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ResilienceMT: Partnering with Rural and Tribal Communities to Cultivate Youth Climate Resilience Engagement

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REVIEW ARTICLE

Academic capture in the Anthropocene: a framework to assess climate action in higher education

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Abstract

Higher education institutions have a mandate to serve the public good, yet in many cases fail to adequately respond to the global climate crisis. The inability of academic institutions to commit to purposeful climate action through targeted research, education, outreach, and policy is due in large part to "capture" by special interests. Capture involves powerful minority interests that exert influence and derive benefits at the expense of a larger group or purpose. This paper makes a conceptual contribution to advance a framework of "academic capture" applied to the climate crisis in higher education institutions. Academic capture is the result of the three contributing factors of increasing financialization issues, influence of the fossil fuel industry, and reticence of university employees to challenge the status quo. The framework guides an empirical assessment evaluating eight activities and related indices of transparency and participation based on principles of climate justice and the growing democracy-climate nexus. The framework can be a helpful tool for citizens and academics to assess the potential for academic capture and capacity for more just and democratic methods of climate action in higher education. We conclude with a series of recommendations on how to refine and apply our framework and assessment in academic settings. Our goal is to further the discussion on academic capture and continue to develop tools that transform higher education institutions to places of deep democracy and innovative climate education, research, and outreach to meet the challenges of the Anthropocene.

Keywords Higher education · Fossil fuel industry · Transparency · Participation · Greenwashing · Democracy-climate nexus · Climate justice

1 Introduction

Calls for higher education institutions to play a more prominent role in the climate crisis are increasingly common and widespread (Barron et al. 2021; Fazey et al. 2021; Hurth and Stewart 2022; Kelly et al. 2022; Kinol et al. 2023; Leal Filho et al. 2021; McCowan 2022; Reid 2019; Steele and Rickards 2021). Higher education institutions have a mandate for "conserving, understanding, extending, and handing on to subsequent generations the intellectual, scientific, and artistic heritage of mankind" (Collini 2012) along with a clear

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responsibility to uphold a public good (Grant 2021; Observatory Magna Charta Universitatum 2020; Sperlinger et al. 2018). Referencing the Anthropocene, higher education institutions are entrusted "to find the cracks and let the light shine with integrity and honesty" (Anderson et al. 2022).

Perhaps no issue rises to the level of universal public good than the threat of climate disruption (IPCC 2023; UNFCCC 2018). Given the economic influence and power of various groups profiting from continued fossil fuel consumption, there is significant potential for higher education institutions to shirk their responsibility and be captured by special interests. Capture can be understood as an outcome of steering the resources and political direction of organizations, movements, or parts of a social structure (Táíwò 2022). At its essence, capture involves power, with a minority interest exerting influence and deriving benefits, often at the expense of a larger group or purpose. The term academic capture has seldom been applied in the context of higher education (Milovanovitch et al. 2018; Okada 2019; Rapach and Wilson 2018) and with no reference to climate change. Academic capture, like regulatory capture (Dal Bó 2006), elite capture (Táíwò 2022), policy capture (Organisation for Economic Co-operation and Development 2017), or institutional capture (Urpelainen and Van de Graaf 2015), are terms that posit the co-option of an initiative or institution having outcomes at odds with a broader public interest. Climate policy has in the past been associated with notions of capture. For example, Stoddard et al. (2021) affirm the emissions curve has not been bent in decades because "among global and national elites, a high-carbon lifestyle has become an entitlement protected through normalization."

The normalization of delayed climate action is the result of the climate denial machine (also referred to as the "climate change counter-movement") characterized by those who promote narratives casting doubt on scientific evidence and the need for rapid emissions reductions (Basseches et al. 2022; Brulle and Aronczyk 2019; Brulle et al. 2021; Dunlap 2013; Ekberg et al. 2023; Grasso 2022a; King et al. 2022a; Kramer 2020; Mann 2021; Supran and Oreskes 2021). Delay is now said to be the new form of denial (Shue 2023). The terms "soft denialism" (Read 2019), "new denialism" (Anderson 2022), and other "discourses of climate delay" (Lamb et al. 2020) imply the acknowledgement of risks but with concomitant behavior not commensurate to the threats.

Academic capture involves many stakeholders associated with higher education whose careers and livelihoods benefit from the denial of the climate crisis and/or delay of climate action. The fossil fuel industry exploits climate denial and delay and benefits through "corporate capture of academic research" (Franta and Supran 2017). The fossil fuel industry is a key player, but only one of many who engage in climate denial, delay, or other forms of obstruction (Dunlap and Brulle 2020; Ekberg et al. 2023). As a result, the priorities of higher education institutions "are increasingly aligned with the priorities of the rich and powerful rather than focusing on the public good" (Kinol et al. 2023). While the role of higher education is described as "essential" to address the climate crisis (O'Malley 2020), critiques of policies and practices within institutions of higher education to better reflect the realities of the Anthropocene are growing. The scholarship is replete with details on the deficiencies of higher education and calls for transforming these institutions to specifically address climate disruption (Alexander 2023; Borgermann et al. 2021; Fazey et al. 2021; Kelly et al. 2022; Kinol et al. 2023; McCowan 2022; Rickards and Pietsch 2020; Rousell 2016). For example, Ehrlich and Diamond (2022) affirm, "Our educational systems are failing to prepare people for existential environmental threats …it drives rather than solves the problems facing us." Read (2023) explains, "universities, of all places, should be leading the way in exploring what authentic ecological thinking means and how it works in practical terms …There is mostly an atrocious failure to centre teaching or research

upon our ecological nature and predicament." Academic capture results in "the illusion of action" (Miliband 2021) while validating modest efforts and justifying procrastination (Lamb et al. 2020).

This paper provides a conceptual contribution by offering a new framework to understand academic capture and establishing a relational empirical assessment to evaluate capture and the potential for climate action in higher education. Our goal is to introduce the framework by outlining the complexity of various causes and contributing factors of academic capture through a synthesis of scholarship. With an understanding of the term, we advance the foundation for an instrument to empirically assess academic capture based on transparency and participation measures and informed by principles of climate justice and the democracy-climate nexus. We view the concept of academic capture as a necessary rationale for our empirical assessment and as a starting point for critical analysis of higher education institutions and their role serving the public good. Our hope is that the introduction of this new framework and assessment will begin a broader conversation on the need to further explore the causes and consequences of academic capture and the methods of evaluating impacts and other dynamics in higher education in the Anthropocene.

2 Causes and contributing factors of academic capture

We recognize the many causes and contributing factors influencing university operations and functionality that can incite academic capture. Academic capture benefits a narrow constituency of higher education administrators, faculty, and the fossil fuel industry through job and lifestyle security, funding for research and overhead, and by safeguarding their status quo. We identify three primary factors influencing the potential for academic capture that include financialization issues with increased reliance on private and corporate funding, the influence of the climate denial machine, and problematic dynamics related to university employee reticence.

2.1 Financialization of higher education

Financialization trends in higher education have resulted in economic inequities to the benefit of wealthy students, alumni, donors, and corporate interests and led to "limited institutional commitments to prioritizing the public good and civic engagement" (Kinol et al. 2023). Financialization of higher education has resulted in increases in the financial costs and returns from endowments, institutional borrowing, student loan borrowing, fueled rising expenditures, and led to a new industrial-scale business model with negative consequences for student outcomes (Eaton et al. 2016).

The stress of financialization is further complicated with the decline in public funding which has made universities more susceptible to academic capture from private interests. In the United States (U.S.), cuts in funding from state governments for higher education over the last decade have contributed to rapid and significant tuition increases and budget shortfalls. Mitchell et al. (2019) found that state funding for public 2- and 4-year colleges in the U.S. declined more than $6.6 billion for the decade ending in 2018. Globally, public funding for higher education in the Global North was as a whole essentially stagnant for nearly a decade up to 2018 (Williams and Usher 2022).

With increasing costs and the decline in public funding comes the need for support from many entities including private donors and corporate interests. In their study of U.S.

higher education private philanthropy over 30 years from 1988 to 2018, Shaker and Borden (2020) report a 175% overall increase in support, especially for public institutions. Capeloto (2020) reports the majority of public colleges and universities in the U.S. have separate foundations to receive and manage their private donations and that state laws are generally unclear about whether public-university foundations are subject to disclosure requirements. Bader (2019) found few higher education institutions have any formal policies or best practices to ensure that donor agreements specifically respect faculty governance and academic freedom. The issue is pervasive in some institutions with Franta and Supran (2017) referring to the "colonization of academia" by corporate interests.

Much has been written about neoliberalization trends in higher education and the ties to current financialization issues (Mintz 2021). Neoliberal policies from ideological tensions between education as a public and a private good and the "student-as-customer" orientation and have led to the "the death of American universities" whereby "universities become corporatized …to make sure that labor is docile and obedient" (Chomsky 2014). The 1971 Powell Memorandum explains in no uncertain terms the motives of corporations and industry seeking to control the economy from leftist inclinations and capture public opinion by exerting influence over the institutions including academia (Brulle 2020). University administrators minimize actions that risk the reputation or status of an institution to safeguard budgets and recognize the need to focus on growth in enrollment stressing market logic and a customer satisfaction model to degree earning (Schulze-Cleven and Olson 2017). The result is "academic capitalism" with universities functioning like economic enterprises that aim to maximize their revenues and/or advance their economic competitiveness (Jessop 2018). Higher education institutions that maintain close ties with the fossil fuel industry may incur not only substantial reputational risk, but they may also violate their own policies and principles and undermine their social and academic mission.

2.2 The fossil fuel industry and climate denial machine

Evidence continues to grow that higher education institutions are profoundly influenced by the fossil fuel industry (Almond et al. 2022; Bader 2020; Franta and Supran 2017; Grasso 2022a; Sharmina 2022). Mayer (2017) reports on the use of "dark money" to influence "hiring decisions" and exert control in universities. Increasingly, partnership with the fossil fuel industry is eroding confidence in the commitments of institutions toward climate action, leading a number of them—including Princeton University in the U.S.—to cut all ties with the industry and divest from fossils (Stand.earth 2021). A recent report by Kumar (2023) evinces the strong ties between American higher education institutions (e.g., University of California, Berkeley; the University of Illinois at Urbana-Champaign; and George Mason University) and the fossil fuel industry have been abundantly lubricated by money with roughly $680 million donated or pledged to 27 U.S. universities between 2010 and 2020 from BPAmerica, Chevron, ConocoPhillips, ExxonMobil, Koch Industries, and Shell. These companies have hidden, trivialized, and distorted the science of climate change for decades (Mann 2021; Oreskes and Conway 2011). In the European Union (EU), Ferguson and Matthews (2023) found that fossil fuel companies have provided more than $330 million into EU universities since 2016 resulting in influence over course offering and degree programs. Evidence related to American, Canadian, and British universities' energy research centers shows that those funded by the fossil industry are more favorable to gas than to renewables, whereas centers less dependent on fossil money have the opposite attitude (Almond et al. 2022).

The fossil fuel industry is but one player of many who engage in climate denial, delay, and other forms of obstruction and are motivated by profit through unfettered economic growth. Climate obstruction refers to the campaigns and policy actions led by well-organized and financed networks of actors who include fossil fuels and other major corporations (including conservative media outlets) and their trade associations, conservative philanthropists and their foundations, conservative think tanks, public relations firms, and various front groups and coalitions (Dunlap and Brulle 2020). The fossil fuel industry is a key driver behind many of these groups who finance, support, and actively engage in climate denial, delay tactics, or other forms of obstruction and engage in "predatory delay" that impedes change from unsustainable and unjust systems purely for the sake of profit (McKibben 2019; Steffen 2016).

While the impact of a deluge of money spent to encourage predatory delay is not predictable, the scientific community fears a "funding effect," with a statistical correlation of climate obstruction outcomes to the sources of funding (Krimsky 2013). Although fossil fuel companies present themselves as sustainability leaders, their fossil investments continue to be enormously greater than their investments in renewable energy, which represent only a small percentage of their total capital expenditures (International Energy Agency 2020). Therefore, the fossil industry's claim to lead the energy transition bears no factual credibility. Academic institutions collaborating with this industry are contrary to commitments to the public good, antithetical to the core academic and social values of higher education, and may undermine an ability to address the climate emergency. The fossil fuel industry and its key partners work in academia to support climate denial, delay, and obstruction by creating and maintaining favorable academic programs, endowing academic chairs, providing educational support for students, and generally steering academic activities toward efforts that oppose climate action (Brulle 2020).

Even though science incontrovertibly validates the point that no investment in new fossil projects is possible in order to limit global warming at a safe level (International Energy Agency 2021), the major fossil fuel companies continue to plan new extraction projects that are incompatible with the goals of the Paris Agreement (Kühne et al. 2022). To this end, fossil fuel companies are increasingly using new, sophisticated, and highly effective communication and public relations strategies (Si et al. 2023). These observations are consistent with Supran and Oreske (2021)'s notion of "fossil fuel saviorism" and involve the advancement of arguments favoring "non-transformative solutions" in which technological optimism, and "all talk-little action" discourses are dominant. These arguments include long-term net zero commitments and short/mid-term sustained fossil expansion that promote a greater reliance on gas as a matter of energy security. Greenwashing strategies, such as emphasizing companies' offsetting practices and using nature-evoking visuals in advertising, are also central. All of these tactics serve to delay truly transformative action on climate. Obstructionist discourse has served to strengthen oil and gas companies' hegemony and dictate a future entrenched in fossil fuel use (Wright et al. 2022). Overall, the influence of the fossil fuel industry could be one of the most telling, yet largely unnoticed, reasons why universities—traditionally quite sensitive to Big Oil's desiderata—have not yet prioritized research on fossil fuel phase out.

2.3 University employee reticence

Academic capture may also be influenced by university employee reticence. Hansen et al. (2023) refer to "scientific reticence" where members of the academy shirk their

responsibilities to communicate threats while posing the questions, "Are we scientists not complicit if we allow reticence and comfort to obfuscate our description of the climate situation? …As professionals with deep understanding of planetary change and as guardians of young people and their future, do we not have an obligation, analogous to the code of ethics of medical professionals, to render to the public our full and unencumbered diagnosis?" Scientists working in academia are criticized for their reticence, which has been identified in some contexts as a "community norm" (Oreskes 2020). Brysse et al. (2013) affirm "scientific reticence with respect to global warming is a consequence of the charged political context in which climate scientists operate" and report on systematic bias by climate scientists who "err on the side of least drama."

Reticence at any higher education institution can be tied not only to the previously mentioned influences of financialization and the climate denial machine, but also due in part to the challenges of the culture and internal governance structures within the university. Capture is about disproportionate power, and many universities have a culture of advantaging and promoting some people and some ideas while explicitly disadvantaging, excluding and disregarding other people and their ideas. Much has been written about the power dynamics between faculty and administrators in higher education (Kater and Burke 2022; Ginsberg 2011; O'Meara 2011). Bess and Dee (2014) describe the rising conflicts between faculty and administrators due to competition for resources, extensive oversight through performance monitoring systems, and differences in prioritization of multiple competing goals that results in "negative repercussions" whereby "faculty and staff fear retribution if they speak too forcefully in opposition to an administrative initiative." Academic capture has the potential to further exacerbate power dynamics between faculty and administrators straining and influencing access to information and how decisions are made. Ginsberg (2011) highlights the "administrative blight" and "managerial pathologies" that serve to marginalize faculty in carrying out various tasks including personnel and curriculum decisions. Many faculty are influenced by what Simms (2020) refers to as "deep institutional systemic bias" from administrators who can stifle younger academics working on climate change and can be "reprimanded for asking difficult questions by their senior colleagues and supervisors." A culture can proliferate with academics focused more on keeping their jobs than doing their jobs.

Academic administrators are responsible for organizational oversight of the institution and play a critical role in cultivating the culture and shaping its vision. Despite university chancellors or presidents ambitious climate statements on their "deep and longstanding commitment to addressing the realities of climate change" or claims that, "we owe it to our students and their future to do all we can to promote unified action to combat this global threat" (Second Nature 2016), Bearss (2022) found that university administrators in the U.S. are often supportive in words but not in action, with 47% of university respondents indicating a lack of stakeholder buy-in from administration toward carbon neutrality measures and a failure to allocate effective resources to realize goals.

Some academics may also be concerned with blurring the line between expert and advocate, potentially undermining their credibility as objective purveyors of facts and information through more unconventional communications such as news appearances, op-eds, and commentaries (Boykoff and Oonk 2020; Green 2020). Williams (2006) claims that higher education institutions are often suffocated by consensus and conformity which "precludes all but the most determined attempts at truly ground-breaking free thought. …It is not a fear of libel which curtails debate; rather it is the reluctance of many academics to say anything controversial at all." In their national survey of faculty across multiple disciplines at 4-year colleges and universities in the U.S. regarding general attitudes on free expression

and academic freedom, Honeycutt et al. (2023) found that a third of faculty from a sample of assorted disciples self-censor out of concern over the responses of staff, students, or administrators, and 91% are at least "somewhat likely" to self-censor on social media, in meetings, in presentations, and/or in publications. Additionally, Honeycutt et al. (2023) report a significant portion of faculty support punishing their colleagues in ways that can chill expression to create a "spiral of silence" termed "soft authoritarianism and reinforced through formal and informal channels." As a remedy to the dynamics between and within faculty and administrative groups, Kater and Burke (2022) advocate for increased transparency and more participatory forms of university governance.

3 An empirical assessment of academic capture

There is a proliferation of policies and action toward a more democratic orientation to climate planning and implementation (Di Paola and Jamieson 2018; Fiorino 2018; Hanusch 2017; Lindvall 2021; Stehr 2015). Regarding environmental issues, Stehr (2015) argues democratic forms of governance have the best capacity to deal with disputes that can arise and are the most efficient organizational model to generate legitimacy for proposed policies. With respect to climate policy outcomes, Lindvall and Karlsson (2023) find that democracies tend to generate better results than autocracies since, "mass mobilization for climate action …is more likely to occur in open and democratic societies, respecting freedom of speech and freedom of association. In this sense, democracies offer the most hopeful prospects for a sustainable future." The democracy-climate nexus is described as an integral and synergistic union between democratic principles and the potential for climate action (Lindvall and Karlsson 2023). The democracy-climate nexus is based on the conception and supporting evidence that democracies typically produce greater innovation in technology and experience higher levels of environmental performance than autocracies (Deese 2019; Fiorino 2018; Hanusch 2017; Orr 2023).

The democratization of climate planning and policy-making is informed by various principles and frameworks associated with climate justice (Grasso and Sacchi 2015; Robinson and Shine 2018; Newell et al. 2021), energy democracy (Stephens 2019; Szulecki and Overland 2020), climate governance (Dryzek and Niemeyer 2019; Grasso 2022a; Stevenson and Dryzek 2014), and a host of intersectional issues that prioritize the involvement and influence of the most vulnerable populations impacted by climate disruption (Kaijser and Kronsell 2014; Mikulewicz et al. 2023; Versey 2021). Access to information (i.e., transparency) and the ability to influence decisions (i.e., participation) are seen as hallmarks of good governance and democratic processes (Carothers and Brechenmacher 2014; Office of the High Commissioner for Human Rights 2023). Specific guidelines to implement more democratic approaches to climate action that advocate for transparency and participation have been developed by many scholars and practitioners (Asselt et al. 2018; Ataöv and Peker 2021; Goodwin et al. 2022; Initiative for Climate Action Transparency 2020; Selseng et al. 2022). The democracy-climate nexus has been formalized through Article 6 of the UNFCCC that prioritizes six key areas of activity seen as essential factors in addressing the climate crisis that include education, public access to information, and public participation (UNESCO and UNFCCC 2016).

Developing effective, accountable, and transparent institutions at all levels of society is a key component of the UN Sustainable Development Goals (2023) and is repeatedly

highlighted as integral to successful climate action (Grasso 2022b; King et al. 2022b; UN Environment Programme 2019a; UNFCCC 2022a). The right to information and the right to participate are key procedural components of climate justice (Grasso and Sacchi 2015; Robinson and Shine 2018) and are also stressed in the governance of higher education institutions to address climate action (Kinol et al. 2023; UnKoch My Campus 2020). Calls to implement more democratic policies in higher education that specifically strive for transparent and inclusive governance systems are increasingly emphasized as essential elements of climate action planning (Helmers et al. 2021; Kinol et al. 2023; McGeown and Barry 2023; Sweke et al. 2022). Responding to the need to democratize institutions and provide for more transparency and participation, we offer both a framework to understand the potential for academic capture previously discussed, as well as the following assessment to gauge how and in what forms the capture exists in higher education. The empirical assessment is detailed in Tables 1 and 2 with an emphasis on transparency and participation.

Within each table are eight activities that have specific indicators. Each indicator has several proposed questions that can guide and serve as a metric. An accountability index is also offered to designate the primary responsible party or parties for each activity. The indicators are sourced from the literature to provide additional guidance on how targets and metrics, both qualitative and quantitative, could be further refined and developed. The tables are meant to stimulate thought and discussion on the activities, indicators, and questions and can guide the development of specific measurements. We also suggest the exploration of specific weighted scores in the future to more accurately assess academic capture and compare progress longitudinally within and across institutions.

Transparency relates to the full flow of information based on the willingness and ability to disclose relevant data (Hollyer et al. 2014). For the transparency indices (Table 1), we reference the AA1000 Accountability Principles (AccountAbility 2018) created to provide organizations with internationally accepted standards to assess, manage, improve, and communicate sustainability accountability and performance. These principles provide standardized indicators that acknowledge, assume responsibility for, and are transparent in an appropriate and timely manner about the impacts of policies, decisions, actions, products, and associated performance. As a supplement to the framework, the Initiative for Climate Action Transparency (2020) has developed methods of measuring and reporting transparency indices. We offer the metrics used in the AA1000 Accountability Principles (AccountAbility 2018) and the Initiative for Climate Action Transparency (2020) to guide the transparency indices across all activities in Table 1. Additional supporting documentation can include the Enhanced Transparency Framework, a principle component in the design, credibility, and operation of the Paris Agreement "to ensure the transparency of mitigation and adaptation actions and support" (UNFCCC 2022b).

Participation is an essential element of good governance, helping to build trust, communicate expertise, strengthen legitimacy, and close gaps in accountability (Carothers and Brechenmacher 2014; Transparency International 2011; UN Sustainable Development Goals 2023). Effective participation in climate action has three interrelated elements of access to information, direct engagement, and oversight (Transparency International 2011). Participation indices throughout Table 2 are based on the Global Reporting Initiative (2021) General Disclosure Standards that seek to ensure access to and meaningful engagement with all stakeholders. The Global Reporting Initiative provides international standards that help organizations communicate their impacts on many issues including climate change and is described as the world's most widely used sustainability-reporting standards.

Regarding the commitment to "deep, rapid and sustained greenhouse gas emissions reductions in all sectors" (IPCC 2023) and to reduce risk and avert catastrophic warming (Anderson

Table 1 Transparency indices to assess academic capture[1]

Activity	Indicator	Indicator metric/question(s)	Accountable party
1. Commitments	· Pledge of GHG reduction targets and/or zero-carbon goals · Promote understanding of climate crisis through research and teaching[2] · Statement of climate emergency	Has a public pledge been made to reduce emissions annually as per the most current science?[3] Has a zero-carbon pledge been made? Are specific benchmarks and targets identified and accessible? Is the precautionary principle applied? Do faculty provide and promote an accurate understanding of the climate crisis in classroom and in their research? Have senior administrators (e.g., president or chancellor) made or updated a public climate emergency declaration?	Faculty/administrators
2. Curriculum	· Number of courses specifically focusing on climate change	What is the quality and quantity of climate-related curricula across and between disciplines? Is there a core curriculum requirement for all students related to climate change courses?	Faculty/administrators
3. Funding	· Disclosure of fossil fuel funding sources, amounts, and directives[4] · Disclosure of donations to endowments/higher education foundation	Is the source, amount, and directives related to fossil fuel funding fully disclosed? Are donations and investments related to the higher education institution or foundation fully disclosed? Are ESG criteria identified and incorporated in investment policies and procurement decisions?	Administrators/fossil fuel industry
4. Greenwashing	· Evidence of greenwashing in policies or communications[5]	Is there evidence of greenwashing related to higher education research, classroom instruction, policies, or communications?	Faculty/administrators/fossil fuel industry
5. Markets	· Disclosure of offset and credit markets and objectives[6]	Are criteria for assessing the quality of offsets and credits transparent and broadly understandable?	Administrators

Table 1 (continued)

Activity	Indicator	Indicator metric/question(s)	Accountable party
6. Meetings	· Access to Climate Action Team[7] meeting notices, agendas, and minutes	Is the meeting noticed publicly? Is the meeting agenda provided in a timely manner? Are meeting minutes posted publicly and in a timely manner? Do meeting minutes accurately reflect the content of all matters proposed, discussed and decided? Is public comment accurately reflected in the meeting minutes?	Administrators
7. Planning	· Access to Climate Action Plan	Is there a detailed adaptation and mitigation plan with short-term targets/benchmarks and metrics? Is metadata provided and clearly articulated? Are plans updated regularly (annually)?	Administrators
8. Reporting	· Availability of emissions data[8] updates to climate action plan	Are emissions data available per IPCC reporting requirements? Is there an annual report on progress toward targets? Are the short-term targets updated in a timely manner (annually or in the last 2 years)?	Administrators

[1]All transparency indices are based on AccountAbility (2018) and Initiative for Climate Action Transparency (2020) unless otherwise noted

[2]Honeycutt et al. (2023)

[3]IPCC (2023); UN Environment Programme (2019a); World Meteorological Organization (2022)

[4]Climate and Development Lab and Scholars at Brown for Climate Action (2023) and Almond et al. (2022)

[5]Nemes et al. (2022)

[6]Integrity Council for the Voluntary Carbon Market (2023) and Allen et al. (2020)

[7]Climate Action Team is also referred to at various universities as a Sustainability Advisory Council, Sustainability Advisory Committee, Climate Advisory Committee, Climate Task Force, Climate Coalition, and the like. They are often run by sustainability office personnel

[8]World Resources Institute and World Business Council for Sustainable Development (2004), IPCC (2006), and UNFCCC (2014)

Table 2 Participation indices to assess academic capture[1]

Activity	Indicator	Indicator Metric / Question(s)	Accountable Party
1. Commitments	· Ability of all stakeholders to engage with and influence commitments for climate action	Do administrators and faculty ensure climate action processes have adequate opportunities for legitimate participation from all stakeholders? Do faculty and administrators provide opportunities to participate in how climate action data is collected and represented?	Faculty/administrators
2. Curriculum	· Quantity and quality of course offerings · Number of faculty with expertise and degree opportunities in climate change · Opportunity to influence courses and degrees	Do faculty provide at least one course lecture related to climate change? Do faculty prioritize climate science and policy in discussions? Are faculty and administrators actively working on offering/updating degree or certificate programs related to climate change? Do stakeholders (i.e., students) have an opportunity to influence the creation or improvement of courses and degrees?	Faculty/administrators
3. Funding	· Opportunity to provide meaningful input on funding sources and expenditures	Do stakeholders have input on decisions related to funding sources and expenditures? Are stakeholders able to influence investment and procurement policies and practices?	Administrators/fossil fuel industry
4. Greenwashing	· Opportunity to address greenwashing[2]	Do stakeholders have an influence over university communications? Do stakeholders have opportunities to review and alter communications prior to release?	Faculty/administrators/fossil fuel industry
5. Markets	· Determination of offset and credit markets and objectives[3]	Do stakeholders have opportunities to provide input on the quality of offsets and credits?	Administrators
6. Meetings	· Climate Action Team[4] meeting notices, minutes, and agenda	Is membership open to all stakeholders? Are stakeholders actively involved in meeting discussions, decision-making or voting? Can stakeholders add items to a meeting agenda?	Administrators
7. Planning	· Climate Action Plan	Are stakeholders able to participate in and influence planning and implementation processes?	Administrators

Table 2 (continued)

Activity	Indicator	Indicator Metric / Question(s)	Accountable Party
8. Reporting	· Input on annual report progress toward targets	Are stakeholders able to provide input on draft reports before they are issued?	Administrators

[1]All participation indices are based on Global Reporting Initiative (2021) General Disclosure Standards unless otherwise noted
[2]Nemes et al. (2022)

[3]Integrity Council for the Voluntary Carbon Market (2023)

[4]Climate Action Team is also referred to at various higher education institutions as a Sustainability Advisory Council, Sustainability Advisory Committee, Climate Advisory Committee, Climate Task Force, Climate Coalition, and the like. The teams are often run by sustainability office personnel

et al. 2020; IPCC 2023; World Meteorological Organization 2022), a key commitment index is a pledge of ambitious GHG reductions and zero-carbon goals with specific benchmarks or targets that are clearly identified, broadly accessible, and aligned with the most robust science. The UN Environment Programme (2019a) Global Emissions Report urgently warns that global greenhouse gas emissions need to fall by 7.6% each year between 2020 and 2030. Recognizing the great uncertainty in calculating available carbon budgets, Lamboll et al. (2023) stress the need for even faster and greater emissions cuts. Anderson et al. (2022) call on higher education institutions to achieve a 45% cut in emissions by 2025, 75% percent by 2030, and 100% by 2035. There is little evidence to date that reductions of this scale are occurring or even planned at most universities. The assessment of a university's commitment to GHG reductions should include specific short-term targets that acknowledge the need for rapid reductions (Lamboll et al. 2023) while also providing opportunities to apply the precautionary principle (Desing and Widmer 2021; Hoepner and Rogelj 2021). University employees tasked with making and upholding climate action commitments can ensure that all stakeholders are fully engaged in how targets and goals are set and how data is collected and represented.

The assessment also includes indicators of commitments that acknowledge the urgency and severity of the situation by declaring a climate emergency. To date, more than 7000 colleges, universities, technical schools, and community colleges from around the world have declared a climate emergency (UN Environment Programme (2019b). Latter and Capstick (2021) affirm that a climate emergency declaration provides a public commitment on the role of universities as institutions with a responsibility both to act on climate change as well as to shape the broader societal response. As Barratt (quoted in Ryan 2019) notes, "Declaring a climate emergency changes the nature of the urgency in higher education." Climate emergency declarations should also actively involve stakeholders who can help draft the statements and sign on as active supporters.

To assess the commitment of faculty who actively engage and provide an accurate understanding of the climate crisis through unbiased research and teaching, we reference recent analyses by the Foundation for Individual Rights and Expression (Honeycutt et al. 2023). Their survey instrument and methods seek to measure, analyze, and report general attitudes and behaviors related to free expression, academic freedom, and self-censorship of faculty across disciplines. Their sampling framework could be expanded to include adjunct faculty in addition to tenure and tenure-track professors with specific measures on climate censorship in research, outreach, and the classroom.

Indicators on the quality and quantity of climate-related curricula across and between disciplines are also included in the assessment. Hess and Maki (2019) report that the inclusion of climate change as either part of a core curriculum or general education requirement can help to improve awareness of and belief in anthropogenic climate change. Burkholder et al. (2017) has shown climate change curriculum for undergraduate students results in improved climate literacy as well as transferable skills such as interdisciplinary thinking, self-confidence, public speaking, and deeper involvement in climate and sustainability action. Participation in the development and implementation of climate-related curricula should include students and other stakeholders who can provide additional input on new and improved courses, degrees, and interdisciplinary options.

Issues of funding are also assessed including public disclosure of fossil fuel-industry sources, amounts, and directives. Participation indicators provide an assessment of opportunities for stakeholders to provide meaningful input on funding sources, expenditures, and investment and procurement policies and practices. Most of the academic collaborations with the fossil industry focus on energy transition, an area of research that aspires to solve the problems that fossil fuel companies have caused in the first place and continue

to exacerbate (Grasso 2022a). To assess fossil fuel industry funding and disclosure, we reference the decision tree methodology established by the Climate and Development Lab and Scholars at Brown for Climate Action (2023) using their six established discourses of denial. Additional guidance is based on the lexicon- and rule-based sentiment scoring tool applied by Almond et al. (2022) to examine the policy positioning of university-based energy centers towards natural gas. While controversial in its application and admittedly difficult to measure, the use of environmental, social, governance (ESG) criteria is also incorporated in the assessment of financial connections and disclosure in higher education. With new metrics being analyzed and developed using carbon risk scores (Folqué et al. 2021) and broader ESG measures of social equity (Keeley et al. 2022), tools are available to assess the degree to which institutions are engaging in climate-disrupting financial investments as well as procurement practices (i.e., Scope 3 emissions dealing with purchased materials and services as well as Scope 4 emissions dealing with product life cycle).

An assessment of greenwashing related to research, classroom instruction, policies, or communications is provided. Partnerships between higher education institutions and fossil fuel companies play a key role in greenwashing a company's reputation. The academic world provides the fossil industry with the much-needed scientific and cultural legitimacy that is a valuable asset allowing fossil companies to present themselves to the public, politicians, the media system, and their shareholders as agents collaborating with authoritative academic institutions on solutions for transitioning to a low carbon world. Higher education partnerships play a key role in greenwashing corporate reputations by endorsing fossil fuel "solutionism" that claims the industry is "part of the solution" (Lamb et al. 2020).

Greenwashing at higher education institutions is reported to be increasing in scale and scope through policies or media communications (Beveridge et al. 2014; Borgermann et al. 2021; Jones 2012). Borgermann et al. (2021) describe the "reputational benefit" that results from "green positioning" at some universities. Examples of greenwashing in higher education include the marketing of sustainability progress without significant reductions in emissions or a lack of progress on new curricula and degrees (Beveridge et al. 2014; Smith 2022; Vaughter et al. 2015). The fossil fuel industry has also "perpetrated a multi-decade, multi-billion dollar disinformation, propaganda and lobbying campaign to delay climate action by confusing the public and policymakers about the climate crisis and its solutions" (Supran and Oreskes 2021). Equally as deceptive is the use of "greenhushing," defined as the deliberate withholding of information about sustainability practices (Font et al. (2017). University administrators often control external communications through media press releases and can greenwash or greenhush intentions and accomplishments. Faculty can also greenwash their research and misreport their data or choose to change their messaging through scholarship, in the classroom or outreach, or in the evaluation of institutional policies.

To assess various forms of greenwashing, we reference Nemes et al. (2022) who have developed a framework and an actionable tool for analyzing the quality and truthfulness associated with greenwashing including highlighting efforts that seek to delay or distract real solutions. Their framework also assists in the development of practices and communication strategies that avoid greenwashing. Within the assessment, indicators are offered to gauge how stakeholders can play a role in reviewing and providing input on university policies and communications to avoid the potential for greenwashing.

Disclosure on the use and quality of offset and credit markets is another key criterion for assessing academic capture. Stakeholders should have the ability to provide input on the value and efficacy of these markets. Carbon neutrality and net zero pledges are the primary policy objective by which universities seek to decarbonize. However, there is an increasingly critical view of carbon neutrality and net zero goals that rely primarily on the use of offset

markets (Armstrong & McLaren 2022; Bjørn et al. 2022; Cullenward and Victor 2020; Dyke et al. 2021; Hale et al. 2022; Haya et al. 2020; Kemfert 2021; McLaren et al. 2019; Skelton et al. 2020). The offset industry is also under increasing scrutiny with claims the markets do not reliably reduce emissions and provide less incentive to mitigate use and achieve "real zero" (zero-carbon) emissions from fossil fuels (Stoddard et al. 2021; Watt 2021). Moreover, Anderson (2012) claims offsets are dangerously misleading since they almost certainly contribute to a net increase in the absolute rate of global emissions growth.

Even with offsets, the success of emissions reductions appears lacking. Barron et al. (2021) identified 11 universities in the U.S. that claim to have achieved carbon neutrality and found purchased offsets as the single largest source of reductions, with three of the universities seeing their gross Scope 1 emissions (produced on-site) increase from the baseline year to the carbon-neutrality target year. According to Borgermann et al. (2021), carbon offsetting rather than actual reductions is still the preferred climate strategy for many higher education institutes. Helmers et al. (2021) report only one zero emission institution of higher education identified in their global study.

The use of offset markets shows no signs of decline with projected growth globally and across all sectors from $2 billion presently to over $600 billion annually by mid-century (Ma 2023). No single standard governs the carbon offset industry with growing criticisms of exaggerated or misleading claims of the industry (Guizar-Coutiño et al. 2022). The Oxford Offsetting Principles take the position that traditional carbon offsetting schemes are "unlikely to deliver the types of offsetting needed to ultimately reach net zero emissions." Allen et al. (2020) advocate cutting emissions as a first priority while shifting to carbon removal projects that involve long-term storage. If offsets are to be used, the Integrity Council for the Voluntary Carbon Market (2023) is focused on improving the quality of current carbon offset and credit projects and have published their Core Carbon Principles for determining high-integrity carbon credits. This Council is an independent governance body working to ensure that voluntary carbon markets accelerate progress toward the objective of addressing climate disruption. Their ten Core Carbon Principles for high-integrity carbon credits are used to guide our assessment and include specific criteria and metrics for effective governance, offset tracking, transparency, robust independent third-party validation and verification, additionality, permanence, robust quantification of emission reductions and removals, double counting, sustainable development benefits and safeguards, and contribution to net zero transition.

The ability of all stakeholders to access and influence climate meetings and planning processes is a key concept of the democracy-climate nexus that posits more opportunities for direct democracy and renewed emphasis on transparency and accountability (Deese 2019; Orr 2023). The deliberate and authentic participation of the most vulnerable stakeholders in both tactical and strategic climate planning processes is integral to climate justice (Grasso and Sacchi 2015; Robinson and Shine 2018; Newell et al. 2021). There is growing interest through organizational initiatives in developing and implementing specific metrics to better understand the potential for participatory democracy at the democracy-climate nexus.[1] Stakeholders should have access to meeting materials and be encouraged

[1] We note the following organizations and initiatives are proactively exploring opportunities to implement and evaluate the democracy-climate nexus; See for example, the Climate Democracy Initiative (https://www.climatedemocracyinitiative.org/), Westminster Foundation for Democracy (https://www.wfd.org/environmental-democracy), United National Democracy Fund (https://www.un.org/democracyfund/news/empowering-next-generation-democracy-climate-justice), The Democratic Society Climate Democracy Model (https://www.demsoc.org/resources/climate-democracy-model), and The Participation Playbook (https://participationplaybook.org/climate-democracy).

to engage in the design and implementation of planning processes and documents. Climate plans should be updated regularly with metadata that is provided and clearly articulated. Key stakeholders should also be encouraged or formally permitted to have some degree of decision-making or voting authority.

In terms of reporting, the assessment includes provisions on the availability of emissions data, updates to climate action plans, and the ability of stakeholders to provide regular input on progress toward targets and general reporting documents. The lack of transparency in reporting emissions reductions with detailed benchmarks and metrics remains problematic at many higher education institutions (Sweke et al. 2022). Helmers et al. (2021) found only a small number of higher education institutions worldwide are collecting and publishing their carbon emissions data and for those who do, there is limited consistency in collection, analysis, impact measures and targets. A standardized format for measurement and reporting the carbon footprinting of an institution of higher education is lacking, and there remains resistance to implementing sector-wide standards, particularly for the more difficult to quantify Scope 3 and 4 emissions.

For emissions reporting, the need for "openly shared trustworthy data" is critical since many reports lack necessary detail, exploit loopholes, and manipulate data to hide noncompliance (Carlson and Pfeiffenberger 2023). According to Helmers et al. (2021), almost all higher education institutions who do report CO_2 emissions are following a scheme given by the "GHG Protocol Corporate Accounting and Reporting Standard" (herein GHG Protocol). This standard was designed to increase consistency and transparency in GHG accounting and reporting and disclose relevant assumptions, calculation methodologies, and data sources used. Specifically, transparency in the GHG Protocol relates to the degree to which information on the "processes, procedures, assumptions, and limitations of the GHG inventory are disclosed in a clear, factual, neutral, and understandable manner" (World Resources Institute and World Business Council for Sustainable Development 2004).

As a method to develop, certify, and apply GHG emission data, we suggest the use of a standardized template be adopted and used specifically for universities. The standardized reporting in the GHG Protocol requires each party to provide an annual GHG inventory covering emissions and removals of direct GHGs annually with documentation and data to understand the underlying assumptions and calculations of the reported emission estimates. The 2006 IPCC Guidelines for National Greenhouse Gas (GHG) Inventories can also be used for guidance and supplemental metrics (IPCC 2006). According to the UNFCCC (2014), annual GHG inventories should "should be transparent, consistent, comparable, complete and accurate." There are many opportunities to involve stakeholders in the collection and analysis of data as well as the updating of climate action plans including through student lab projects or citizen science initiatives.

4 Conclusions

Academic capture is based on three contributing factors of increasing financialization of higher education, influence of the fossil fuel industry, and reticence of university employees to challenge the status quo. We offer a framework as a conceptual contribution to better understand various limitations and weaknesses in higher education as well as the ability of higher education institutions to serve the public good. The framework serves to guide our empirical assessment detailing eight activities and related indices

associated with transparency and participation issues in academia. The framework and assessment can also serve as a catalyst to create policies that prevent the proliferation of capture and promote the potential for climate action in higher education.

We recognize that there are multiple ways to measure, analyze, and report the various indices related to academic capture, and we encourage a concerted discussion, debate, and further refinement around our framework and assessment. We also encourage the expansion of additional indicators, specific numerical and written/qualititive metrics, and benchmarks incorporating weighted scores, and the inclusion of additional factors such as financial flows and more subjective assessments related to the values of various stakeholders. Additionally, we would urge organizations and academics to assist in refining, testing, and implementing our framework and assessment. Ultimately, higher education institutions in UNFCCC Annex 1 parties with the highest cumulative emissions bear the brunt of the responsibility to develop, implement, and refine the framework.

We also recognize the challenge that lies ahead for higher education institutions and offer this framework with humility cognizant of the scale of transformation required for universities, let alone society as a whole, to effectively respond to the climate crisis. Yet, we also propose that universities themselves should be examples of deep and profoundly authentic centers of democratic practice. Members of the academy should serve as society's greatest proponents of research, pedagogy, innovation, and integrity. Academics have a duty, as Chomsky (1967) claimed in his essay, *The Responsibility of Intellectuals*, to speak the truth and advance the boundaries of debate. Chomsky (quoted in Allott et al. 2019), reflected back on his essay by referencing the climate crisis stating,

> "climate scientists, and in fact scientists generally, certainly have a responsibility to make the public aware as much as they can of the significance of scientific results. But it's not just their responsibility. It's everybody's responsibility. We are now facing a real existential crisis. The possibility that organised human life may continue on anything like the scale that we now know is very much threatened".

Scientists working in academia, whose "clients are all humanity," have a "sentinel obligation" to alert society to threats, particularly when public tax dollars are involved (Oreskes 2020). Perhaps as Chomsky (1969) noted in his essay, *The Function of the University in a Time of Crisis* essay, "To the extent that reform does not reach the heart of the university, the content of the curriculum, the interaction between student and teacher, the nature of research, and, in some fields, the practice that relates to theory, it will remain superficial." The function and responsibility of academia is to avoid academic capture and engage in reform founded on the courage to warn humanity while engaging in transparent and participatory truth-telling. It is the *raison d'etre* of the academic community. As Gay (2023) proclaims "Universities must remain independent venues where courage and reason unite to advance truth, no matter what forces set against them."

The anticipated and desired outcomes of our academic capture framework and assessment are multifaceted: to improve policymaking at all levels of higher education; to more explicitly address complex and long-term challenges associated with climate action planning across academia; to encourage cooperation through better understanding of the challenges of the climate crisis; to mobilize and engage all stakeholders on campus and nearby communities; to enhance the capacity of higher education institutions to practice more democratic forms of governance; to motivate the next generation of university employees and students; and, perhaps most fundamentally, to rapidly reduce emissions and provide an example to society of both innovation and inspiration. The successful implementation of the framework and assessment means enhanced transparency and

participation in democratic processes related to climate action. Addressing the inadequacies and pathologies associated with academic capture requires the courage to act, often in the face of resistance from peers. Only with courage can institutions of higher education truly be the responsible stewards of truth and knowledge benefiting present and future generations while collectively navigating the challenging and uncertain path in the Anthropocene.

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Data availability The authors confirm that the data supporting the findings of this study are available within the article and its supplementary materials.

Declarations

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