacy (Lindgren, 2016; Kulkarni et al, 2022). It is also much longer (over 1000 words) than the content in the Story Hub. This allows for a lot more information to be presented, however, there is a higher risk of the reader becoming lost or disengaged if the piece is not written with a good balance of technical detail and digestible explanations.

If I were to re-do this story, I would consider changing the story format. Instead of a traditional plain text feature, I would break the text into smaller sections and convert some of the information into short lists or infographics to embed in the main text. I would also

consider adding an interactive element to keep the reader engaged as they scroll through the story.

5.1.5 *Deploy, Wait, Recover & Standing on the Ocean*

"Deploy, Wait, Recover" (4) explains a highly complex scientific undertaking – long-term deployments – in short, humorous lists, and photos. This piece links to both external content, such as the dispatches, and internal content (notably, 9: "What is a time series?"). Similarly, "Standing on the Ocean" (8) addresses ice work, another rather intensive process, through photos and short texts. Both (4) and (8) are difficult to visualize if one is unfamiliar with the process, particularly the scale of the operations, so I chose these two pieces to have the strongest visual focus.

Photojournalism has a "rich tradition of documenting complex *social* issues" (Midberry and Dahmen, 2020, emphasis added), so it is reasonable to assume that stories driven by photos would be equally effective for communicating complex *scientific* issues. In addition, research has shown that pictures and other visual content are key drivers of audience engagement, in part due to the fact that they are processed faster and elicit stronger emotions than simple written text (Midberry and Dahmen, 2020). In fact, based on visual communication theory and existing literature on solutions- and photojournalism, Midberry and Dahmen suggest that visual content is particularly powerful for "delivering comprehensive and compelling coverage that would likely spur audience engagement."

This last point is of particular importance for the Research-Creation Project, as one of its main goals was to raise awareness and inspire engagement with the Arctic region and the scientific endeavours that are being conducted there.

5.1.6 *Insights from the Experts*

"Insights from the Experts" (5) is designed as a resource centre for those who wish to learn more about ongoing projects in the Arctic. This piece addresses two of the primary principles

identified by Kulkarni et al (2022): context and agency. It is structured similarly to (2) and (7), referring to external content and accompanied by a short contextual summary. However, as these are mostly intergovernmental organizations, the linked content is on a much larger scale.

Piece (5) also delves into the policy aspect of Arctic work, showcasing eight organizations that I felt highlighted the collaborative nature of Arctic research. In the short text accompanying each organization, I highlighted any special reports directly, if applicable.

5.1.7 *Polar Bears*

"Polar Bears" (6) is the only piece to include video as well as photos. Kulkarni et al (2022) suggest that short, informal videos with a playful tone are well-received by audiences due to their ease of navigation, visual appeal, and functionality. In their study investigating different story formats, the video format scored high on audience engagement and also appeared to have a strong impact on public understanding of the topic.

I had originally intended to include more video pieces in the online Story Hub, however, it ended up being outside of the scope of this project. Working with video aspects adds an additional two dimensions (audio and motion) to producing a story, and I did not feel that I would be able to produce pieces of the same quality as text- and photo-based stories in the time I had for this project. I chose instead to focus the time and effort into producing pieces to cover a broader scope of narrative focus types (see Figure 1).

However, I felt it was important to include the short video element in this particular piece. It was an unforgettable feeling to see these powerful animals first-hand, seeing the strength in their movements and how they interacted with the ship with such strong curiosity. I wanted to share this experience with the audience as best as I could, bringing them into the moment as a virtual bystander, and I felt this needed more than just photographs.

In addition, the visuals in "Polar Bears" are accompanied by a very short text and a link to

an external story about polar bear research, originally published by Canadian Geographic, for more context and in-depth storytelling.

5.1.8 *What is a Time Series*

The most technical piece in the online Story Hub is a short explainer article, "What is a time series?" (9). The only piece showcasing (and linking to) actual data from the research cruise, in this piece I attempted to first build the distance between reader and author as seen in traditional scientific communications (Kimmerer, pp. 344-345), and then bridge that distance by addressing the reader directly and using everyday examples to illustrate the points. This is building directly on Kimmerer's narrative style and Olson's concept of "relatability," which I discuss at length in section 5.4 – Limitations of the Project.

For the topic of the piece, I chose to focus on time series as they are a fundamental aspect of oceanographic research. In fact, time series are a fundamental aspect of all scientific disciplines, as well as non-scientific disciplines – anything that changes over time can be represented as a time series. This universality is a significant advantage for building a common ground from where to deepen the scientific narrative.

This piece is also the only one to use different fonts to highlight key words and concepts. This is modelled on classic science textbooks, where key terms and definitions are often set apart visually from the remaining text. Textbooks are generally accepted to be good at conveying information, so I was intrigued by the concept of blending this highly factual format with an informal, personal tone, and Olson's teachings on character and narrative relatability.

5.1.9 Overall Reflections

Nearly every part of an Arctic cruise is complex, from the logistics to the science work to the ship itself. Traditional scientific communications typically value efficiency and precision over relatability and context, but this can lead to incomplete reporting, and hence, compromised understanding of these complexities (e.g. Kimmerer, 2013; Zelizer, 2021). Instead, I chose

to address the complexities through various formats other than text (e.g. lists, in piece 4; or photo-based storytelling, in piece 8) and external links.

I hypothesized that the most effective way to present information from external sources was to briefly summarize the content, showcase it with a relevant image, and encourage readers to explore the full piece through links. This way, the reader has full control over what content they choose to pursue in depth, and in what order. It also breaks up the content into more digestible chunks, in a narrative structure the audience is familiar with, and avoids overloading the reader.

This hypothesis follows the findings presented by Kulkarni et al (2022); this particular work has a strong audience feedback element, which I was unable to cover myself within the scope of this Research-Creation Project. The work found that the key principles of communicating information on an online platform are (i) using a linear narrative; (ii) presenting a diverse suite of content, particularly with a focus on the individual; (iii) providing context to the story; (iv) allowing the audience agency to satisfy and leverage their "inbuilt sense of curiosity to drive engagement;" and (v) using a tone more in line with the informality of modern online communication.

It is interesting to note that points (i), (iii), and (v) are strongly echoed by Olson's work on narrative structure, while points (ii) and (v) are reflected in Kimmerer's *Gathering Sweetgrass*. In addition, it is now well-documented that allowing the audience more agency, point (iv), in choosing how to consume the content can contribute to higher intimacy with, and a stronger personal connection to, the presented narrative. This can significantly increase audience engagement with the material and boost overall enjoyment (e.g. Newman, 2021; Usher, 2016; Lindgren, 2016; Keng and Ting, 2009). Furthermore, Hardy et al (2014) found that coupling these points with a more informal tone, point (v), can oftentimes positively contribute to an audience's understanding of the material, while also increasing their awareness of their own agency in the topic. This, in turn, has a positive impact on community

engagement and a sense of belonging (Wenzel et al, 2016).

My initial plans for this Research-Creation Project included a multimedia piece showcasing the data collected on this trip, to allow the reader a more direct look at this aspect of the scientists' day-to-day. Due to the expedition being part of a long-term research project, a significant amount of raw data are available to use. Unfortunately, the amount of data analysis involved was outside of the scope of this project. I did, however, include links to the raw data (which is freely available on the Beaufort Gyre Exploration Project website) in content piece (9), for anyone interested.

5.2 Reflections on Blending Personal Narrative with Science

In preparing the content, I included a strong personal voice in most pieces (with the exception of 3, 6, and 9) to bring the reader into the experience, as very few people have the privilege to travel to the Arctic themselves. This experience was most likely to draw the interest of the reader, allowing me to experiment with Olson's template to "arouse the interest of the audience, then [...] fulfill their expectations" in the content itself (Olson, p. 160). In fact, as I was putting together the different stories, I often asked myself what I would want to read about: I have an interest in the Arctic in general, but this was my first true exposure to the scientific research there. I was able to use this to focus which stories I wanted to tell from the extensive bank of content I was able to collect for this project. In a news landscape that is increasingly integrating audience feedback and validation to determine what gets published (Meijer, 2019), my theory was that experiences that surprised or interested me would likely also be interesting to others.

I do not believe that this method of blending narratives can replace traditional scientific reporting, nor is it meant to give the reader an in-depth analysis of the scientific process. However, I am convinced that blended scientific and personal narratives are ideally placed to act as an introduction to various scientific topics and research.

For example, in the mixed-media piece "Deploy, Wait, Recover," the reader is introduced to long-term instrument deployments. These deployments are quite complex and require a lot of planning, and it would be easy to write an entire book on the full procedure from logistics to technical considerations to scientific value, not to mention the technology of the instruments themselves. The average reader would be lost in the details and likely unable to parse what information is actually important to understanding the overall process.

By presenting this complex undertaking as a personal anecdote, I was able to guide the reader to these processes in a digestible manner. The piece does not, for example, include technical details of how the acoustic release mechanism works, or why the researchers adjusted certain parts of the instrumentation before redeployment. What it does show, through short paragraphs, lists, and images, is the overall process and scale of the operation, presented through my observations and focussed through my own specialized scientific frame of reference (e.g. Kimmerer, 2013; Boesman and Meijer, 2018).

For readers who are interested and want more details, the Story Hub offers links to the raw data and other materials not processed for the general public, e.g. previous cruise reports intended for expedition partners, industry, and academia.

The blended narratives create a first stepping stone into the in-depth science. By funnelling the content through a personal lens, this blended approach gives the reader enough information to approach the complexities without overwhelming them with the full scientific and technical details from the start. Its purpose is not to produce expertise, but rather, to cultivate interest. Once the interest is there, and the tools to explore further are available, the audience's natural sense of curiosity will take them deeper into the topic (Usher, p.171; Kulkarni et al, 2022).

5.3 Reflections on the exposure.co Platform

The exposure.co platform fulfilled nearly all of my expectations for this project. I had originally chosen the site for its focus on diverse multimedia elements and user-friendly interface, paired with an array of simple yet elegant design options. I wanted my Arctic Story Hub to be transparent and interactive, so I appreciated the ability to easily add hyperlinks to both text and images. Small details, such as a hovering link icon on hyperlinked graphics and unobtrusive photo captions that appear only when scrolling over the image add to the transparency and approachability of the site. Incredibly versatile, the platform also allows embedded content from a host of external sites, such as social media, maps, and YouTube. The code for these embeds is pre-formatted, but can also be accessed as html code to make adjustments when desired.

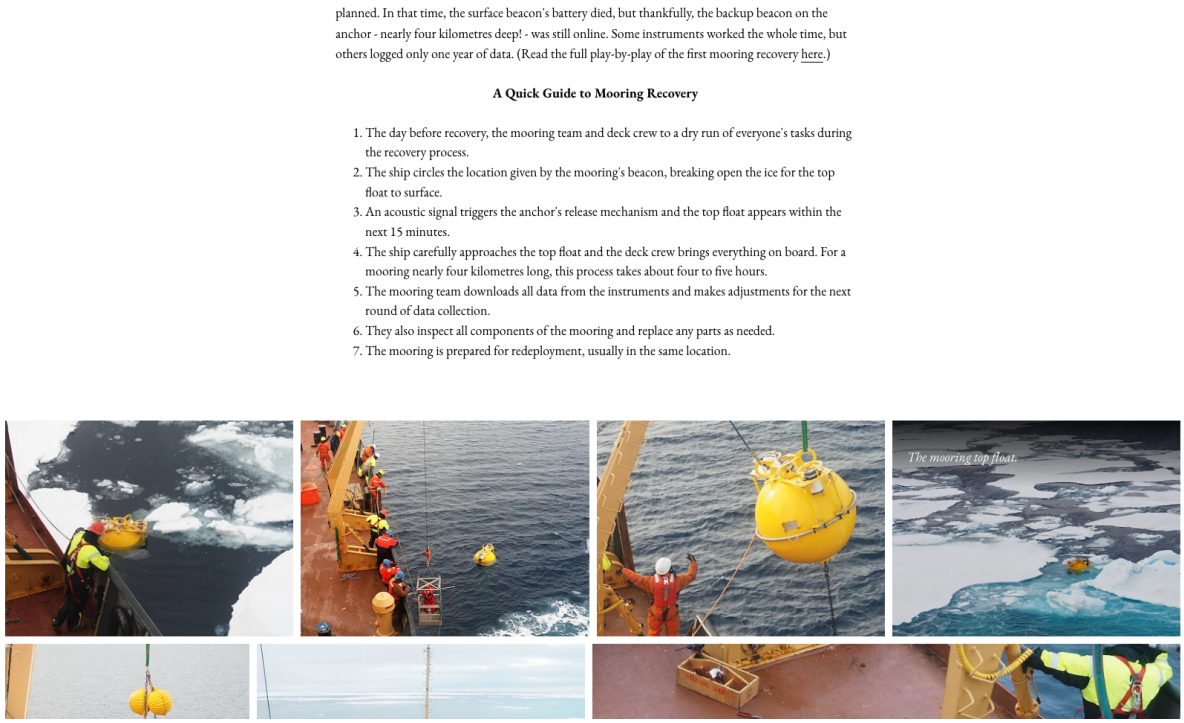

Figure 2: The formatting options on the exposure.co platform were easy to use, and adding hyperlinks and media elements was straightforward. The platform automatically arranges photos into aesthetically pleasing grids and features hover captions, as seen on the top right photo of the mooring top float.

It would have been nice if this functionality were extended to the text elements as well. There were multiple text formatting options, including for easy pull-out quotes and in-text headers, but these were not adjustable. Preset by the overall site design, of which there are multiple to choose from, the text options are more limiting than coding the site in CSS or JavaScript, for example. However, they are incredibly user-friendly and have enough options for most standard content. It also translates into exceptional visual consistency and helps keep the site clean. This feature could be particularly helpful in a collaborative setting such as a newsroom, where multiple users are uploading content to the site.

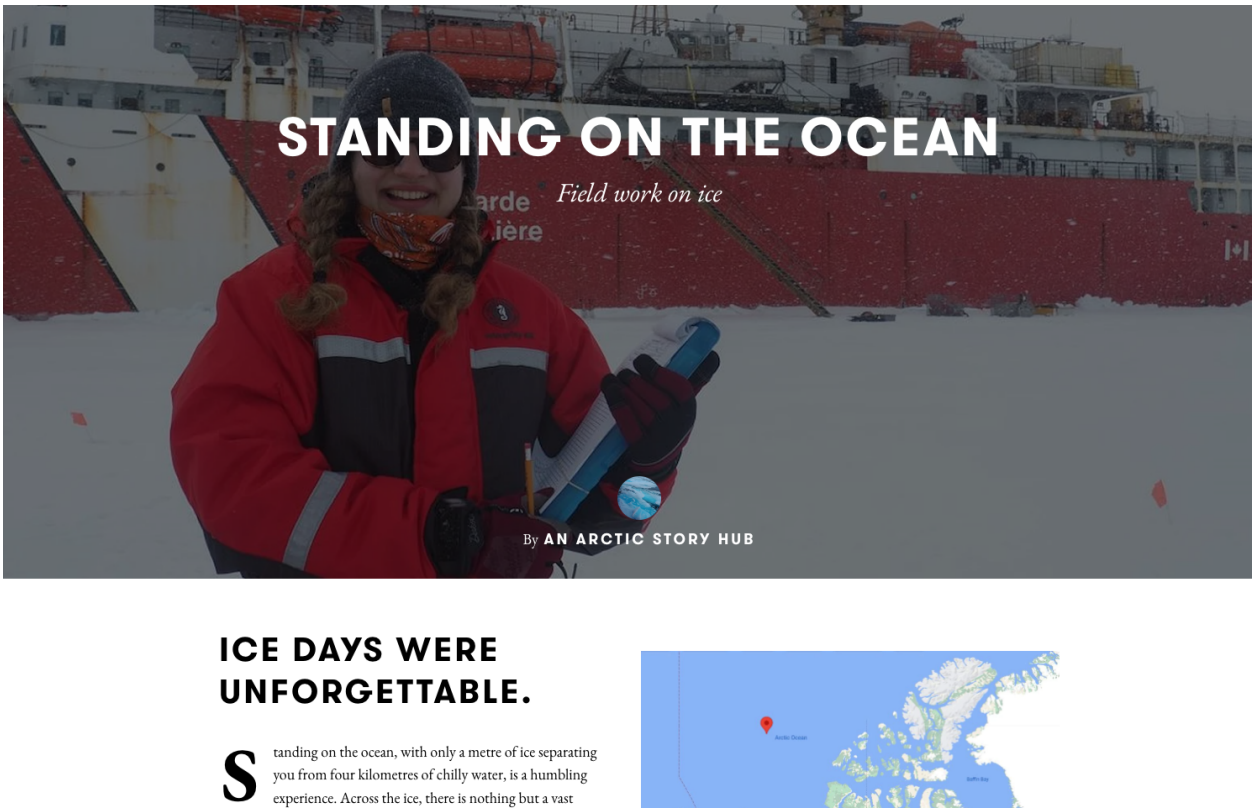

Figure 3: The platform template allowed for strong design consistency across all pieces, but did feature some quirks, such as the byline set by the page title.

A slightly more irritating, yet not insurmountable, quirk is that the site title is determined by what is set as the author's name in the basic account settings. I presume this is because exposure.co is currently primarily used as a portfolio or single-story platform. While not a

particularly devastating limitation, this quirk meant that I was not able to add bylines to the individual posts.

I compromised by adding a universal footnote, seen on every page, that works as a byline for all of my content. For content that is not my own, I included an additional byline in the text itself or in the photo caption of the content. The footnote also functions as a simple introduction to the project and includes contact information. Again, other design outlines would have allowed for a separate "about" section on the side of the page, but I felt the chosen design option better suited my purpose.

Overall, I found that exposure.co was a good choice to host the Arctic Story Hub. There are enough design options to create a visually appealing, transparent, and dynamic web space, with simple and effective methods for embedding external content. The platform, reminiscent of a higher quality blog or portfolio, is well suited to a more personal narrative, multimedia style. Of course, the paid plans offer even more features, such as embedded audio, but I found the free plan to be sufficient for this project.

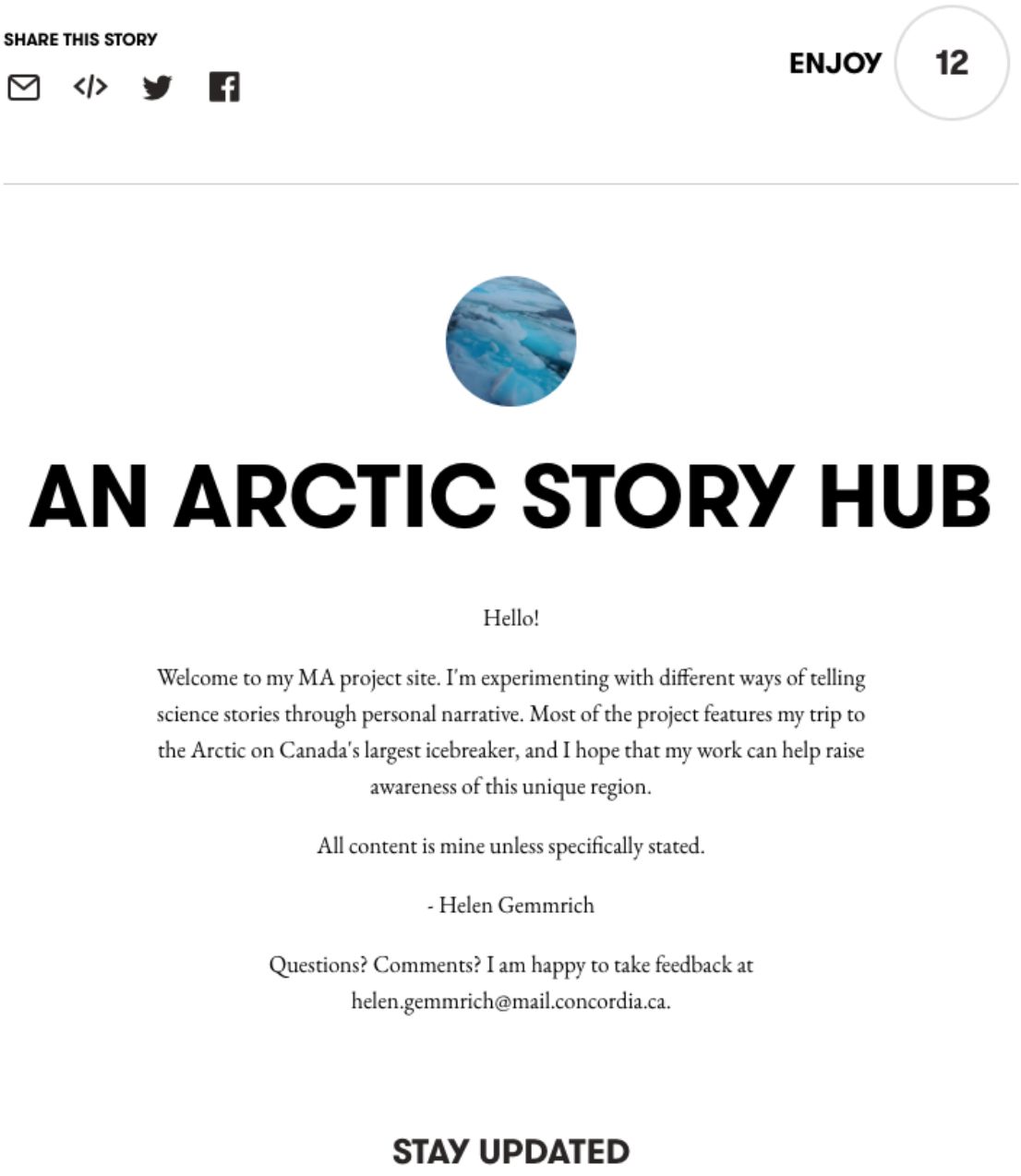

Figure 4: The "about" section features at the bottom of every page on the online Arctic Story Hub. Links to like and share content or subscribe to the page are clear and easily accessible.

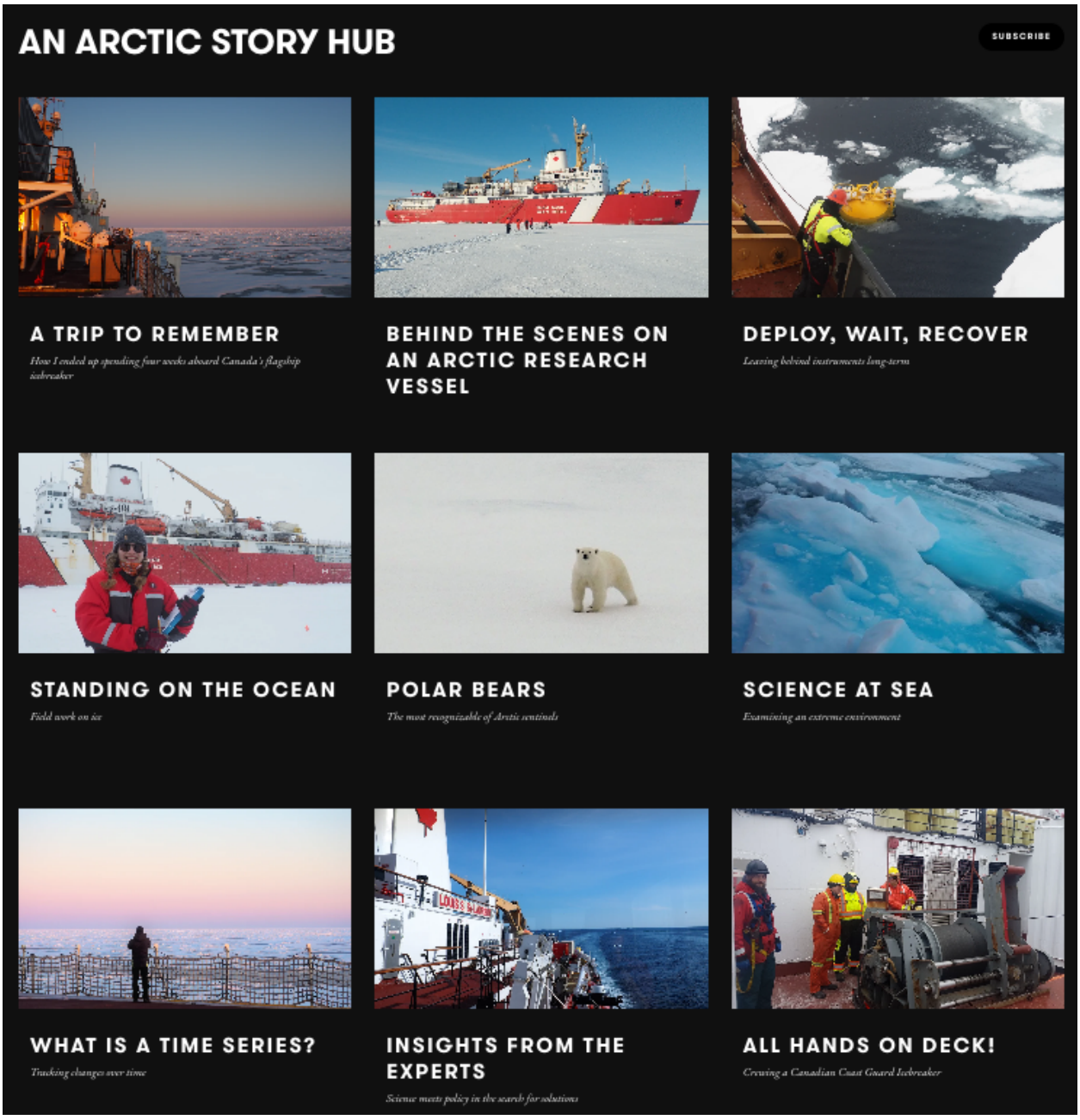

Figure 5: The Arctic Story Hub homepage features all nine content pieces. The formatting is pre-set by one of the many templates offered by the exposure.co platform.

5.4 Lessons for Pedagogy in Science Journalism

This section summarizes some of the key takeaways I would like to highlight after completing this Research-Creation Project. I have also included discussion points for the benefit of anyone wishing to build on or pursue similar work in the future.

1. Find relatability. How does the topic relate to your audience? Open a channel of communication first, then bridge to the specialized or technical content. As outlined in Olson (2015), this can be successfully done through:

   (a) *character relatability*: framing the topic in terms the audience is familiar with if possible;

   (b) *narrative relatability*: using a familiar story structure to establish a common ground if there is negligible overlap in the topic and audience background; or

   (c) *both character relatability and narrative relatability*: this is particularly useful for pieces that are meant for a broad audience, or where only one or the other would not be enough to create a common ground.

2. Add an element of audience feedback. In particular, I recommend the following groups:

   (a) Feedback from the scientists and/or story subjects: does the story convey the science correctly? Check for technical correctness as well as proper emphasis on different parts of the study e.g. results, methods, unexpected discoveries, system failures, personal achievements, etc.

   (b) Feedback from the local community: does the story accurately reflect the community, their concerns, and their achievements? Does it affect how the community interacts with the news? Does it positively contribute to a sense of community or belonging?

   (c) Feedback from the wider community: does the story increase the community's

awareness of the story topic and/or region of interest? Does it affect their perception of the topic and/or region of interest? Does it motivate them to seek further information on the topic and/or region of interest?

(d) How does the feedback from the local community differ from that of the wider community? What elements are most important to each group? How do we, as journalists, balance the requirements for each group?

3. Be flexible. Scientific pursuits are by nature experimental and can be highly unpredictable. Start with a hypothesis and a sampling plan, but allow enough flexibility in your work that you can adapt to unforeseen changes, or if it turns out your original priority isn't the most important, or the most feasible, topic to cover. If you can, let the project evolve naturally instead of attempting to force your experiences to mould to your expectations.

   For example, I did not expect that polar bears would be so plentiful that I would dedicate an entire piece on these beautiful sentinels (i.e. "Polar Bears" (item 6 in Table 1)). However, it was an important part of the shipboard experience and always brought together everyone on the vessel, regardless of their normal occupation on the ship. In my initial planning for the Research-Creation Project, I also expected to include more content on the coastal communities in the Arctic. While the final project does mention Inuit and Arctic community projects (e.g. "Behind the scenes on an Arctic research vessel" (item 3 in Table 1) and "Insights from the Experts" (item 5 in Table 1)), it turned out that in-depth content on this topic was not feasible on this trip. Instead, I restructured the project to focus on the icebreaker community and the science projects underway on board.

4. Leverage the knowledge of experts. Scientists are passionate about their work – use this to your advantage. Ask them directly what is most important to report on. However, keep in mind that scientists' work is generally also very niche, and that passion can

quickly turn into an hour-long wormhole. Prepare questions that are specific to your audience if possible, but also consider how the topic plays into the wider community (e.g. Olson, 2015; Kimmerer, 2013; Usher, 2016). Good questions to ask include:

(a) How does this play into [global issue]? e.g. How does sampling sea water in the Arctic play into monitoring climate change?

(b) How would you explain this to someone with no science background?

(c) How does this affect [specific audience]? e.g. How does increased salinity in Arctic waters affect the coastal communities that live in the area?

5. Be precise. In *Houston, We Have a Narrative*, Olson declares that the most powerful story is the most specific one (p. 160). Personally, the biggest challenge I encountered in the process of this Research-Creation Project was that I had too broad a scope. While this allowed for excellent flexibility (see point 3 above), it was difficult to tie all of the content, experiences, and knowledge I gathered into a concise central theme.

   If I were to do this project again, I would structure my process as follows, adding the first and last sections:

   (a) *Background Research*: this Research-Creation Project would likely have been much more streamlined if I had started the data collection process with a more thorough plan for the content I wanted to collect, based on solid background research. For example, I could have spent more time doing pre-interviews with polar scientists to get a better idea of what would be possible to do on the ice-breaker. I had been to sea on a research vessel before, but in the mid-Atlantic, on a ship approximately half the size of the *CCGS Louis S. St-Laurent* icebreaker. While the core seafaring concepts were the same, my role on the ship was not the same, being in the Arctic presented unique logistical challenges, and everything was much more complex on the *Louis*. It was a completely different experience.

(b) *Data Collection*: adding the previous section would have allowed for more targeted content collection, and I could have spent more energy on the specifics rather than trying to cover it all.

(c) *Data Analysis*: see section 5 – Reflections on the Creation Process.

(d) *Data Synthesis*: I find documenting the process and results to be very helpful in reflecting on the project as a whole.

(e) *Peer Review*: I would have liked to include an element of audience feedback, as described in point 2 above.

5.5 Limitations of the Project

Determining the true impact of this project is limited by its scope, which did not include collecting and analysing audience feedback. Therefore, beyond my personal satisfaction with the project and some informal feedback, no investigation has been made into how an audience would perceive the content showcased in the online Arctic Story Hub.

As discussed in previous sections, this Research-Creation Project aimed to increase awareness of, and interest in, the Canadian Arctic, with the broader goal of opening the region to increased engagement and impacting future reporting on issues such as polar science and climate change. Since it was not possible to quantitatively test this goal in practice, I addressed the limitation from a theoretical standpoint, basing my work on Olson's reflections on relatability in *Houston, We Have a Narrative* (2015).

Olson explores the importance of relatability as a key element in scientific storytelling. He addresses both character relatability and narrative relatability in creating common ground between narrator and audience.

Character relatability: the ability to explain the topic in terms that are familiar to the audience.

> E.g. "If you're speaking to a group of golfers about the physics of space flight, see if you can present some of the challenges in terms of the physics of golf. Anything you can insert that they will recognize from their world will make it easier for them to relate to what you have to say" (p. 122).

Narrative relatability: where common terms cannot be used, the ability to shape the story into a narrative structure the audience is familiar with.

> E.g. "[But] say you are speaking to a group of people who have absolutely no background or interest in your field. You might still connect with some of them for at least a moment if you have a narrative structure they can recognize and relate to" (p. 123).

Olson highlights that "relatability has to come first" (p. 123), and that finding any common ground – either through shaping the story into a form from the audience's area of expertise or by offering a common narrative structure – is critical to opening up an effective channel of communication early on in the conversation.

Consider the following excerpt from "What is a time series?" posted as part of the online Arctic Story Hub (item (9) in Table 1). This short science explainer article is the most technical piece in the collection, and the only one that directly shows data plots. It is an introduction to time series, the basis of any scientific research with a temporal component.

> "In some ways, nature is a scientist. Take a tree, for example. A tree is a living log book (pun intended) that keeps a diligent record of everything that happened to it in the past. Looking at a tree's cross-section, we see its growth over time. It is a snapshot of decades or even centuries: dark, narrow rings of late summer and fall growth separate the lighter growth rings of the spring.
>
> In scientific terms, this collection of data is called a time series. A time series is a way to track how something (usually a single variable) changes over time. They

> exist in all fields, for example tracking the value of stocks or economic change; measuring temperature or the amount of precipitation in a given area; or keeping track of the growth of trees. Even marking your height on your bedroom wall every year is a type of time series!"

I begin by introducing a broader idea, i.e. the connection between nature and science, and guide the reader to various examples from different disciplines. I establish the common ground of time series existing everywhere, adding elements of humour and a light tone, before moving into more technical detail in the following paragraphs. This is an example of creating both character relatability (content) and narrative relatability (structure) in a short amount of text.

There is, naturally, a limit to how colloquial a journalistic article can be, predominantly determined by the overall style and tone of the publication. As the goal of this Research-Creation Project was to foster awareness and interest in the Canadian Arctic, rather than instill highly technical scientific expertise, I had the flexibility to spend as many paragraphs on creating relatability in a piece as I deemed necessary. Thus, some pieces use more colloquial language (e.g. "A Trip to Remember," item (1) in Table 1), while others rely on images and a universal awareness of the topic to create Olson's relatability (e.g. "Polar Bears," item (6) in Table 1). Taken in its entirety, the online Arctic Story Hub then offers a blueprint for different methods of creating relatability when blending scientific topics with personal narrative reporting.

Nevertheless, without a structured, quantitative, and qualitative feedback loop with the audience, I am unable to definitively comment on how my work would be received and perceived.

6 Concluding Statement

Science is complex and chaotic, and in my experience as both a scientist and a journalist, unfortunately often brushed off as too complicated to understand. This is both untrue and detrimental to building an informed democracy – one of the elemental goals of journalism – as this mentality fosters disinterest in phenomena affecting people both locally and globally.

This project explored possible communication formats to counteract this lethargy, aiming to raise awareness and cultivate interest through blending personal narrative with traditional scientific reporting. As explained by Olson (2015), weaving personal experiences into science communications grips the reader's attention and provides a common ground for the discussion.

The project allows multiple levels of engagement. Readers may consume the content only on the site (e.g."What is a time series"), read a combination of content on the site and offsite (e.g. "Science at Sea"), or choose to explore the topics more in-depth on external sites only (e.g. "Insights from the Experts"). All external content is given with context and direction, providing some guidance for readers that wish to explore more deeply on their own.

As such, this project serves as a blueprint for non-traditional science communication, specifically, sharing science through personal narrative. As science journalism continues to evolve, this blended format creates an accessible and engaging starting point that is likely to resonate with a wider audience than traditional science communications. The diversity in content type and multiple levels of possible engagement also allow the reader to choose how they wish to consume the content, "inviting discovery within the many layers of information" and allowing them to "investigate their own particular questions independently" (Usher, p. 171).

This approach is not meant as a replacement for traditional scientific reporting, but rather as

a complementary method for raising awareness and establishing a stronger human connection to the scientific content. Building this awareness and connection is essential to address current global issues, for example the climate crisis, particularly in underreported, high-impact areas such as the Arctic (e.g. Harvey, 2021; Zelizer, 2021, Wenzel et al, 2016; Mathisen and Morlandstø, 2022).

6.1 Future Directions

I recommend including an element of audience feedback in future work. This would assess how a test audience perceives the various formats, and the impact on overall comprehension and engagement around remote and unique study areas such as the Arctic. Additionally, previous literature suggests that this type of blended personal-scientific narrative content would likely be most effective when paired with a companion piece that provides additional context for those wishing to dig deeper into the topic. Future directions could include expanding the Arctic Story Hub to include such companion content.

It is interesting to note that all content in the online Arctic Story Hub naturally fell along a fairly linear range from "intimate tone and personal experience driven" to "reserved tone and highly technical topics." It would be worth exploring how far content can be pushed towards the opposing extreme of "intimate tone and highly technical topics," for instance to determine if there exists a limit beyond which blended narratives lose their value in creating engaging and informative narratives, or if there is a golden ratio to balancing scientific and personal narratives in journalistic endeavors.

Bibliography

Agsten, A. (2021). Reforming the Arctic Narrative. Paper, Belfer Center for Science and International Affairs, Harvard Kennedy School. belfercenter.org/publication/reforming-arctic-narrative#footnote-010

Arctic Monitoring and Assessment Program (AMAP) (2019). Arctic Climate Change Update 2019. amap.no/documents/download/3295/inline

Arnold, E. (2018). Doom and Gloom: The Role of the Media in Public Disengagement on Climate Change. Shorenstein Center. shorensteincenter.org/media-disengagement-climate-change/

Barel-Ben, D.Y., Garty, E.S., and Baram-Tsabari, A. (2020). Can scientists fill the science journalism void? Online public engagement with science stories authored by scientists. PLoS ONE 15(1): e0222250. DOI:10.1371/journal.pone.0222250

Batsell, J. (2015). Engaged Journalism: Connecting with Digitally Empowered News Audiences. Columbia University Press. DOI:10.7312/bats16834

Blum, D. (2021). Science journalism grows up. Science. DOI: 10.1126/science.abj0434

Boesman, J., and Costera Meijer, I. (2018). Nothing but the facts? Exploring the discursive space for storytelling and truth-seeking in journalism. Journalism Practice, 12(8), 997-1007. DOI:10.1080/17512786.2018.1493947

Callison, C. (2022). Journalism in Canada's Northern Territories. Risky Futures, 122. DOI:10.3167/9781800735934

Callison, C. and Tindall, D.B. (2017). Climate Change Communication in Canada. Oxford Research Encyclopedia of Climate Science. DOI:10.1093/acrefore/9780190228620.013.477

Green, S.J., Grorud-Colvert, K. and Mannix H. (2018). Uniting science and stories: Perspectives on the value of storytelling for communicating science. FACETS 3: 164–173.

DOI:10.1139/facets-2016-0079

Guenther, L. (2019). Science journalism. Oxford research encyclopedia of communication. DOI:10.1093/acrefore/9780190228613.013.901

Gustafson, A., Ballew, M.T., Goldberg, M.H., Cutler, M.J., Rosenthal, S.A., and Leiserowitz, A. (2020). Personal Stories Can Shift Climate Change Beliefs and Risk Perceptions: The Mediating Role of Emotion, Communication Reports, 33:3, 121-135, DOI: 10.1080/08934215.2020.1799049

Harvey, F. (2021). Reporting on the climate crisis: 'For years it was seen as a far-off problem.' The Guardian. www.theguardian.com/membership/2021/aug/26/reporting-climate-crisis-before-my-time

Keng, C. and Ting, H. (2009). The acceptance of blogs: using a customer experiential value perspective. Internet Research, Vol. 19 No. 5, pp. 479-495. DOI:10.1108/10662240910998850

Kimmerer, R.W. (2013). Braiding Sweetgrass. Tantor Media, Inc.

Kovach, B. and Rosenstiel, T. (2001). The Elements of Journalism. Penguin Random House Canada.

Kulkarni, S., Thomas, R., Komorowski, M., and Lewis, J. (2022). Innovating online journalism: new ways of storytelling. Journalism Practice, 1-19. DOI:10.1080/17512786.2021.2020675

Laghi, R. (2021). Fiction, Science, Journalism: Hybrid Narrative Paths for Our Challenging Present. Cadernos De Literatura Comparada, (44), 239–253. DOI:10.21747/2183-2242/cad44a14

Lassila-Merisalo, M. (2014). Story First-Publishing Narrative Long-Form Journalism in Digital Environments. Journal of Magazine & New Media Research, 15(2), 1–15.

Lindgren, M. (2016). Personal narrative journalism and podcasting. Radio Journal: International Studies in Broadcast & Audio Media, 14(1), 23–41.

Linnit, C. (2020). Who tells the story of the present? Candis Callison on redefining journalism in Canada. The Narwhal. https://thenarwhal.ca/candis-callison-on-redefining-journalism-in-canada

Marsh, C. (2010). Deeper than the fictional model: Structural origins of literary journalism in Greek mythology and drama. Journalism Studies 11: 295–310. DOI:10.1080/14616700903481937

Mathisen, B. R., and Morlandstø, L. (2022). Audience participation in the mediated Arctic public sphere. Journalism, 23(8), 1700–1716. DOI:10.1177/1464884920973102

Meijer, I. C. (2019). Journalism, audiences, and news experience. In The handbook of journalism studies (pp. 389-405). Routledge.

Midberry, J., and Dahmen, N. S. (2020). Visual Solutions Journalism: A Theoretical Framework. Journalism Practice, 14(10), 1159-1178.

Nairn, R., Mccreanor, T., and Barnes, A. (2017). Mass Media Representations of Indigenous Peoples MURF Report.

National Resources Canada (NRCAN) (2019). Implications of changing climate for the Arctic environment. nrcan.gc.ca/environment/resources/publications/impacts-adaptation/reports/assessment

Newman, N. (2021). Journalism, media, and technology trends and predictions 2021. Reuters (Digital News Project 2021). reutersinstitute.politics.ox.ac.uk/sites/ default/files/ 2021-01/Newman_Predictions_2021_FINAL.pdf

NOAA (2021). Arctic Report Card 2021. arctic.noaa.gov/Report-Card/Report-Card-2021

Olson, R. (2015). Houston, we have a narrative: Why science needs story. The University of Chicago Press.

Pavlik, J.V. (2013). Innovation and the Future of Journalism. Digital Journalism, 1:2, 181-193, DOI:10.1080/21670811.2012.756666

Pfeifer, P. (2018). From the credibility gap to capacity building: An Inuit critique of Cana-

dian Arctic research. Northern Public Affairs. www.northernpublicaffairs.ca/index/wp-content/uploads/2018/07/NPA_6_1_2018_Web_pg29-34.pdf

Rantanen, M., Karpechko, A.Y., Lipponen, A. et al. (2022). The Arctic has warmed nearly four times faster than the globe since 1979. Commun Earth Environ 3, 168. DOI:10.1038/s43247-022-00498-3

Secko, D.M., Amend, E. and Friday, T. (2013). Four models of science journalism. Journalism Practice, 7:1, 62-80, DOI: 10.1080/17512786.2012.691351

Shoalts, A. (2020). Beyond the Trees: A Journey Alone Across Canada's Arctic. Penguin Random House.

Usher, N. (2016). Interactive Journalism: Hackers, Data, and Code. Urbana, IL: University of Illinois Press.

van Krieken, K., and Sanders, J. (2021). What is narrative journalism? A systematic review and an empirical agenda. Journalism, 22(6), 1393–1412. DOI:10.1177/1464884919862056

Wahl-Jorgensen, K., and Schmidt, T. R. (2019). News and storytelling. In The Handbook of Journalism Studies (pp. 261-276). Routledge.

Wenzel, A., Gerson, D. and Moreno, E. (2016). Engaging communities through solutions journalism. cjr.org/tow_center_reports/engaging_communities_through_solutions_journalism.php

Woods Hole Oceanographic Institution (WHOI) (2019). The Arctic and Climate Change. whoi.edu/wp-content/uploads/2019/01/ArcticClimateChangeLinksFin_42763-2.pdf

Zelizer, B. (2021). Why journalism's default neglect of temporality is a problem. Media, Culture & Society, 43(7), 1213–1229. DOI:10.1177/01634437211015846