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The framing of Indigenous and local ecological knowledge amidst climate change education in the COP27 cyberspace

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ABSTRACT

We explore representations of Indigenous and local ecological knowledge (IEK/LEK) within the cyberspace of COP27 through a digital ethnography of the UNESCO-UNFCCC Webinar Series organized to supplement the in-person meetings that took place in Egypt. Through frame analysis and an accounting of UNFCCC literature on knowledge produced by Indigenous Peoples and local communities (IPLCs), we argue that while the UN's efforts toward inclusivity are valuable, this webinar demonstrates the significant shortcomings of international climate governance's engagement with IEK and LEK. Digital spaces surrounding global climate governance represent a contradictory dualism for Indigenous and at-risk communities, as these spaces both provide an outlet for decentralized climate activism and a method of co-optation by neoliberal forces orbiting the UN system. We argue that meaningful changes are necessary in the digital approaches of the UNFCCC and UNESCO to climate change education and epistemic inclusivity to account for the place-based, localized impacts of global climate governance. The changes should reflect the diversity of IEK and LEK forms, give agency to IPLCs to determine whether to share climate information, and must include adequate representation from affected communities.

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Introduction

Global climate change negotiations, including the Conferences of the Parties of the UNFCCC (COPs) and the meetings of permanent subsidiary bodies established by the UNFCCC, are notoriously inaccessible for Indigenous Peoples and local communities (IPLCs) (Lakhani, 2021; Shulbaeva, 2022; Smith & Sharp, 2012). That is not to say that Indigenous and other disadvantaged groups have no power in climate negotiations; quite to the contrary, previous ethnographic work by Marion Suiseeya et al. (2022) at COP21 demonstrates that Indigenous peoples have achieved both descriptive and substantive representations at these events. Changes since COP16 have also attempted to address some failures in representation – including a call for the inclusion of Indigenous knowledge in UNFCCC literature (Ford, Cameron, et al., 2016a, Ford, Maillet, et al., 2016b; IPCC, 2018; Shawoo & Thornton, 2019). However, even in smaller multi-stakeholder forums, 'problems persist regarding representation, voice and influence of marginalized groups in these invited spaces' (Larson et al., 2022, p. 17). There are several contemporary concerns regarding the method of IPLC inclusion in climate governance, including that global climate policies will reinforce extant power structures despite IPLC perspectives, the objectification of IPLC culture, and the standardization or rejection of IPLC knowledge forms to serve techno-political aims (Carneiro da Cunha, 2009; Foyer & Kevran, 2017; Martello, 2001; Nautiyal & Klinsky, 2022); despite this, several scholars have argued that IPLC perspectives have had too little impact amidst the global policy focus of international climate negotiations and related spaces (Belfer et al., 2019; Brugnach et al., 2017; Doolittle, 2010; Hagelsteen & Becker, 2019; Nautiyal & Klinsky, 2022). The structure of the UNFCCC has failed to reckon with unequal power relations, colonialism, and structural barriers present within its confines (Shawoo & Thornton, 2019). Given this context, it is necessary to turn critical attention to the inclusion of Indigenous knowledge, IPLC agency, and IPLC representation in COP27 – the iteration of COP held in Sharm El-Sheikh, Egypt during November 2022.

Through a digital exploration of the UNESCO-UNFCCC Webinar Series on climate change education, we argue that COP and UNFCCC-related events still fail to engage effectively and meaningfully with IPLCs and their knowledge production. In our analysis, we highlight the shortcomings of this webinar series' engagement with LEK/IEK and IPLCs to suggest improvements for future representations of heterogeneity in knowledge production – which is critical to understand the place-based and localized impacts of climate change. These suggestions can provide another perspective to continue discussions of pragmatic methods of moving toward legitimate, respectful ways of achieving IPLC representation in future COP events and international climate governance. We find that digital climate spaces represent a contradictory dualism

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for the inclusion of underrepresented voices and knowledge. These spaces both furnish decentralized environments where IPLCs can use their agency to impact climate governance discourse and become a means, however inadvertent, of reinforcing existing structural inequalities and modes of thinking.

The principles established in UNFCCC communications play a central role in climate politics at various levels of international governance (Betsill et al., 2015), which is troubling given existing inequity in representation. These principles are also reflected in forms of digital communication and education in virtual public spaces revolving around COP meetings themselves. This is significant given 'how cultural identities, representations, and imaginaries, such as those hinged to … nation, and indigeneity, are remade, subverted, communicated, and circulated through … engagement with digital technologies' (Coleman, 2010, p. 488), which makes digital spaces of critical importance in the politics of global climate governance. These realities merit an examination of UNFCCC sociopolitical discourse and require an evaluative analysis of the UN-curated digital media messaging and events surrounding global climate governance.

While many of the excellent contributions to this special issue specifically investigate themes through in-person ethnography, we chose to engage within this collaborative project through an exploration of the growing cyberspace around in-person COP27 events to gain insight into the ways in which Indigenous and local epistemologies are digitally represented by the UN and its subsidiaries. We specifically focus on the UNESCO-UNFCCC Webinar Series, and how IEK and LEK are framed within climate change education spaces in the COP27 arena. In recent years, efforts around Sustainable Development Goal (SDG) Target 4.7 (education for sustainable development and global citizenship) have expanded beyond national education policies and curricula to include socio-emotional and behavioural learning to cultivate a 'whole institution' approach to climate change that integrates climate action across institutional spaces and cultures (The Sustainability and Education Policy Network, 2020). These moves reflect neoliberalism's combination of its economic principles with an emphasis on scientific and intellectual perspectives from psychology and neurology to understand the human condition (Whitehead et al., 2018) to acknowledge the growing 'capacity of both state and non-state actors (including corporations) to govern via … novel cognitive and emotional regulation strategies in order to produce preferred forms of social conduct' (Bryan, 2022, p. 2). Thus, while the 'whole institution' approach allegedly allows for the inclusion of conflicting interests, knowledge forms, and value systems, social-environmental learning and educational reform in pursuit of the SDGs have effectively maintained neoliberalism's economic-focused approach and failed to include diverse realities and intercultural concerns (Bryan, 2022; Rizvi, 2017).

Theory, concepts, & methods

Theoretical & conceptual review

It is critical for scholars of climate change and development to recognize the value of diverse, pluriversal understandings of culture, nature, and cosmology. Lauer and Aswani (2009) explain that 'Researchers and practitioners across many disciplines now recognize that local people's knowledge, perceptions, and cosmologies are important in planning social and economic change programmes and in the management and monitoring of ecosystem processes and functions' (p. 317). This recognition requires an engagement with place-based realities, relationships, and intimate knowledge forms (Garavito-Bermúdez & Lundholm, 2017). IEK (often referred to as 'traditional ecological knowledge' or TEK[1]) comprises the set of knowledge generated by Indigenous communities and their multifarious relationships with their natural environment. Some authors have expressed concerns and critiques of IEK (Gupta, 1998; Tsing, 2005), as the direct labelling and othering of this form of knowledge 'undermines efforts to understand the hybrid, heterogeneous, and contested nature of knowledges' (Lauer & Aswani, 2009, p. 317). Nazarea (2006) also notes that critical postmodern scholars in the 1990s and early 2000s like Arun Agrawal and Arturo Escobar raised concerns that attempts to abstract and decontextualize local forms of knowledge could prove both harmful to conservation efforts and communities themselves. Admittedly, this is a significant concern for this research, as we are addressing IEK and LEK as a larger category and must resist one of the very critiques we levy on climate governance – the treatment of IPLCs as a monolith. In this paper, we are not analyzing specific treatments or educational practices within distinct epistemologies or forms of knowledge production which we argue must be socioculturally situated; instead, we discuss how global climate governance and educational spaces in sum fail to properly respect, include, and learn from non-dominant knowledge systems.

Still, there is demonstrable value especially in the context of environmental decision-making and pedagogy to ensure the inclusion of diverse forms of place-based epistemologies and knowledge. While Ruddle and Davis (2011) admit that LEK at times may miss some ecosystem dynamics and complexities, their work and other literature on environmental management has demonstrated its value across environmental applications – from marine conservation, fishery management, agroecology, and stakeholder engagement to name just a few (Baker & Constant, 2020; Noble et al., 2020; Oteros-Rozas et al., 2019; Silvano & Valbo-Jørgensen, 2008). Furthermore, given that IEK and LEK are often tied to specific bio-regions, their inclusion in curriculum and the adoption of place-based pedagogies can both promote local ecosystems' capacity for regeneration, provide for epistemological multiculturalism in climate change education, and subvert top-down, technocratic forms of instruction (Jimenez & Kabachnik, 2023; Zidny et al., 2020). In both the pedagogy and inclusion of IEK and LEK, it is fundamentally critical to push back on notions that IPLC frameworks lack objectivity which can only be found in European and settler accounts (Daigle & Sundberg, 2017), to recognize their value in environmental knowledge production.

Unfortunately, the scales of knowledge production in global climate governance disadvantage IPLCs, IEK, and LEK by prioritizing global perspectives over local insights. Participants in global technical discussions tend to conceptualize climate change in terms of scale, differentiating between global

processes and local impacts (Tsing, 2005, p. 104). This 'scalar approach' frames the discourse around what is considered reliable knowledge and who can contribute to broader discussions (MacKinnon, 2011), thereby excluding so-called 'non-experts' whether that be in scientific or political discourse, from the production of knowledge on climate change (Walker-Crawford, 2022). Powerful social and political actors can legitimize their actions by associating themselves with 'higher' scales while disempowering subaltern groups by confining them to the local (MacKinnon, 2011). This rings particularly true in international climate governance, which is marked by an epistemological politics that both posits a dichotomy between scientific and local knowledge and gives precedence to scientific insights over experiential knowledge (Marino & Schweitzer, 2009). Actors in UNESCO climate negotiations also align themselves with the scales and conceptions of the 'Western' one-world world,[2] whereas a recognition of IEK and LEK requires a recognition that acknowledges that 'multiple knowledges, or epistemes, refer to multiple worlds, or ontologies' which all require attention (Escobar, 2016, p. 13).

Importantly, these multiple worlds or ontologies require not only attention, but direct participation. IPLC thinking is too often applied in European and settler contexts without members of those communities present, which results in a structure that fails to 'respect [Indigenous] physical self-determination (and right to ensure Indigenous thinking is employed accountably)' (Todd, 2016, p. 10). Indigenous scientific knowledge holders are engaged merely in an extractive way: knowledge is treated as data that can be aggregated and understood abstractly (Latulippe & Klenk, 2020). But Indigenous knowledge is 'embodied practice embedded within a worldview;' it is inseparable from its sociocultural, political, legal, and spiritual place-based context (Latulippe & Klenk, 2020; Reo, 2019; Parsons et al., 2017). Thus, the crux of IEK and LEK inclusion in climate governance is not merely an issue of respecting IPLC knowledge and integrating it into western science and education spaces, but also insisting that IPLCs are given the space to represent it properly themselves via IPLC-led research and education. This is necessary to ensure that climate action, which still often takes the form of dispossession or extraction, does not impede IPLC efforts at environmental stewardship (Correa-Salazar et al., 2021; Redvers et al., 2023).

Local perspectives are also marginalized in pedagogical approaches to development discourse. Since educational approaches in multinational organizations like the UN serve to reinforce mainstream 'development' thinking (i.e. top-down, rigid, geared toward specific economic goals and modernization) and uphold existing hegemonic thinking (Hickling-Hudson, 2002; Leach et al., 2021; Mundy, 1998, 2002), new epistemes of governance are required to fully recognize emancipatory, justice-oriented projects (Chan, 2007). In thinking through the Anthropocene, a common irony has appeared through which thinkers acknowledge the need for epistemological heterogeneity while struggling to avoid a prejudice 'against evidence that is not founded in either the sentiments of politically dominant groups or the calculative enumerations of modern science' (Neale, 2019, p. 490). UNESCO has been criticized for its misleading attempts to articulate a humanistic agenda and a tendency to conveniently co-opt forms of knowledge and learning to appeal to conflicting interests – primarily as an effort to maintain its own legitimacy as a political institution (Bryan, 2022; Elfert, 2018). This co-optation reflects UNESCO's tendency towards treating epistemic inclusivity as a flag of convenience, a term used in education contexts for

> the discursive practice of invoking policy buzzwords in order to appeal to donor agencies or to bolster legitimacy for national educational reform initiatives, only for these initiatives to 'sail' under different objectives once the funding or legitimacy has been granted. (Bryan, 2022, p. 12)

In sum, there is little reason to believe that UNESCO has changed its superficial at-best and problematic at-worst commitment to epistemic inclusivity and heterogenous epistemes without demonstrated evidence.

Given this predilection to certain types of knowledge and previous failures to seriously engage with conflicting epistemes in environmental governance, it is necessary to interrogate how political organizations communicate regarding non-dominant forms of information, allow for the participation of non-dominant actors, and how international climate governance represents IEK/LEK. This is especially important given previous UN Development Group (2014) commitments to 'communicating as one' and that the structure of political messaging in these quasi-official digital spaces relies primarily on a top-down approach in the creation and dissemination of knowledge. This top-down orientation may give rise to 'digital colonialism:' a phenomenon in which domination is exercised through ownership and control of the architecture of the digital ecosystem, which vests Western institutions with immense political, economic, and social power (Kwet, 2019). Digital educational spaces are increasingly important in the contemporary, post-pandemic age. But the digitization of the world, and with it the emergence of new information and communication technologies, is a double-edged sword. On one hand, digital technologies augment human capacity for communication, and their pervasiveness typically means that more individuals have opportunities to produce, communicate, and use digital media (Castells, 2004). On the other, some scholars argue that the introduction of these communication technologies within Indigenous communities can exert epistemic violence against local knowledge systems, further enabling cultural domination by the Global North (Young, 2019). While digital climate education spaces provide access to engagement for those physically or bureaucratically unable to attend COP negotiations (Marion Suiseeya & Zanotti, 2019), they also empower dominant institutions to define global digital society norms based on their own priorities and perspectives. To be clear, this is not a call for the abolition of digital educational spaces, which can provide for easy exchange of information given their ability to extend past the strictly controlled spatial confines of COP27. Indeed, the ubiquity of digital technologies presents opportunities to enhance the self-determination of Indigenous Peoples, such as Indigenous data sovereignty and the building of Indigenous broadband infrastructure (Taylor & Kukutai, 2016; Trostle,

2021). However, their use must be examined critically, with an emphasis on knowledge co-production not co-optation.

Positionality

Given the nature of this work, we feel it is critical to acknowledge our positionality as authors and scholars in this space. We would like to note that our status as graduate students in the Global North grants us access to resources largely unavailable to many communities most affected by climate change. We also would like to acknowledge the privilege we personally have to critically interact with COP27 in this special issue, and to have the technological and institutional backing to represent ourselves in climate governance spaces.

J.W. Dean: I am a white, cishet scholar who works with small-scale food systems, marine conservation, and socioecological communities primarily through qualitative political ecology in coastal Mexico. This work experience has influenced my direct appreciation of LEK's value for environmental decision-making, especially in the face of growing climate uncertainty.

J.R.K. Parks: I am Xicana of Mexica, Japanese, and European descent. My work strives to support the cultural sovereignty of Native Nations and Indigenous communities. This work hinges on the ability of communities to access and manage their lands and waters, a goal made increasingly difficult due to epistemic and environmental injustice.

Methods

Our work results from the collaborative event ethnography (CEE) process employed in this special issue. Collaborative qualitative research can provide great benefits to understanding complex events. CEE builds on team ethnography and encourages collaboration across the entirety of the research process through which various researchers work to engage a primary research objective (Corson et al., 2014; Gray et al., 2020). In this case, members of the CEE provided input on abstracts, met before, during, and after COP27, and provided scholarly input on drafts ahead of submission – including insight from their specific interaction with COP27. CEE is especially useful in the analysis of environmental governance as it allows for an analysis of diffused power in neoliberal institutions, climate meetings as social devices, and studying up to power brokers of environmental policy (Büscher, 2014; Brosius & Campbell, 2010). While several members of the CEE engage diffused power, sociality, and power brokers at COP27 on-site in Egypt, we contribute through an exploration of power and sociality in the cyberspace of this event. Through this diversity of situatedness – including other digital work – this CEE achieves one of the method's key strengths for event ethnography: an examination of 'how actors who are normally dispersed in time and space come together at international conferences to facilitate, structure, and disseminate conservation paradigm shifts' (Corson et al., 2019, p. 57).

Specifically, our contribution to this issue employs digital ethnography to explore the framing of IEK and LEK in the UNESCO-UNFCCC Webinar Series. The UNESCO-UNFCCC Webinar Series attempts to respond to 'calls for action from young people to ensure every learner is equipped to tackle climate change' through 'monthly conversations on climate change education for social transformation' ('UNESCO-UNFCCC Webinar', 2022). Designed to make 'progress' toward SDG 4.7 and the goals of the 1.5-degree path suggested by the Paris Agreement, this collaboration represents UN attempts to increase 'synergy' across the UNFCCC and the UN SDGs (Outcome Summary - Climate & SDGs, 2019; United Nations Climate Change Secretariat, 2017). Season 1 of this webinar series was an eight-part collection of webinars hosted between April and November 2022. Entitled 'On the road to COP27', it addressed topics centred around how climate change education can create social transformation – including how to harness these lessons in climate governance spaces and the demarginalization of IEK and LEK ('UNESCO-UNFCCC Webinar', 2022). Our digital ethnographic analysis centres on the sixth seminar entitled 'The ancient futures: Un-learning and re-learning our way towards a post-carbon future', which took place on September 27. This webinar emphasized 'the values and practices of harmony embedded in traditional knowledge and indigenous communities across the world' ('UNESCO-UNFCCC Webinar Series', 2022). We also include insights and background from an October seminar on climate change education at COP27, a final November seminar reflecting on COP27's impact on climate change education and knowledge evaluation, and our engagement with the broader webinar series. Since discourses created by international organizations often 'help to regulate new norms, interests, and shared social tasks' globally (Ford, Maillet, et al., 2016b, p. 430), this webinar series will help shape the inclusion of non-Western epistemologies and public perceptions of IEK and LEK in climate change education.

Digital ethnography is critical in 'enhancing understandings of meanings, how they come to be assigned to technology and the cultural experiences that … are enabled by the digital medium' (Kaur-Gill & Dutta, 2017, p. 2). Given that digital media can cut across geographic/spatial boundaries and political delineations (Kaur-Gill & Dutta, 2017), this Webinar Series is a space of study for new social relationships and messaging established by the UNFCCC. As such, ethnography within this platform can provide key insights into macro social relations and the politico-economic structures cyberspace entities produce (Hakken, 1999; Budka & Kremser, 2004). Digital ethnography also provides a temporal advantage, with the opportunity to compare messaging on IEK and LEK inclusion prior to and following COP27. By collaborating with physical attendees of COP27, our work can explore the co-constitutive digital-material environments of global climate governance – which Pink et al. (2016) argue is key in understanding the social relations of contemporary events.

Our work involved live attendance of four of the episodes of the UNESCO-UNFCCC Webinar Series entitled 'Climate change education for social transformation', along with observation of the remaining four recorded webinars we were unable to attend live for logistical reasons. In addition to direct participant observation of the content of the webinars and the interactions of the speakers, we monitored the associated Slido – which was a medium for audience submissions of questions for the speakers and responses to calls for audience participation. Our qualitative methodology[3] predominantly employs

frame and thematic analysis. Framing refers to how sense is made of a specific issue or topic through a process of both emphasis and de-emphasis in communication on the subject (Schäfer & O'Neill, 2017; Tyagi et al., 2022). This framing process is directly situated within sociopolitical power (Carragee & Roefs, 2004; Wozniak et al., 2017), comprising what Entman (1993) refers to in the news context as 'imprints of power'. This is especially important to note given that peoples' perceptions of the world grow from human communication (Matthes, 2014; Schäfer & O'Neill, 2017). Frame analysis pays specific attention to how these imprints of power in various forms of media and communication emphasize and de-emphasize certain strands of information. While some literature uses frame analysis to analyze COP-related media and IPLC representation in climate change governance (examples include Roosvall & Tegelberg, 2013 and Vanhala & Hestbaek, 2016), it is useful to extend this work beyond the physical event and journalistic coverage to digital messaging from the UN itself.

Our work specifically looks at the 'topical frame' (see Schäfer & O'Neill, 2017) of LEK and IEK in the context of UN media surrounding COP27. We employ a hermeneutic or qualitative frame analysis, which uses 'small samples that mirror the discourse of an issue or an event … in depth' (Matthes & Kohring, 2008, p. 259). Similar to the process of Coleman and Dysart (2005) and Zoch (2001) with media coverage but on a smaller scale, both authors took extensive notes during webinars, collaborated to create transcripts, and then debriefed with each other following webinars to identify key words, phrases, and themes related to IEK, LEK, and IPLCs within the webinar series. We also analyzed the aspects of IEK and LEK that were emphasized by panelists in the series. In this paper, we first present observations from the webinars followed by an analysis of the framing of IEK and LEK, accessibility, and representation. Given that we do not use a quantitative model, our elaboration of the framing of IEK and LEK within the series results from a discursive process between the authors and with collaborators in the CEE. To prepare for these analyses, both authors read the associated agenda with each topic and engaged with related UN, UNESCO, and UNFCCC literature to the topic at-hand. While some scholars have expressed the limitations of the extractability and robustness of the hermeneutic model (Tankard, 2001), this method can provide highly-detailed insights (Schäfer & O'Neill, 2017). We argue that the extractability concern is partially mitigated by engaging within the CEE process and its publication within the broader special issue; in a sense, we provide a snippet of the COP27 cyberspace that interacts with the broader ethnographic material in this issue. We also analyze the accessibility of the webinar series and the engagement with audience framing of key topics related to IPLC epistemologies, for while the framing of an issue is critical, so is the audience who can receive such messaging.

Observations

Access to webinars & format

The webinar series was conducted via Zoom with additional accessibility through Slido, a text-based Q&A and live polling platform designed to foster increased audience interaction while providing the option to remain anonymous. Each webinar consisted of a moderator, with three panelists providing insight on a specific aspect of climate change education and knowledge. The moderator introduced the topic and contextualized it within related UNESCO and UNFCCC discourse, and then guided a conversation surrounding two key questions followed by an audience Q&A. To 'attend', a participant must have a cellphone, tablet, or computer with an internet connection, speakers (built-in, USB plug-in, or wireless Bluetooth), and the minimum bandwidth required for Zoom functionality (this varies depending on the type of meeting). An email reminder with instructions on how to join the Zoom meeting was sent out in the days leading up to each webinar in the series. One had to register for all the episodes of the series on the UNESCO website to receive these reminders. The instructions were provided in three languages: English, French, and Spanish. To respond to polls or submit a question to the panelists, attendee's computer systems required a keyboard or some means of typing out a response. A microphone was not required. The webinars were held anywhere from 10:00 to 14:00 GMT + 2 (Cairo time) and were recorded for access on the UNFCCC website and YouTube. Three of the recordings are posted in English, French, and Spanish, while five solely exist in English and French.

Representation

To understand the actors involved in the process of framing IEK and LEK in the webinars and their positionality, it is critical to highlight the representation of the panelists. Each webinar generally consisted of a moderator with three panelists responding to broadly posed questions. The substantive discussion of IEK/LEK in the sixth webinar did not include members of ICLPs, or any first-hand practitioners of IEK or LEK. The sixth panel specifically consisted of UN workers in science policy and cultural heritage, as well as artists, educators, and non-profit workers. While no representatives of Indigenous Nations, tribes, or communities were present during this sixth panel discussion, in answer to one of the two questions posed by the moderator, one panelist presented a video recording of an Indigenous community[4] in which a local leader shared reflections about the Indigenous pedagogy of *buen vivir*: 'The time has come for the new people to return to the pedagogy of maíz where we all understand that we are grains of the same cob … and that we all have to take care of each other'. Another webinar in the series, entitled 'How climate change can become climate action', also featured valuable contributions from an Indigenous scientific knowledge holder, who discussed the importance of Andean traditions and the need to shift away from anthropocentrism in climate change education. Apart from these and other brief appearances, representation for those whose knowledge is embedded in an Indigenous epistemology or LEK was minimal.

Discussion of IEK, LEK, and IPLCs

Speakers in the sixth panel primarily focused on how to include IEK and LEK into pedagogical processes. In response

to the question 'What are the key messages from local and Indigenous knowledge and values to be embedded in climate education?', one speaker urged educators to consider not only the values of Indigenous Peoples but also the structures in which they lived, noting that they lived in 'localized economic systems' that were 'smaller scale' and that 'they could actually see the impact that they had on the land and on other people'. The speaker used exclusively past tense grammar to discuss Indigenous Peoples and closed their remarks by suggesting that '[o]ur arms are so long that we can't see what our hands are doing' without clarifying how these observations can be viably integrated into climate education or adapted to the challenges of global economies.

There was panelist consensus that including IEK in climate change education requires 'un-learning' or re-learning, which would help deconstruct the Western paradigm present in climate change education especially in the Global North. The webinar series emphasized the importance of immersion, deepening students' and teachers' connection to nature and its rhythms, incorporating youth perspectives, and acknowledgement of the spiritual dimension. One speaker advanced the notion that Indigenous communities invite us to return to the school of nature which children can 'learn by observing' because 'we cannot come to understand the beauty of nature and therefore to defend it if we never see it'. The panel recognized that what we seek is not a 'grafting of Indigenous knowledge and teaching' onto learning centres 'designed for life in an industrial modern world'. Rather, the goal is for educators to frame Indigenous pedagogies as equal systems of knowledge transfer. One panelist admonished that 'Those from whom learners can learn should not be excluded because of their being informal teachers'. It was also noted that 'informal learning' or 'transmission' can 'manifest in at least as many ways as there are cultures that we can name but there are common elements to all of them'. Still, viewers were left with no practical explanation as to how this could be done within the guidelines of the SDGs or UNFCCC goals for climate change education. There was also no attention given to whether Indigenous Peoples and local communities desire to share all forms and levels of their ecological knowledge or whether and to what extent the so-called 'West' is *entitled* to these forms of knowledge.

Community engagement and resources

While each webinar provided spaces for crowdsourced questions from attendees, panelists' interaction with community questions was not guaranteed. Audience questions in the webinars regarding IEK and LEK demonstrated highly disparate framings of these knowledge forms, while demonstrating the lacking infrastructure provided by the UNFCCC process at local educational levels. Some audience members questioned how the UNFCCC was increasing 'collective and individual agency to overcome oppression' and whether the process was becoming 'more inclusive to Indigenous communities'. Another respondent questioned whether communities full of 'norms and traditions' can 'learn the [*sic*] new things like climate change and others?' Similarly, an attendee pondered the 'challenges' of connecting students to 'experienced farmers'. The panelists never directly responded to these audience concerns or cleared up the future role of IEK in climate policy, and there was minimal discussion about the actual logistics (i.e. how knowledge would be incorporated in policy recommendations, how different scales of knowledge will be evaluated, how experts from IPLCs will be chosen or integrated) of IPLC's various forms of place-based knowledge in the UNFCCC process. Multiple audience members also requested further information on IEK and LEK inclusion, classroom resources for instructors, and sponsored workshops carried out in schools and educational institutions. There was special emphasis on this from multiple attendees as they noted that the 'UN is calling for compulsory climate change education in schools by 2025'. These calls for resources and information went virtually unanswered in the webinar series themself, especially within the sixth. This included a question as to whether UNESCO and the UNFCCC are limiting their efforts for climate change education 'to the four walls of the classrooms [*sic*]'. While multiple audience members attempted to advertise their own educational resources, there was no public space with which to share collaborative resources from audience members; overall, it is evident that audience members wanted more concrete resources for including place-based epistemologies in youth spaces.

Attendees of the webinar series also had their own chance to characterize their understanding of core concepts, including their role in climate governance and education. There were 75 participants during the sixth webinar on Slido, where attendees were posed questions to contribute to a word wall of common answers. First, they were asked to answer: 'How can local and indigenous knowledge and values be fostered in teaching and learning on climate change?' The most common answers were storytelling, collaboration, and experiential learning – but ranged everywhere from 'roleplaying the past' to literacy. Second, participants were asked to identify 'the key messages from local and indigenous knowledge and values to be embedded in climate education'. Respect and 'respect for nature' were the leading answers; however, sustainability, balance, 'live in harmony with land', and 'climate science literacy' were also popular answers.

Discussion & Analysis

Informality, universality, and temporality

We argue that the framing of IEK, LEK, and their practitioners in the webinar series emphasized a condition of informality and universality. While the speakers seemingly had good intentions, the discourse in the sixth webinar does highlight some of the problematic ways in which the UNFCCC and UNESCO have approached local knowledge. The speakers generally regarded IEK and LEK as informal, nature-tied, spiritual, and reciprocal. Indigenous knowledge was described as transmitted through 'non-traditional' means and the divine, built upon an understanding of the rhythms of nature. While commenters and panelists alike stressed the need for a paradigm shift in climate education, their framing of IEK/LEK as 'non-traditional' and 'informal' insinuates that their pedagogical and knowledge production methods are less subject to

standards or scrutiny. In fact, it was argued during the sixth webinar series that IEK and LEK transmission required the bypassing of 'roadblocks' present in conventional education systems. However, given the lack of any specific means of accomplishing this goal or including IPLC perspectives in climate change education and the UNFCCC process, these promises sound like those of the flags of convenience previously analyzed in UNESCO policies. The webinar also argues that self-sufficient, localized economic systems allow IPLCs to ensure respect, stop environmental degradation, and maintain a direct connection with the food they consume. This discourse framed epistemic contributions and ontological orientations as a universal and uniform experience among IPLCs – reflecting the monolithic, essentializing discourse regarding Indigeneity in climate governance spaces. We also problematize the participants – both presenters and participants alike – tendency to repeatedly frame Indigenous knowledge forms as 'ancient' (which was indeed a featured part of the name of the sixth webinar). Not only was this knowledge directly referred to as ancient, but this was also reinforced by the use of past tense verbiage and by the comments of attendees in the Slido. This choice to represent IEK and LEK as a remnant of some former entity reflects a rhetorical 'vanishing' of Indigenous groups. This insight comes in part from the linguistic insights of the term 'lasting' as coined by O'Brien (2010) and described by Davis (2017) as the 'discursive process through which Indigenous populations are framed within local … histories as 'vanishing' by defining Indians based on a singular characteristic' (p. 45). This process operates through iconization and erasure (Irvine & Gal, 2000), through which that singular defining characteristic (in the original definition of the term the discourse surrounding 'last speakers' of a language) is then slowly erased through temporal discourse – creating a 'specific configuration of hyperbolic valorization and enumeration' (Davis, 2017, p. 45). In this case, Indigenous epistemologies are singularized into remnants of 'ancient' knowledge-bearers, which have valiantly lasted to be harnessed by climate governance systems. Much like depictions of 'lasting' in the context of language, this depiction subconsciously evokes a false reality of younger generations' 'failure to acquire' IEK (Meek, 2010, p. 30). It also characterizes IEK and LEK as stagnant knowledge forms, instead of living epistemic systems.

Engagement, access, and representation

Given the decentralized and more accessible nature of the webinar format, it is critical to explore the ability of attendees to directly engage with UN representatives, provide their own input on climate change education, and receive answers to their questions and concerns. Otherwise, the framing of IEK and LEK remains held by hegemonic actors (especially given the representation on the panel) and fails to legitimately engage with a diverse suite of local actors. It is no secret that institutional barriers to the UNFCCC process create accessibility issues whereby IPLCs are structurally barred from meaningfully participating in global climate negotiations (see Comberti et al., 2019; Halgren, 2021; Okereke & Coventry, 2016; Smith & Sharp, 2012). The proliferation of climate education and action in the non-material realm may indeed be a response to the inaccessibility of these spaces, and the potential for empowerment and connection by expanding online learning experiences is remarkable. However, while global access to the technology required to attend virtual climate change education courses and webinars is admittedly becoming cheaper (Barteit et al., 2018), there are still significant technological and logistical barriers to entry – from the need for a computer, the timing of the webinars, and the minimal accessibility provisions in terms of language.

Climate change has devastating effects on the world's poorest and on those in the Global South, and it is representatives from these communities who are often absent or unheard at the highest levels of decision-making. If we think of climate justice as a forward-looking framework for guiding leaders, scientists, and professionals in meeting critical sustainable development goals (Whyte, 2013), it is necessary to continue discussions of how to close the gap of the digital divide and make climate change education as accessible as possible for everyone worldwide (Barteit et al., 2018). Time zones also provided a barrier to attendance. For those residing in the western part of the United States, this meant that a 12:30 webinar took place at 3:30; or for someone tuning in from Fiji, this 12:30 webinar occurred at 2:30 the following day. Of course, the inconvenience of time zones is an unavoidable consequence of conducting a global conference. That the webinars were recorded and are, for the most part, available after the fact, enhances access for those whom the hour was a barrier. However, viewing the recording deprives one of the opportunities to engage with both the panelists and the other attendees of the webinar series.

Even those able to attend and engage with the webinar series faced significant restrictions in their ability to engage with UNESCO and UNFCCC representatives, framings, and questions. While it is unrealistic given the format and scope of the webinar series to expect critical engagement with every attendee, the flaws in the webinars' commitment to audience engagement left these digital spaces feeling like lectures. In practice, the webinars were almost entirely unidirectional spaces of information dissemination which failed to capitalize on the level of engagement possible in decentralized COP spaces. The webinars also repeatedly failed to provide many of the resources requested by attendees and educators present. Even if the webinars did directly address this issue, many of these questions would directly require the input and perspectives of IPLCs, Indigenous educators, and local possessors of ecological knowledge themselves. Given this – and as we discuss further below – the curriculum provided to attendees stymied productive conversations given its failures in representation.

Community concerns

Finally, it is important to note the lacking discussion surrounding whether all IPLCs wish for their ecological knowledge to be brought into conversation with global climate governance – and the problematic ways in which IEK and LEK can be co-opted by corporations and government actors. Biopiracy and bioprospecting are prominent examples of such behaviour – where corporations, academic institutions, and

governments claim ownership of biological resources to commodify them for purposes including chemical production and drug development (Assembly of First Nations, n.d.; Mathur, 2003).[5] In general, the inclusion of IEK and LEK in neoliberal climate governance and corporate settings is 'a two-edged sword' for IPLCs precisely 'because it involves making public an earned system of knowledge and entering into the contested knowledge systems of colonialist corporations' – especially since these communities very often lose control of how their knowledge is used (Hawthorne, 2007, p. 315). This is especially true in global climate governance because given the context of scalar politics it is 'challenging to balance the need for large scale synthesis of [IEK and LEK] with the attention to contextualized knowledge', especially because IEK and LEK are often culturally situated (McElwee et al., 2020, p. 1673).

Conclusion

The UNESCO-UNFCCC webinars demonstrated a dualistic, contradictory nature of the COP27 cyberspace. While IPLCs have previously used (Chia, 2021; MacKenzie & Stenport, 2020; Manga, 2023; McDaniel, 2020; Renzi, 2022) and continue to use digital spaces to engage with the UNFCCC and environmental discourse more thoroughly and authentically, there are still significant limits to the agency of digital spaces. This includes cumbersome logistics, at-times lacking notice, minimal centralization and inclusion in the COP negotiation process, and the fact that cyberspaces remain a tool of established actors with oftentimes more digital imprint than decentralized actors. The digital space therefore provides a redress to the lack of inclusion faced by IPLCs, while simultaneously serving as a source of reproduction for the epistemological inequalities present within this climate governance forum. This is not necessarily an inherent state or characteristic, and no doubt – given that cyberspace is still a relatively recent development – new digital possibilities will continue to emerge. Nonetheless, what we observed represents a precarious contradiction worth addressing. Even when attendees requested resources to harness the power of the digital format to improve the inclusion of LEK and IEK in climate change education in their community, the webinar format remained a primarily unidirectional engagement focused on the narratives of UNESCO and the UNFCCC. So, while we return to Ford et al. (2016b) who tell us that discourses created by international organizations often 'help to regulate new norms, interests, and shared social tasks', it seems that in many cases the discourses surrounding COP help to maintain existing norms, interests, and desired social tasks. On one hand, cyberspaces and decentralized climate governance spaces can be legitimate platforms to share narratives of IPLC agency while working toward environmental justice and the representation of pluriversal cosmological understandings.[6] On the other hand, the one-world ontological underpinnings of the UN and its processes can also co-opt and create content framings in this space.

One significant impact of this one-world ontological treatment of IEK and LEK is the universalization of Indigenous epistemic forms. Cultural biases that inevitably exist in Western scientific thought, coupled with a lack of engagement with Indigenous experts, can and often does lead to inadvertent mischaracterization of so-called traditional knowledge as monolithic (Singleton et al., 2023; Leonard et al., 2020; Kincheloe & Steinberg, 2008). A webinar that purports to discuss 'the values and practices of harmony embedded in traditional knowledge and indigenous communities across the world, and how they help us visualize a post-carbon future' ('UNESCO-UNFCCC Webinar Series', 2022) while failing to collaborate with Indigenous knowledge holders and practitioners runs the risk of essentializing the vastly diverse knowledge systems cultivated by Indigenous communities, tribes, and nations across the world. Essentializing the knowledges of Indigenous Peoples can lead to ongoing harm because, among myriad reasons, it renders homogenous groups that are often quite different in the interest of highlighting a certain ecological ethic that is portrayed as universal to all Indigenous Peoples because it is deemed useful from western scientists' and policymakers' perspectives (Singleton et al., 2023; Berkes, 2018). Although all three panelists to some extent attempted to avoid problematic essentialisms by referencing the specific communities with which each worked, this framing nonetheless becomes problematic where IEK holders themselves are notably absent from the discussion – a fact which received minimal attention from the panelists or the webinar administrators. This essentialization was further evidenced by the repeated emphasis on IPLCs' connection to the 'country' or natural cycles, the 'ancient-ness' of Indigenous knowledge forms, and arguments that IPLCs actively oppose urbanization. While some of these points may be true in specific cases, these characterizations minimize the diverse desires, agencies, and practices of IPLCs to a monolith. This reductionist approach minimizes 'the possibility that Indigenous culture changes with the times and influences of modern life, but still emphasizes their TEK' (Fang et al., 2016, p. 33). This was evident in community responses too, especially those that argued IPLCs can 'roleplay the past' to inform climate change education. The impacts of this reduction were worsened by lacking discussions of the structural inequalities of knowledge acceptance and treatment in climate governance.

Given such, this webinar series and ongoing official engagements amidst the UNFCCC process demonstrate a need for the improvement of inclusion for the various forms of LEK/IEK in nuanced, place-based, and contextual manners. This requires programming in both physical and digital spaces that addresses IPLCs as a diverse group of knowledge possessors and creators, while also ensuring that the voices of these communities are heard directly – and only if they so desire. This process will likely also require burgeoning understanding of IPLCs' diverse, multifarious methods of knowledge production and transmission across various agents in COP. One possible path forward is the intentional and central provision of platforms for IPLCs in the various spaces of COP27 – not just within peripheral events like the UNFCCC-UNESCO Webinar Series, but also in more centralized discourse. Given such, we also recommend that the UNFCCC provides opportunities for digital and non-main floor negotiation discourses to achieve a more centralized role within COP meetings. Doing so would increase equality of access and

democratize the knowledge-creation process of international climate governance. While we acknowledge the failures and inequalities present in COPs and the UNFCCC, given its key importance in climate governance and discourse efforts must be undertaken to engender increased equity within its confines. The works in this special issue also demonstrate that digital *and* physical spaces are key to international climate governance. While the media and academic focus on the physical meetings of COP itself are important, it is critical that similar attention is paid to the digital messaging surrounding the event – especially on topics of environmental justice and epistemic inclusion.

Notes

1. The UN Special Rapporteur on the rights of Indigenous Peoples advocates for the usage of "scientific and technological knowledge" in lieu of "traditional" or "customary" knowledge to "avoid language that devalues the ideas of indigenous peoples" (Calí Tzay, 2022, p. 6).
2. John Law (2015) contends that differing conceptions of nature are not just matters of belief and coding, but rather represent different worlds and realities. Thus, the problem of grappling with this 'fractiverse' of worlds is "Whether to assume the world is one and that we are all inside it; or, instead, to wrestle with the implications that worlds in the plural are enacted in different and power-saturated practices" (p. 128). We argue along with Law that liberal institutions assume there is only one world (the Western one-world world), but this fails to engage with other worlds, epistemologies, and ontologies.
3. The University of Arizona Institutional Review Board determined our research did not classify as human research given the work's contribution to generalizable knowledge, the fact that we do not collect private information outside of a public use dataset, and that no presenter can have a reasonable expectation of privacy for comments broadcast live on Zoom and disseminated by UNESCO itself on YouTube. Given the anonymous nature of the comments posted during this webinar, we do not know the background, personal information, or affiliation with IPLC of non-presenters in the webinar. Still, the authors recognize the need for researchers to go beyond Western research ethics when working within Indigenous contexts and to account for Indigenous research protocols when seeking access, permission, and consent. See David-Chavez and Gavin (2018) for a longer discussion of Indigenous community engagement in climate research and methods for responsible research practices with IPLCs.
4. Specifics omitted to meet journal specifications.
5. For examples look no further than the Mayocoba Bean and the theft by patent of Larry Proctor or the case of the Neem Tree.
6. Marisol de la Cadena's chapter "Uncommoning Nature" in the edited volume *Anthropos and the Material* (2019) provides an excellent overview of the importance of interrupting the "hegemonic partition" in political worlding to create an "ontological opening" (p. 46). The chapter also provides a discussion of the deleterious impacts of the expanding one-world world in environmental politics.

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