

Environmental Communication at a Time of Planetary Crisis: Five Theoretical and Analytical Resources for Academic Research and Practice

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This article draws on transdisciplinary perspectives to contend that attention needs to be paid to contemporary contexts of environmental communication, especially in light of the latest assessment reports of the Intergovernmental Panel on Climate Change. Amid stark warnings around planetary crisis, this article provides environmental communication scholars, academics, and practitioners who are concerned with communicating aspects of deepening environmental crisis, a set of theoretical and analytical resources for the analysis and communication of environmental issues. Communicating environmental issues requires an expanded set of transdisciplinary approaches to move beyond a focus on representation of issues. To this end, the article draws on interdisciplinary bodies of knowledge from geography and communications to provide a set of reinforcing and complementary theoretical and analytical insights that are generally absent in the field of environmental communication. The article contends that attention needs to be paid to transdisciplinary perspectives, ontological, structural, and material challenges, and to the salience of other media, including digital and emerging media. The article thus provides five transdisciplinary theoretical and conceptual resources that expand the dimensions of environmental communication.

Keywords: environment, communication, media, culture, journalism, novel approaches, transdisciplinary

The global environmental crisis has recently come to higher prominence in media and popular discourse, most recently with the release of the sixth assessment report of the Intergovernmental Panel on Climate Change (IPCC). This follows a long-term upward trend in world newspaper coverage of climate change or global warming since 2013, as per the longitudinal data provided by Boykoff et al. (2022). This increase in coverage occurs on a recent backdrop of global temperature records and impacts from extreme weather events because of a changing climate. After the “heat dome” in the Pacific northwest of the United States, the extreme flooding events in Europe, and the landslide events in India in 2021, February 2022 saw the release of the Working Group 2 (WGII) report from the IPCC declaring a “code red” for humanity. In particular, this assessment confirms that the impacts of climate change are already in evidence and that the most vulnerable communities worldwide are bearing the strongest impacts of global heating. Indeed,

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the report cautions that global societies “will miss a brief and rapidly closing window of opportunity to secure a liveable and sustainable future for all” should they fail to act (IPCC, 2022, p. 35).

As noted by the full technical report of the IPCC’s (2022) Working Group 2 in a section titled “Political Economy of Climate Resilient Development,” “the prevailing political economy is itself now at risk as its legitimacy, viability and sustainability are called into question” (p. 18–65). This indicates a strong need to take account of structural transformations in economies and societies to both mitigate and adapt to “locked in” global heating. Although these issues have reached greater representation recently, this article contends that an increase in representation of these issues requires further momentum in both academic research and communication practice.

To this end, this article draws from a transdisciplinary study conducted across two funded research projects that assessed the strengths and limitations of mainstream media and the potential for alternative media practices to communicate environmental issues in novel ways (Morgan, 2017, 2020a). The research contends that forms of knowledge production, such as noncommercial and digital production, can have distinct strengths as means of communicating environmental matters. Therefore, this article identifies five bodies of knowledge that offer distinctive and pointed insights to better inform the practice and analysis of environmental communication, its challenges, and its potentials. This set of theoretical and analytical resources is not intended to be exhaustive but should provide a starting point for further analysis and discussion.

The first of the analytical resources foregrounds the structural contexts of knowledge production.¹ It argues for a continuing need to move beyond the study of how environmental matters are represented and toward the structural limitations and affordances of various domains of knowledge production. It argues that production of knowledge is situated within economic contexts, with financial constraints impacting what knowledge can be produced. This provokes questions of the relative autonomy of domains of knowledge production and takes account of compromises between economic and symbolic or cultural capital that domains of knowledge production have to navigate.

Implications from the first analytical resource provoke a discussion of how noncommercial environmental knowledge production holds different affordances and constraints to commercial production. This second resource concerns how noncommercial environmental knowledge production can provide an expanded remit to reveal environmental issues in a pragmatic way. The article therefore suggests that alternative forms of environmental knowledge production, including creative digital practices, can enhance capacity for communicating environmental matters.

¹ The article refers to “knowledge” production rather than “content” production throughout. This is in an attempt to broaden out Bourdieu’s (1996) perspectives on cultural fields as “symbolic” (Garnham & Williams, 1986, p. 122), which suggests a specific form of knowledge. This distinction invites readers to consider knowledge more abstractly than content, in that it may be legal, scientific, creative, cultural, informational, and/or policy-related material.

Extending ideas of digital affordances, the third resource addresses the role of digital hardware. The literature in this area reveals how environmental sensing can lead to increased environmental awareness, can enable citizen participation in environmental matters, and can provide novel forms of engagement with environmental issues. This resource explores how expanding environmental communication to take account of these developments is a fruitful way of enhancing analysis and practice of environmental communication.

The review next offers a fourth set of concepts on the nature/society relationship in the contemporary setting. It contends that although addressing structural, digital, and hardware elements of environmental communication provide insight into *how* to communicate, consideration also needs to be given to *what* is communicated. To this end, the nature/society relationship is examined to enhance awareness of what is “naturalized” or assumed about the environment, how nature is produced in contemporary economic contexts, and how to better understand that relationship. This is with a view to developing a criticality around environmental communication.

The fifth and final resource examines how materiality comprises an important if frequently neglected dimension of environmental communication. Although studies of media in general tend to focus on representation, this insight contends that media needs to be also considered as infrastructure, with environmental impacts from its production, use, and disposal. This section considers the geopolitics of media and the uneven distribution of environmental risks from the production of media devices. This section also calls for an ethics for producers of media, to acknowledge the environmental impacts of this form of knowledge production.

The five resources are discussed further later, but first an overview of the field of environmental communication is provided. This is to outline the general state of the field as a baseline from which the five resources are developed.

The Field of Environmental Communication

The field of environmental communication has some particularly high-profile and high-impact works that focus on the role of journalism, mainstream media, and climate change.² However, contributors to the field have also long called for an expansion of its remit, to strengthen transdisciplinary, structural, and creative approaches to environmental communication.

For example, Cox (2010) considers communication to include face-to-face interactions such as marches, videos and “visual and nonverbal symbolic actions” in the public sphere (p. 16). The work also considers how some studies in this area can point to new imaginaries, with a reflection on “imagining a

² Though not exhaustive, indicative works other than referenced in the main body of this text include those by Anderson (2017), Boykoff (2011), Boykoff and Luedecke (2016), Brüggemann and Engesser (2017), Eide and Kunelius (2012), Hackett, Forde, Gunster, and Foxwell-Norton (2017), Kunelius, Eide, Tegelberg, and Yagodin (2017), Painter (2019), Painter and Gavin (2016), Painter, Kristiansen, and Schäfer (2018), Schäfer and Painter (2020), and Schäfer and Schlichting (2014).

different world" (Cox, 2010, p. 365). Campbell (2014) considers the role of "factual entertainment" that combines factual and documentary footage with reconstructions and other techniques that dramatize content (p. 58).

The work of O'Neill (O'Neill 2013; O'Neill, Boykoff, Niemeyer, & Day, 2013; O'Neill, Williams, Kurz, Wiersma, & Boykoff, 2015) foregrounds the importance of visual cues and framings in environmental messages. O'Neill (2013) observes that such visual frames "are actively shaping the cultural politics of climate change, as images associated with articles about climate change in newspapers are not used indiscriminately" (p. 18). Thus, visual cues are also important areas of research and analysis in environmental communication that would benefit from further attention.

Cox and Hansen (2015) foreground the multidisciplinary perspective in environmental communication, specifically including a call to consider perspectives from social science disciplines such as environmental history, environmental human geography, environmental economics, politics, psychology and sociology (pp. 50–55). In a similar vein, Smith and Lindenfeld (2014) make the case for transdisciplinary research. Although the authors identify a significant existing body of knowledge within media studies, they point to a gap in transdisciplinary research that takes a more systemic and action-oriented approach to the climate crisis. Likewise, Olausson and Berglez (2014) also call for an understanding of the "interdisciplinary challenge" of researching media and climate change (p. 254). They observe that this interdisciplinary challenge lies between the natural and social sciences as well as within aspects of the social sciences. This critical perspective highlights the importance of transdisciplinary, interdisciplinary, and engaged research.

Indeed, for Anderson (2015), "the issues are such that it is now widely recognized that we need to tackle them at a multidisciplinary level" (p. 382). Anderson acknowledges strengths of the field in how it manages to provide voices to scholars from different disciplines such as human geography, science and technology studies (STS) and others. This perspective acknowledges how a challenge for the field is around creative collaboration and synthesis of knowledge between disciplines.

Hansen and Machin (2013) call for a broadening of the scope of the field, to include considerations of production, power and economic contexts. They argue that with an expanded and structural analysis of culture, "we look to the nature of the industries where representations are reproduced," to include economic contexts in which media outlets have to function, such as conglomeration, integration, financialization, and the role of advertising (p. 153).

For Hansen (2011), key challenges concern a recognition of "a need for media and communications research on environmental issues/controversy to reconnect with traditional sociological concerns about power and inequality in the public sphere and in public communication" (p. 9). Hansen (2015) also foregrounds the need to conduct further research on structural and power dynamics, to involve "uncovering the deeply ideological nature of public communication, but more particularly . . . uncovering how communicative 'power' in society is deeply unequally distributed" (p. 389).

Boykoff (2019) provides an insight into the importance of creative practices, observing that "creative and participatory communications and representations can be ignored or dismissed in shaping

climate science, governance and everyday cultural politics at our peril" (p. xi). Thus, rather than considering that publics learn about environmental issues such as climate change just through "serious" scientific reports, lectures and policies, Boykoff (2019) acknowledges that "there are many ways we may learn and know about climate change: experientially, viscerally, emotionally, affectively, tangibly and aesthetically" (p. 94). Therefore, creative forms of environmental communication need further acknowledgment and foregrounding in the environmental communications literature.

This brief summary of trends in the field points to three areas that this article contributes to. First is the call for transdisciplinary approaches to continue to incorporate insights from human geography and other disciplines. Second is the need to consider structural economic and power-related dynamics in the production, distribution, and consumption of environmental media. Third, an understanding of novel and expanded approaches to what is understood as communication, including the role of creative practices in communicating environmental issues, requires further development and integration into the field of environmental communication.

It is in this context that this article offers five analytical tools for environmental communication. These tools provide a transdisciplinary contribution to the field, that take account of structural issues at play and consider novel and emerging media as a creative factor in environmental communications. The first analytical tool deals with the structural contexts of production.

Consideration 1: The Structural Contexts of Knowledge Production

In terms of the contexts of production of environmental knowledge, Anderson (2014) assesses the complexities of climate change communication in the contemporary network society, arguing that "media coverage has tended to focus more on the problems than the solutions. Many environmental issues are complex, uncertain and involve long time spans. These sit uneasily in news media schedules that favour certainty, immediacy and simplicity" (p. 2). Anderson (2014) also notes the challenges of echo-chambers and filter bubbles while also stating how "mass self-communication" is "being co-opted into corporate frames" (p. 27). This points to the limitations in contemporary media to communicate the long-term and ongoing threats posed by climate change. Therefore, it is important to consider the economic constraints of mediated communication and, in turn, the effect of such constraints on what environmental information is presented to audiences.

Anderson (2014) critiques how a focus on framing analyses of environmental stories frequently ignores power. Anderson acknowledges the financial constraints in media industries that impel them toward a reliance on PR and discusses how framing is influenced by such developments (pp. 43–44). Thus, future directions in environmental communication need to consider alternative research paths beyond representation alone, because such studies "inevitably produce a partial and narrow picture of what is going on; they shed little light on the wider cultural politics of environmental issues" and remain overly "media-centric" (Anderson, 2014, p. 166). What is neglected in such an approach is "less visible aspects of news production processes and the hidden faces of power" (Anderson, 2014, p. 166). Therefore, issues of structural power, including hidden power and the silences that ensue by *not* adopting certain positions in communicating environmental matters, is revealed.

A key account of the structural challenges of communicating climate change is also provided by Boykoff and Yulsman (2013), who point out political economic tensions and challenges in communicating climate change. Despite overwhelming scientific evidence of environmental crisis, action is not well agreed upon, with the role of the mass media key in describing and analyzing not only scientific issues and concrete actions but also "imaginaries" (Boykoff & Yulsman, 2013, p. 360). Although such new perspectives are urgently needed to communicate climate change and action, the structural and economic contexts of contemporary journalistic production limit the time spent on researching stories while also requiring journalists to diversify the beats that they cover. Furthermore, notions of journalistic "accuracy" in reporting can be devoid of a sense of the importance or effectiveness of what is being covered (Boykoff & Yulsman, 2013, p. 361). I suggest that these are important considerations, as providing alternative imaginaries for this unprecedented crisis is urgent and necessary. The role of media is to the forefront of public engagement on climate change, with the mass media responsible for interpreting and disseminating research to which the public do not automatically have direct access (Boykoff & Yulsman, 2013).

Given these issues, along with the discussion in the prior section, attention needs to be paid to the structural constraints in the production of environmental knowledge. I suggest that the work of Pierre Bourdieu (1996) provides a framework in which to situate the production of knowledge, and assess its potential efficacy or limitations for production of environmental knowledge. Bourdieu's (1996) field theories involve individual, social, and institutional actors, as well as sites of economic and cultural capital (p. 124). Bourdieu's work provides an important point of departure and a point of discussion for this article. Bourdieu's field theory is reproduced by the author in Figure 1.

According to the theory, the first element to consider in the social space is what Bourdieu terms the field of power, which is "characterized by high levels of economic capital and low levels of cultural capital" (Hesmondhalgh, 2006, p. 214). In Bourdieu's (1996) work, this is denoted by the acronyms "CE+" to indicate a high level of economic capital and "CC-" to indicate a low level of cultural capital (p. 124). Therefore, any field within the field of power needs to operate within the constraints of such dynamics, and this has implications for every field.

The next layer within Bourdieu's (1996) system provides an in-depth analysis of the field of cultural production. As seen in Figure 1 below, Bourdieu divides this field into two broad sections. The first section is large-scale production, characterized by high levels of economic capital (CE+) but low levels of cultural capital (CC-). Bourdieu places the area of journalistic production into this part of the field of cultural production. In contrast, the small-scale production field is characterized by high levels of symbolic cultural capital (CC+) but low levels of economic capital (CE-). In Figure 1, the field of large-scale production is characterized by low levels of autonomy over production (AUTON-), whereas the field of small-scale production is characterized by high levels of autonomy (AUTON+). I suggest that this provides a significant analytical tool for evaluating the communication of environmental issues across a range of media forms in terms of their relative strengths and weaknesses with respect to the autonomy of the content they can produce (Morgan, 2020b).

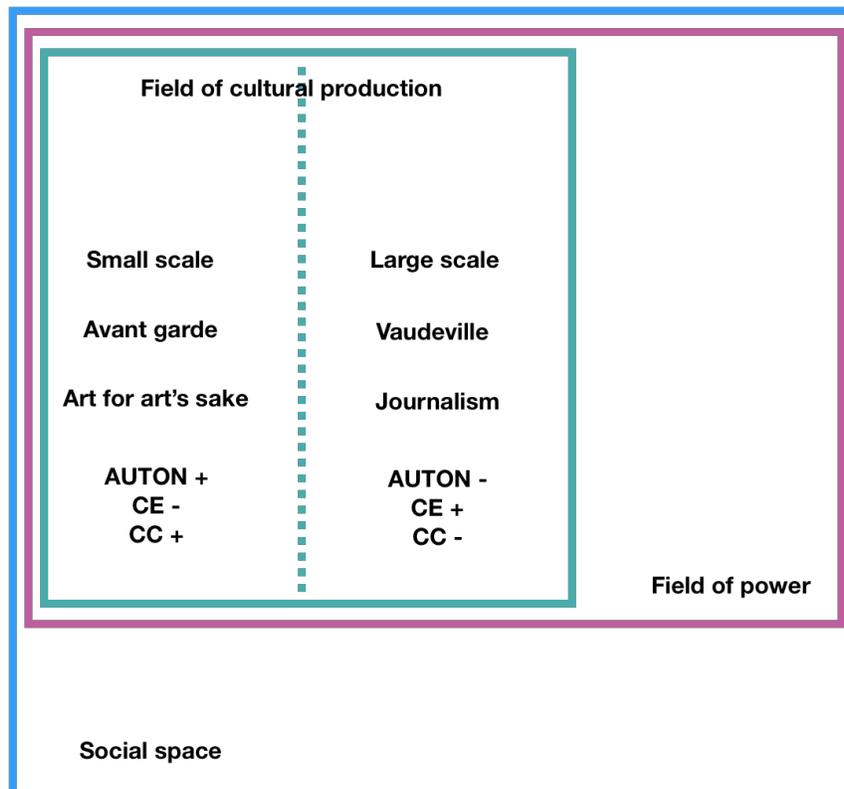


Figure 1. Bourdieu's (1996) field theory, re-annotated by author (p. 124).

Culture and Autonomy

One key application of Bourdieu's (1996) field theory is in assessing the relative strengths and limitations of various domains of knowledge production to communicate environmental issues. It is especially helpful that Bourdieu provided a comparative positioning of the commercial (journalistic) and noncommercial (artistic) domains. This is important because, as noted earlier, contributors to the field of environmental communication are calling for more attention to visual representation, analysis of entertainment, and artistic and creative representations.

Analyzed through Bourdieu's (1996) perspective, small-scale, noncommercial production tends to endure low levels of economic capital in favor of high levels of cultural capital and autonomy (CE-; CC+; AUTON+). In contrast, the field of journalism is characterized by a lower degree of autonomy (AUTON-) than the artistic field; however, it possesses more economic capital (CE+). The "trade-off" for this field of production is the apparent sacrificing of the symbolic or cultural capital, and autonomy enjoyed by the artistic field: (CC-; AUTON-). The contrasts between artistic production and journalistic production are in terms of the autonomy of the goods they produce, the material or economic capital that they enjoy, and the prestige or specific and symbolic capital that they possess.

This has implications for the role of journalism as a field of knowledge production, particularly in terms of its influence over public discourse. If, according to Bourdieu, the domain of journalism enjoys material capital but lower autonomy of expression, the limitations of communicating environmental matters in this way needs to be considered. Furthermore, attention needs to be paid to social spaces where greater autonomy of communication of environmental issues is enjoyed. Such spaces include what Bourdieu (1996) understood as *avant-garde* practices and small or noncommercial practices. It is to the noncommercial aspects of knowledge production that this article now turns.

Consideration 2: Noncommercial Environmental Knowledge Production

In the light of Bourdieu's (1996) field theory, I suggest that attention needs to be paid to the noncommercial, artistic, and creative aspects of environmental communication. For example, Cheetham (2018) describes the field of ecological art as a form of production that "embraces a range of contemporary practices that investigate the interconnected environmental, aesthetic, social, and political relationships between human and nonhuman animals as well as inanimate material through the visual arts" (p. 1). This suggests that domains of noncommercial production such as that of ecological art can provide a structural and situated lens through which to problematize environmental issues including and beyond climate change, in potentially novel ways.

Indeed, ecological art runs counter to "the age-old course of human chauvinism," and through eco-art practices, such notions are "replaced with recognition that humans are merely a type of mammal sharing space on the planet with all other species" (Weintraub, 2012, p. 3). Thus, the anthropocentrism that centers on ideas of progress and domination of the environment is countered with an ecocentric outlook that acknowledges complexity and that is attentive to alternative imaginaries around assumed anthropocentric structures. Furthermore, ecological art involves working with distinctive mediums "because the scales, mediums, processes, and themes it is introducing are correlated with compounding environmental woes and humanity's determined efforts to rectify them" (Weintraub, 2012, p. 5). It is therefore a domain that extends ideas of media and knowledge while acknowledging the materiality of the production of knowledge.

Furthermore, noncommercial practices such as ecological art can embody "a particularly disputed form of innovation" (Weintraub, 2012, p. 5), because it is atypical of the more conceptual, aloof, and highbrow practices often accepted as legitimate art. This is also a defining characteristic of ecological art that makes it useful for communicating interdisciplinary environmental challenges. Indeed, its "pragmatic" nature enables eco art to communicate "the practical requirements of survival" (Weintraub, 2012, p. 5) while also including "utilitarian strategies regarding pollution, resource depletion, climate change, escalating populations, and so on, because the strategies that sustain us are threatened" (Weintraub, 2012, p. 6). It is therefore a form of knowledge that can interrogate alternative imaginaries and ways of communicating environmental matters.

Noncommercial production also extends to the use and critique of digital means. Morgan (2013) has observed how in working with digital cultural practices, the producer needs to consider the corporate infrastructural and technical arrangements of digital means. However, there are practitioners working in the fields of digital design who actively take a critical approach and take account of how such media are not

neutral tools. Such practitioners use the term “critical making” to critique digital media while using them, in that they use digital technologies to expose limitations and biases in such technologies (Ratto, 2011). Critical making as a form of digital practice has affordances for issues of environmental communication and empowerment of publics. Wylie, Jalbert, Dosemagen, and Ratto (2014) outline critical making projects that specifically engage in environmental research, including a citizen-enabled environmental mapping project and an environmental sensing tool. Such citizen science practices “enable . . . citizens to question expert knowledge production through critical making tactics, and creates opportunities to generate credible public science” (Wylie et al., 2014, p. 116).

As such, these noncommercial practices are examples of an approach that engages with topics from environmental sciences. These practices acknowledge how environmental, human, social, political, and cultural systems are interconnected and need to be considered as not isolated from each other. Such practices take account of the dynamism in natural processes instead of stultifying, simplifying, or objectifying them. Finally, they shift the dominant anthropocentric perspective to one that privileges the sometimes ignored or neglected dimensions of nature, while also engaging critically with contemporary digital means of production. This flexibility makes ecological art and critical making practices a relevant example of environmental communication. Added to this are the pragmatic and even utilitarian characteristics of ecological art that run counter to overly conceptual practices. Thus, I contend that these practices can provide a grounded way of communicating environmental issues, and therefore require serious consideration and analysis in the field of environmental communication. Furthermore, in considering noncommercial production, the use of digital tools such as environmental sensing is also increasingly enabling environmental communication. This is discussed in the next section.

Consideration 3: Environmental Sensing as Communication

As seen earlier, there exist affordances of working with digital media and digital sensors in noncommercial contexts that enable citizen participation on environmental matters. This “programmability” of the earth through sensors “yields processes for making new environments not necessarily as extensions of humans, but rather as new configurations or ‘techno-geographies’ that concretize across technologies, people, practices, and nonhuman entities” (Gabrys, 2016, p. 4). The idea of “earth donning an electronic skin” involves how “networked environmental sensors make it possible to listen in on a planet that has always been ‘talking to us,’ but which we can only now begin to hear” (Gabrys, 2016, pp. 6–7). Thus, the idea of sensors enabling society to “hear” or more broadly “sense” the planet reveals a potential affordance of sensing to communicate previously unavailable aspects of environments to citizens.

Therefore, it is important to recognize the role of programmability and sensors in communicating environmental matters. We are urged to consider how, through sensing, an environment “becomes visible—and manageable—as information,” and through sensing “such ecologies inform our lived material, political, and ethical engagements, and they contribute to the scope of our environmental practices” (Gabrys, 2016, p. 15). However, there exist challenges of using media technology in this way, insofar as “a practice of attending to the milieu of media technology does not automatically translate into an environmentalist encounter with media” (Gabrys, 2016, p. 16). Nevertheless, the process of becoming more environmentally aware through sensing warrants attention, in that although sensing may not start out as environmentalist,

the act of monitoring can raise environmentalist questions and provoke appropriate responses in both mediated and nonmediated communication. Therefore, although the technology is not sufficient to communicate environmental issues, it can potentially be an enabler of nuanced environmental discourse.

Gabrys's (2016) work "asks us to rethink relationships between technology and environment" (Morehouse, 2019, p. 110). Furthermore, Gabrys's (2016) perspective showcases speculative practices while maintaining a criticality of assumptions around sensors and how they are potentially co-opted by large corporations, amounting to a "technological fix" (Morehouse, 2019, p. 110), which merely diverts environmental crisis or challenges rather than resolving them. Such fixes are connected with ecomodernist discourses, "which emphasize upscaling technology, innovation, growth and prosperity to bring about ostensibly sustainable--or, predictable--futures" (Morehouse, 2019, p. 110). This approach is problematic in how it "lends itself to technocratic managerialism and cultures of expertise, which raises the question of ecomodernism's accessibility and equitability" (Morehouse, 2019, p. 111). I thus contend that in terms of enabling communication of the outputs of sensing or monitoring, this critique of structural contexts remains important.

Concerns such as those highlighted in Gabrys's (2016) work serve to "question linear and managerial approaches to technology-environment relations," while also offering "the possibility for attuning to new ways of seeing, hearing, feeling, and so on" through environmental sensing (Morehouse, 2019, p. 111). Although this approach may be hubristic, Morehouse is careful to point out that "there are considerable challenges involved in steering vast sensor technology networks away from technocratic managerialism and toward liberating ends," that involve "significant shifts in our understandings of technology-environment relations" (Morehouse, 2019, p. 112).

Thus, considering the communication of environmental issues may not solely involve the use of monitoring to "nudge" citizens into positive environmental behaviors by displaying data. That form of behavior change may have a "rebound effect" (Gabrys, 2014, p. 2099). Instead, creative and arguably more conceptually "messy" communication practices may produce new and different interrogations of environmental issues. I also contend that it is necessary to explore alternative practices and imaginaries. Thus, I contend that there is not one roadmap for environmental communication, but that alongside technical and managerial practices, citizen engagement through novel, experimental, and alternative practices can be an important driver of effective environmental communication. This includes communication that acknowledges that "Fear Won't Do It" (O'Neill & Cole, 2009, p. 355) and that instead provides messages that heighten the personal importance of environmental issues while also helping audiences to develop a sense of personal agency to act.

Consideration 4: What is Understood About the Nature/Society Relationship

This section emphasizes how communicating environmental matters presumes an understanding among policy, academic, cultural, and political stakeholders of the nature/society relationship. I contend that it is of key importance to consider how in our contemporary society, ideas of "nature" are colored through certain conceptual lenses. This section discusses the nature/society relationship from a critical perspective to provide an understanding of assumptions that can dominate in the contemporary context.

For example, the concept of a “metabolic” interaction between society and nature is crucial for any grounded or nuanced understanding of socioecological relationships (Foster, 2013), particularly in urban settings. Bearing in mind that that a majority of the global population are now living in cities (World Economic Forum [WEF], 2020), there is an acknowledgment that “little attention has been paid so far to the urban as a process of socio-ecological *change*, while discussions about global environmental problems and the possibilities for a ‘sustainable’ future customarily ignore the urban origin of many of these problems” (Heynen, Kaika, & Swyngedouw, 2006, p. 2). Considering metabolic relations within urban contexts provides distinct insights into environmental discourses by highlighting the urban as a site of metabolism, interaction, flow, and growth, but also deepening contestation and contradiction between society and nature. Thus, for the communication of environmental issues, it can be helpful to question if the urban is acknowledged as a complex site of interaction with nature, or if urban environmental relationships are ignored or even celebrated in problematic ways, for example through news stories celebrating growth in construction and infrastructural sectors.

A more nuanced approach is in the “re-naturing” of urban theory, an understanding that “attention has to be paid to the political processes through which particular socio-environmental urban conditions are made and remade” (Heynen et al., 2006, p. 2). This perspective acknowledges how “cities are built out of natural resources, through socially mediated natural processes” (Heynen et al., 2006, p. 5). For the purposes of environmental communication, therefore, how the urban context (including infrastructural, planning, and development decisions) is articulated in media requires attention and critique for environmental implications.

Castree (2014) analyzes how concepts of “nature” are “a significant preoccupation of a surprisingly large and diverse set of epistemic communities,” including the media and advertising (p. xviii). Of salience here is how the mass media act as “nature’s principal public representative” and a key “epistemic community,” that is, a community bearing particular knowledge that purports to speak from its position of expertise (Castree, 2014, p. 210). In environmental matters, the media can distort notions of “balance” to become a form of “bias” when reporting climate change (Castree, 2014, p. 240; see also Boykoff & Boykoff, 2004). In giving equal weighting to perspectives lacking in scientific credibility, the so-called balanced reporting “amounts to *decontextualizing* them and thus preventing consumers of news from understanding how much (or little) importance to attach to dissenting views” (Castree, 2014, p. 240).

Castree (2014) draws attention to the issues of *how* nature is categorized and represented through various epistemic communities such as the media. He observes how nature is presented as both “out there” while humans can also “consider ourselves to be *part of nature*” (Castree, 2014, p. 4). This idea suggests a twofold contradiction of externality and universality existing in assumptions about nature, whereas a more nuanced position is to understand that “not only are we affected by and able to alter wider ecosystems; in addition, we are, physiologically speaking, natural entities ourselves” (Castree, 2014, p. 6). Thus, external nature is understood as “the non-human world of living and inanimate phenomena, be they ‘pristine’ or modified,” whereas universal nature can be thought of as “the physical world in its entirety, including human beings as both products of natural history and present-day biological organisms” (Castree, 2014, p. 14). The distinction is subtle but clear: External nature separates society from nature, acts upon nature, but is not entangled in it. Universal nature, by the inclusion of humans, places society within nature.

This perspective highlights and calls into question the unconscious and default assumptions around nature as presented to audiences, whether presented as external or universal. Thus, representations of nature in scientific, cultural, and media settings are not neutral or without bias. As Castree (2014) notes, “most of what we know and feel about nature derives from the claims made by myriad others, for instance wildlife film-makers, journalists, chemists, environmental activists and professional ecologists” (p. 14). Therefore, how concepts of nature are communicated is dependent on the epistemological and ontological understanding of these various domains. For example, the celebration in European newspapers of extreme weather events such as the 2019 heatwave is a problematic presentation of external nature in the light of unquestionable anthropogenic climate change (O’Neill et al., 2022). Indeed, the “fun in the sun” visuals depicting the heatwave presented the extreme weather event as a “positively valenced” event, despite the accompanying text taking on a less celebratory tone (O’Neill et al., 2022, p. 1).

I suggest that this nuanced perspective on the nature/society relationship is one that can inform the communication of environmental issues, and the analysis of mediated communication of these issues also. Furthermore, an awareness of these typical categorizations of nature among producers and practitioners can contribute to a deepening criticality about how nature is presented to audiences. For example, is nature in environmental stories presented as external, that is, separated or distinct from human impacts? Or is it described in such a way as to acknowledge the universality of nature, that is, how societies depend on a livable ecosystem?

Castree (2014) provides a further contribution by observing that nature can be considered in spatial and temporal ways. What we understand as nature can be “in terms of specific locations,” either separate from human impact and therefore pristine, or manufactured and constructed, such as in a zoo or botanical garden, whereas taking a temporal approach by asking, “When is nature?” provokes the answer that “we think these days that it’s ever more a thing of the past” (Castree, 2014, pp. 11–12). Indeed, by both spatializing and temporalizing nature, we can conclude that

because there are, today, more people, more industry, more consumption, more pollution, more travel and more “invasive” technologies than ever before, then there’s therefore less “nature”— it seems to be a zero-sum game in which the natural world is the clear loser. (Castree, 2014, p. 13)

For example, the media celebration of the return of the consumption of space through foreign travel is positioned as a marker of “progress,” particularly during the COVID-19 pandemic. However, this both temporalizes and spatializes nature in uncritical ways that naturalize the unsustainable consumption of space.

I conclude by arguing that considering concepts of the nature/society relationship provides fruitful and nuanced ways of understanding how the interrelationship between society and nature is contested, contradictory, but also embedded and assumed in contemporary contexts. In terms of communicating these nuanced positions, these perspectives critique and challenge notions of separateness from nature, while acknowledging that some domains may be more or less likely to adopt that stance. By drawing on such insights, I argue that the field of environmental communication, and scholars and practitioners concerned with communicating environmental issues, can move toward a more nuanced communication agenda with

respect to the society/nature relationship. Furthermore, considering where and when nature exists helps to develop pathways to action before nature is irrevocably away or in the past. Thus by “denaturalising” (Castree, 2014, p. 282) assumptions about nature, and indeed the place of society as within it rather than external to it, environmental issues become easier to discuss in critical terms. I suggest that it is beneficial for environmental communication scholars, practitioners, and academics to adopt the insight from these ideas as aids to critique normative assumptions of the nature/society relationship that can be prevalent in certain media.

Consideration 5: The Inescapable Materiality of Communication

The article now turns to the final consideration for enhanced understanding and practice of environmental communication, that of the materiality of media production. Christensen and Nilsson (2018) provide an important discussion of the limits of media research on environmental issues, and pathways forward that the discipline could adopt. They note a tendency within media and communications research to focus on “questions of content and representation” (Christensen & Nilsson, 2018, p. 267). In contrast, the authors argue that there is a need within the discipline to also assess how the media also comprise infrastructure, and in doing so, this brings up issues of materiality such as e-waste and its corresponding geopolitics. The authors justify this by noting that “in an era of global distress, where science and knowledge are continuously questioned in a communication environment which generates multiple social imaginaries and material consequences, studying the mediation of environmental issues necessitates more than an examination of questions of content and representation” (Christensen & Nilsson, 2018, p. 267). Therefore, though it is expected that media industries would focus on content and representation, considering the materiality of media “challenges the notion of technology—and digital technology in particular—as clean” (Christensen & Nilsson, 2018, p. 271). Developing a more materialist perspective on media signals a political economy approach that can take account of the materiality of media, thus considering how dimensions such as the “technological afterlives” of media (Christensen & Nilsson, 2018, p. 272), such as computers, cameras, audio recorders, and so on, can shift discourses within media studies by taking account of electronic waste and its environmental impacts.

Furthermore, Christensen and Nilsson (2018) also propose that geopolitics and geographical considerations be considered, which “further highlight . . . this dialectic by making visible the planetary scale through addressing questions of geographic interplay as well as the human scale” (p. 272). The research on this is largely invisible “from the very regions of the world most severely affected by exploitation, environmental degradation, climate change and the disposal of toxic waste, namely developing countries and vulnerable regions of the developed world,” and that this invisibility “serves to highlight the structural geo-centrism and western ethno-centrism in both scientific and communication research” (Christensen & Nilsson, 2018, p. 273). The authors thus call for more reflexivity toward the geographical dimension to media studies, specifically “a critical geopolitics of mediation and environmental change,” noting that the “porousness” and “flexibility” of the research boundaries as “opportunities and less as threats in pursuing both problem-driven and exploratory research and providing new, provocative ways to examine questions central to environmental communication in these times of global crises and multiple truth claims” (Christensen & Nilsson, 2018, p. 274).

Similarly, Cooren (2018) also calls for a consideration of the materiality and the sociality of "everything that exists" by adopting a "relational ontology" to analysis (p. 278). For Cooren (2018), such an approach "puts communication at the forefront because communication corresponds to the materialization of relations" (p. 279). In this way, the understanding of communication extends beyond human communication to also acknowledge that "ecosystems, machines and organizations communicate too, whether to each other or to us" (Cooren, 2018, p. 279). Thus, rather than "remaining at the theoretical level" of analysis, such an ontology "invites us to analyze the multiple ways by which communication constitutes our world" (Cooren, 2018, p. 279). By adopting a materialist, relational ontology of communications, a profound reconsideration of what constitutes communications becomes available to the field. Cooren (2018) argues that "we need to stop reducing communication to human communication, since even *what we call human communication* (two or more people conversing with each other, for instance) *is never absolutely and exclusively human*" (p. 283, emphasis in original). This challenges media and communication scholars, particularly those concerned with environmental communication, to consider the devices and artefacts of production and consumption, and to communicate this to audiences.

Indeed, although contemporary digital media use potentially ecological metaphors in describing "the cloud," data "farms" and "streams," and sending "tweets," the contemporary media context is neither clean nor ephemeral. In policy discourses, the association of digital industries with the "smart" economy veils their materiality, instead implying that they are postindustrial and part of the weightless services sector. Maxwell and Miller (2012) challenge that notion by arguing that these industries are significant drivers of ecosystem damage, challenging the prevailing ideology that media and communications are part of the ephemeral, weightless, knowledge-based economy.

For example, Maxwell and Miller (2012) outline the issue of planned obsolescence of digital devices, observing that "today's digital devices are made to break or become uncool in cycles of twelve months and counting down" (p. 2). This has been recently borne out by fines levied on both Apple and Samsung for deliberately slowing down their phones to amplify user dissatisfaction and thus increased consumption of new devices (Amante & Balmer, 2018). Furthermore, the throwaway culture that such practices encourage do not take account of the hidden environmental cost of the disposal of such devices that contain highly toxic bioaccumulants such as heavy metals and plastics that can leach into soil and water with the environmental effects borne by people who did not have any hand in the production, consumption or indeed enjoyment of these devices. Thus, for Maxwell and Miller (2012), "references to the symbolic power of media technology" along with the rhetoric of the potentials of technology "mak[e] it hard to perceive its material connection to ecological decline" (pp. 4-5). Rather than think of these technologies as clean, green and ephemeral, and therefore less polluting than manufacturing, Maxwell and Miller (2012) remind us that "in reality, old-time toxic manufacturing has moved to the Global South, where it is ascendant" (p. 6).

Cubitt (2017) argues that although the global south bears the brunt of the pollution caused by digital media, the effects are pervasive, noting that "with the scale and velocity of pollution now involved in producing and powering the digital tools with which the wealthy extract and consume value, geographical distance is no longer trustworthy protection" (p. 64). This critical take on the materiality of media has echoes of Castree's (2014) perspectives that urge the consideration of the contradictions of considering aspects of

our relationship with nature to be distant or away. Cubitt forces those with the privilege of owning and using such devices to consider, if even only for self-preservation, their own environmental precarity.

Cubitt (2017) analyzes the materiality of media using a case study of lithium, a key component of many digital devices and their batteries, observing that “these workplace media are one of the biggest markets for Li-ion batteries” (p. 67). This places phones, tablets, and laptops at the forefront of creating demand for the lithium industry. Lithium mining is water-intensive, causing shortages in locations where it is mined, and the accumulation of lithium on the land to the extent that it destroys any growth of vegetation (Cubitt, 2017, p. 67). Yet such concerns are treated as an economic and environmental externality, in that “the market . . . will not question the metal’s provenance, nor take responsibility for the conditions under which it has been produced” (Cubitt, 2017, p. 78). Thus, the manufacturers of digital devices are under no obligation under market logics to build in the environmental, health, and social costs of heavy metal production. For those manufacturers, those costs are external to their concerns.

For Miller (2015), such concerns raise ethical questions for media producers such as journalists. He notes how media producers have benefitted from “the rapid and profound research, communication, and publication guaranteed by new media technologies” (Miller, 2015, p. 653). However, Miller (2015) also observes a significant silence on the environmental impacts of these technologies in that these technologies “connect to a lengthy history of environmental despoliation that is rarely referenced in J-School, in media studies, or in newsrooms” (p. 653). This calls for consideration of the environmental impacts in the production, reception and disposal of media, notwithstanding a twofold issue with acknowledging such environmental impacts, with a “perhaps accidental invisibility” of environmental issues coupled with a “willful obfuscation” synonymous with ecological metaphors such as tweets, farms, streams, the cloud, and so forth (Miller, 2015, p. 656).

To this end, Miller (2015) calls for a “comparative audit of the impact of these forms of journalistic research and a transparent declaration of their carbon footprint, along with that of their consumption by readers, as a new principle of the field” (p. 660). Although focused on journalism, I suggest that this applies across the board for studies of environmental communication. For Miller (2015), a key benefit if applied to the domain of journalism is in how “adding a new layer of ethical self-awareness and public disclosure to digital journalism would improve its ethical standing and its informative role” (p. 660). I suggest that this can be expanded to encompass studies of other forms of media, and indeed can apply to those active in the area of environmental communication.

Concluding Remarks

This article has provided an overview of five key analytical resources for the field of environmental communication for academics and for practitioners at this pivotal time in the societal relationship with nature. Although these conceptual resources are not exhaustive, they serve as a transdisciplinary starting point for further discussion on overarching issues that can inform analysis in the area. By linking conditions of production of media to both normative formulations of the nature/society relationship, to material conditions of media production, and to the contemporary digital and cultural landscape, the article has provided an account of environmental communication that answers calls to

move beyond representation and media-centric approaches. As echoed by Miller (2015), there is an ethical dimension to this work, in that faced with the extensive societal challenges that environmental crisis brings about, those concerned with environmental communication need to be aware of the structural, ideological, and material conditions of our work. It is hoped that by outlining these five areas, a starting point for engagement, discourse, and ethical action in the area of environmental communication research and practice can be fostered and extended.

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