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To cite this article: Keri Facer (29 Aug 2024): Educating the temporal imagination: Teaching time for justice in a warming world, Educational Philosophy and Theory, DOI: [10.1080/00131857.2024.2378086](https://doi.org/10.1080/00131857.2024.2378086)

To link to this article: <https://doi.org/10.1080/00131857.2024.2378086>



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Published online: 29 Aug 2024.



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Educating the temporal imagination: Teaching time for justice in a warming world

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ABSTRACT

Climate change has been called both a ‘slow emergency’ and an ‘urgent crisis’, it creates tensions between human and non-human temporalities, it asks some communities to ‘speed up’ and demands others slow down, and requires choices between present needs, historical responsibilities and future consequences. If students are to understand and confront climate (in)justice, then a ‘temporal imagination’ (Adam, 1998) is required that is alert to the ways that time is central to the politics of a warming world. This paper therefore explores how ‘teaching time’ can support the awareness of and attention to (in)justice. The paper discusses the limits of current approaches to teaching time in education and explores a range of practices for developing ‘temporal attunement’ (Jensen, 2023) that can be found in public arts, Indigenous education, educational philosophy, futures studies and decolonial praxis. It maps out five temporal educational practices of: relational time; rhythm; anticipation and reparation; temporal suspension; and critical time keeping. It argues that these practices can be put into dialogue as a basis for a ‘temporal pedagogy’ that comprises three moves: *interruption* (of habitual and dominant temporal frames and their production of injustice), *attention* (to the latent, situated, plural timings and rhythms of the situation), and *encounter* (through invitations to judgement about the temporal practices that should govern more just collective action in response to climate change). It concludes by working through an example of how such a pedagogy might be deployed to negotiate the conflicting temporalities of socio-ecological change.

ARTICLE HISTORY



Received 9 May 2023
Accepted 23 June 2024

KEYWORDS

Climate change; time; pedagogy; sustainability

1. Introduction

The last thirty years have laid a firm foundation for demonstrating the centrality of time, timing and rhythm to social life (Adam, 1990; Alhadeff-Jones, 2023; Baraitser, 2017; Birth, 2012; Lefebvre, 2004; Sharma, 2014). This work, across sociology, philosophy, critical time studies and rhythmanalysis (amongst others) foregrounds the fact that time cannot simply be considered an unchanging uniform backdrop to our lives, but might better be understood as a situated, relational phenomenon that emerges at the intersection of geological, biological, cultural, political and psychological factors. The timing mechanisms we deploy—whether the time of the body, of the clock, of the seasons, or of the accretion of carbon dioxide molecules in the atmosphere—determine what we pay attention to and what we value. These mechanisms in turn regulate bodies and organisations,

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bringing different actors into alignment and excluding others, privileging certain actors and marginalising others. Over time, these practices collectively create ‘timescapes’ characteristic of different societies, organisations and places that we come to see as natural (Adam, 1998). It is through this naturalisation of timescapes that social rhythms are established—synchronising, coordinating, and alienating (sometimes violently) the diverse temporalities of life; drawing or obscuring our attention to different matters of concern (Lazar, 2019; Nanni, 2012). The unjust effects of temporal naturalisation and the inequalities that dominant timescapes can produce, are particularly visible in the field of climate change, where the different speeds of action and inaction, the dominance of particular rhythms of life and the felt experience of temporal lags and delays are producing material injustices for human and non-human communities.

This paper argues that the socially constitutive nature of time demands attention and consideration by educators interested in teaching in a warming world. Its aim is first, to make the case for the importance of the temporal imagination in understanding injustice in a warming world, and second, to outline the form that a temporal pedagogy capable of cultivating this imagination might take. It draws on examples of my own and other’s artistic and pedagogic practice to gesture towards new possibilities. It recognises that teaching time in the Anthropocene is a matter for both formal education and informal learning, and speaks to those who consider themselves ‘educators’ in both settings.

While not an empirical paper, it is based upon a decade of desk research and ongoing artistic and pedagogic experiment as well as encounters with other educators, artists and thinkers grappling with some of these questions. These have included: arts-based experimental practice with students and educators designed to surface attention to rhythm in life experiences; experimental workshops facilitating dialogues around educational futures; a study of teachers’ attitudes to time and teaching in schools; a study of university professors’ teaching of time in history, geology, physics, social sciences; and a currently live project studying the temporality of sustainability transitions in relation to rivers and waterways. For a more synoptic account of time and education, there is a growing body of literature alongside which this paper might be read, for example: recent special issues on time in Education Studies journals (Schmidt-Lauff, 2023), and on education in Time Studies journals¹; new monographs on Time and Education (Mikulan & Sinclair, 2023); and Michel Alhadeff-Jones work in adult education (Alhadeff-Jones, 2023).²

2. Time, climate change and the necessity of a temporal imagination

The question of time is critical to understanding what it means to live and act in a warming world (Nichols, 2019). It is implicated in debates over how we should respond to ecological and climatic challenges and constitutes many of the obstacles to the collective political capacity to find liveable strategies for change (Anderson et al., 2020; Bastian & International Association for Environmental Philosophy, 2012). Time is central to questions such as: how to balance the rights of young people, future generations and ecologically vulnerable communities with adults for whom climate problems may not be felt for many years if at all (Adam, 1998; Adam & Groves, 2007); how quickly can and should high carbon workers ‘transition’ to low carbon work and who should pay the costs of a speedy transition (ILO, 2022); how can the timings of political decision-making and political constituencies confront the temporality of ecological tipping points (Lenten et al, 2019); and indeed, at what point should responsibility for the current predicament be determined to begin—with colonialism, with industrialisation, with the emissions of the last decade? And who therefore should pay for the damages?

Different temporal framings generate very different definitions of the nature of climate change and of the collective responses required. Activist Bill McKibbin, for example, argues that ‘the contrast between two speeds is the key fact of our age: between the pace at which the physical world is changing and the pace at which human society is reacting to this change’ (cited in Bastian & International Association for Environmental Philosophy, 2012, p12). Such an analysis

demands haste, urgent action, intervention; justice is seen to lie in speed. This is often the language that is adopted in schools and by student climate movements. In contrast, decolonial scholars Vanessa Andreotti and Bayo Akomolefe question the very language of haste that underpins such urgent calls, arguing that this is itself part of the problem and proposing instead that 'the times are urgent, we have to slow down' (Akomolefe, n.d.; see also Haarstad, 2023). As Indigenous communities see lands and waters being taken for large-scale industrial windfarms and megadams, the unjust effects of the deployment of the language of speed and apocalypse become clear (Ulloa, 2020). Indeed, Kyle Whyte makes the case that the language of future climate catastrophe ignores the fact that for many colonised peoples, 'the apocalypse has already happened' an analysis that prioritises reparations and care for vulnerable communities over industrial solutions to carbon reduction (Whyte, 2018). Differences like this draw attention to how timing mechanisms and temporal frames act as a source of conflict and form of invisible power, privileging and obscuring different courses of action, with highly uneven outcomes for different actors (Lazar, 2019).

No timing mechanism or timescape, in other words, is either 'natural' or inevitable. No speed is the 'right speed' or the 'right time'; climate justice will not be achieved by everyone speeding up or slowing down. Slowing down phase-out of petrol cars in rich countries to maintain economic output, for example, means low-lying vulnerable communities will more rapidly have to adapt to rising sea levels. Rather, the challenge is to become aware of how different habits of thinking with time both blind and draw attention to different aspects of climate change and its consequences. Making visible this plurality and attending to these different timescapes surfaces the pluriversal realities we inhabit and the uneven consequences of different temporal frameworks for setting policy and making change (Escobar, 2020). Such 'temporal attunement' makes visible how different time frames and calendars structure our capacity to work with each other and impede our mutual understanding (Jensen, 2023). Temporal awareness, then, can create a multifaceted understanding of the climate challenge, sharpen attention to the forms of domination and power at play, and open opportunities for dialogue across different temporal frames. For educators in schools and informal educators working in the field of climate action, cultivating a temporal lens to help analyse and develop responses to the situation, is therefore important if we are to surface issues of climate justice with the students and communities in which we are working.

This attentiveness to the role of time in structuring problems and shaping collective responses can usefully be called, after Barbara Adam, a 'temporal imagination' (Adam, 1990; author, 2023). Adam's coinage is inspired by the work of geographer David Harvey and sociologist C. Wright Mills who elaborated the concepts of the 'geographical imagination' and 'sociological imagination' (Harvey, 1990; Mills, 1959). In so doing, they were arguing that fully understanding both space and society required a troubling of individual assumptions, an attention to wider patterns of spatial and social arrangements, and a concern with how such patterns produce and reproduce injustices. The form of imagination they invoke, in other words, is analytic and action-oriented, focused on both making visible and addressing inequalities. In Aisling O'Donnell's terms, we might think of this practice of imagination as 'embodied, associational, productive, constitutive of desire and affect, and capable of transformation'. (O'Donnell, 2022: 637).

My aim in this paper is to argue that cultivating the 'temporal imagination' in relation to climate change is an educational matter and to propose that it requires a practice that we might call 'temporal pedagogy'. In so doing, I start from the assumption that such an imagination is not a divine gift but a skilled activity (Kind, 2020), that can be cultivated (Zittoun & Gillespie, 2016), and that can develop in both richness and fluency (Wilson, under review). Equally, I start from an assumption that if time is a situated and contested phenomenon (Baraitser, 2017; Nanni, 2012; Pschetz et al., 2022; Sharma, 2014) then the educational intention here is not to 'master' time or learn to tell 'the right time'. Rather, its aim must be to enable students to get past habitual understandings to see the many rich and sometimes contested

temporalities at play at once, what Jansen (2023) calls ‘temporal attunement’, and how these are producing or disrupting patterns of injustice. More than this, a temporal pedagogy adequate to helping students explore what it means to live in the complex and contested temporal frames of climate change also requires a pedagogy capable of creating publics. In other words, a pedagogy that can bring into being the recognition precisely that the temporal frames deployed by students and politicians, scientists and activists are non-inevitable, diverse and contested and demand collective discussion and judgements about how we might ‘go on together’ (Biesta, 2012). It asks us to make visible what is lost and gained, *who* loses and who gains, as different temporal frames and rhythms are selected to coordinate action and to make a judgement about how these might be changed.

Following this, the educational imperative in cultivating the temporal imagination in teaching climate change could be understood as supporting students to:

- provincialise and challenge habitual conceptions of time in relation to climate change – allowing students to see their own and others’ temporal frames as political, situated and provisional, arising from a complex of social and biophysical rhythms and traditions – and therefore open to both examination and, potentially, reconfiguration;
- attune them to the multiple temporal frames and timescapes present in any socio-ecological situation – deepening their capacity to notice polychrony and indeed pluriversity in the present, as well as the injustices that the dominance of certain timescapes produce; and
- enable them to engage in dialogue with others who use different temporal frames and practices to respond to climate issues – creating a new foundation for political debate rooted not in the inevitable assumption of the primacy of certain temporal frames, but treating these as a basis for dialogue, empathy and the mutual co-construction of more just temporal arrangements and practices for shared existence.

3. Teaching time in schools and climate education

Time, however, is rarely the focus of explicit intellectual inquiry in the classroom (Saul, 2020). Formal education is characterised by a naturalised timescape that structures time as a resource, progress as standardised development trajectory, and by a fragmented curricular and pedagogic engagement with time. The timescapes of contemporary educational institutions function as forms of invisible power that obscure and discipline (sometimes violently) diverse, embodied temporalities and rhythms (Franch & Souza, 2015; Gibbs et al., 2014; Kearnes & Rickards, 2017; Mikulan & Sinclair, 2023; Papastephanou, 2014). In the field of classroom and curriculum studies, beyond the use of time as measurement device, the debate over ‘teaching time’ across literature, history and science is dominated by a concern with students’ grasp of chronology—particularly the ‘correct’ sequencing and measurements of events in narratives and historical change (e.g. Hodkinson & Smith, 2018; Hoodless, 2002; Trend, 2001; Vivas-Moreno et al., 2021). While all disciplines have their own temporal orientations and tools for the study and use of time, e.g. the use of time-use surveys, the measurement of geological eras, the attention to rhythm in poetry, their function is not primarily to draw critical attention to temporal complexity, but to examine another subject, e.g. how people live, when eras start, what meaning is being made in this poem.

Moreover, as Lingard and Thompson have argued, much educational research tends itself to be caught within its own unexamined conception of time as linear, sequential progress and with debates oriented towards the equity and efficiency of its allocation and distribution (Decuyper & Simons, 2020; Lingard & Thompson, 2017 see also Argenton, 2015). One overview of time studies in education, for example (and despite describing the contemporary world characterised by ‘temporal disorder’) concluded its analysis with a demand that we prioritise

teaching the ‘linear temporal expectations of professional settings’ (Duncheon & Tierney, 2013). This is no surprise to critical time scholars. Indeed, temporal myopia is often described as a key function of schooling, as Kevin Birth argues:

‘we typically end our education about time in early primary school grades, and never really return to the topic. What this means is that what we learn about time is merely a conventional representation of time that is useful for managing primary school students and future workers. Undo the representation, and one increases the possibilities of thinking about time. (Birth, 2022)

The attention to time in climate education (where climate education exists, and it remains rare and marginalised (Monroe et al., 2017)) is patchy and at times, confused. The recent crowd-sourced curriculum for climate change developed by the ‘Teach the Future’ network, for example, frames climate change as both a ‘social and ecological crisis’ (a temporal framing that implies a disruption to otherwise linear temporality); as requiring ‘systems thinking’ to engage with ‘complex and non-linear interactions in time and space’; and as requiring attention to anxiety over ‘uncertain futures.’³ The relationship between and indeed incompatibility of, these temporal framings is unexamined. The most recent review of climate education, equally, pays no attention to how time is taught, something that is thrown into stark relief when we see that the spatial elements of climate change—specifically the concern with localising the curriculum to student experience—are seen as a high priority (Monroe et al., 2017). Growing concern for students’ eco-anxiety is, nonetheless, beginning to raise temporal questions and there is significant interest in the pedagogies that might enable students to imagine alternative futures to address this anxiety or, in reverse, enable adults to become ‘good ancestors’ (Ojala, 2015, 2017). Sutoris’ recent ‘Educating for the Anthropocene’ is characteristic of this, with its claims that: *What is needed is nothing short of a wholesale reimagining of the future, and this requires education that helps us envisage alternative futures* (Sutoris, 2022). Despite temporal urgency motivating many in this field, however, the temporal assumptions underpinning the framing of climate change (not least in the reliance on climate models as the key indicator of urgency rather than, for example, measures of poverty or hunger) remain too often invisible; the effects of temporal frames and rhythms in structuring and impeding our collective shaping of responses to a warming world then, are insufficiently examined (although see Cole, 2022).

Given the limited attention to time and timing in mainstream education, then, it is little surprise that citizens and politicians, scientists and activists are poorly equipped to both notice and attend to the temporal tensions that shape collective responses to climate change and the injustices that it is producing. How, then, might we ‘teach time’ in ways that cultivate the temporal imagination, both in schools and also, increasingly urgently, in the public settings where debates over our collective responses to climate change are becoming highly charged around questions of climate justice.⁴

4. Towards a temporal pedagogy

Answering this question requires us to look beyond current schooling practices. Four main fields of practice and theory offer potentially generative responses: (1) Indigenous pedagogy and scholarship that is challenging western, modernist conceptions of time and linking relational temporal frames to concepts of environmental stewardship; (2) Public and participatory arts practices which are at the forefront of experiments in attuning participants to diverse and often more-than-human (plants, land, animals, fungi) forms of time; (3) Educational Philosophy as this has long been a site of reflection on the relationship between time and pedagogy; and finally (4) Futures Studies and Critical Time Studies, because both are developing a theory and practice of teaching critical reflection upon time through concepts such as ‘futures literacies’. The borders between these fields are porous and there is significant cross-fertilisation—as we see, for example, in a practice such as Indigenous Futures Studies. Many draw on other traditions—from the

Sociology of Expectations to Science and Technology Studies to Critical Heritage Studies. Not all of these, moreover, can be interpreted strictly as educational practices, they operate in settings as diverse as community based education to social arts to government offices. What follows, in other words, is not an attempt at an objective or comprehensive taxonomy of such practices, but an active selection from these fields of promising leads to follow for the cultivation of the temporal imagination. I cluster these practices around 5 key speculative questions that draw attention to the different aspects of time and temporality with which they are concerned.

4.1. Practices of relational time: What if time is situated and relational, entangled with more-than-human others?

Both Indigenous knowledge traditions and public ecological arts practices are drawing attention to the limitations and blindspots of anthropocentric time frames, and aim to sensitise students/participants to the deep times of the land and highly diverse temporal frames of the beings with which they are entangled. The Bawaka Country collective, a collective of Datiwuy elders, community members and academic geographers, for example, propose a pedagogy which invites participants to confront a world in which 'time is not abstract, it is not empty, it does not exist separately from human and more-than-human worlds'. (Bawaka Country et al., 2016). In Kich'wa pedagogies, Giaconda Coello tells us, the future is 'a story told between the people of the past and the people of the present and everyone/everything around' (Coello, 2021, 45). In contexts lacking such land-based temporal relationships, public arts practitioners are drawing attention to more-than-human temporalities—the installation of a moon clock on the Thames, Olafur Eliasson's placing of huge blocks of melting ice outside the COP summit in Paris, Una Chaudhuri's 'Whale Fall', which invites participants to move through the body of a dead whale to transform themselves 'into active and joyful participants in the great cycles of decomposition, regeneration and rebirth that are the gifts of our planet's oceans'.⁵ This invitation to engage with more than human temporalities is also present in the thought experiments of scholars and writers who ask readers to explore what it might mean to live in the distributed, sympoetic world of octopus time (Borkenhagen, 2023; Godfrey-Smith, 2016) or in the deep times of stones that reframe our own existence as a form of 'geological life' between fossil layers (Yusoff, 2013; Yusoff & Gabrys, 2011). These practices are not necessarily comfortable bedfellows and derive from highly diverse ontological and cosmological assumptions—they are all, however, offering opportunities to explore what it might mean to notice the temporal frames and rhythms of a world that exceeds the human timescape and locates the human in a dynamic world of relational time.

4.2. Rhythmic practices? What if habitual rhythms of life could be changed and disrupted?

Other practices draw attention to the rhythms that hold existing societies in place, inviting consideration of what might happen when such rhythms are disrupted or remade, and to attend to subordinated rhythms. Michel Alhadeff-Jones, building on traditions of rhythmanalysis (Lyon, 2019), describes this attention as a form of 'rhythmic intelligence' (Alhadeff-Jones, 2023) and proposes practices that draw attention to both periodicity and patterns of change. There is also a wide range of techniques that stimulate this sort of attention to and disruption of rhythm. These include the CChange project which invites groups of people to spend 30 days changing one habit in their lives in support of climate justice, and talking with each other about the barriers they experienced to address this.⁶ This short rhythmic disruption makes strange the rhythms of industrial lives that are harmful to social and ecological flourishing (Shove, 2010; Southerton, 2020). A more radical interruption can be found in the practice of wilderness quests, designed as ritualised pedagogies to pull participants out of their lives' daily habits, and to

carry them through significant life transitions (a demand that is, of course, already well met in cultures and traditions that have retained living rites-of-passage work (Shaw, 2019)). Other practices play with the ultimate rhythmic disruption, namely, the encounter with death. Joanna Macy's grief work (Johnstone & Macy, 2012), and arts practices such as the Extinction Gong or Day of Remembrance for Lost Species, for example, invite explicit attention to the ending of ongoing rhythms and demand reflection on what it might mean that some of the rhythms of our worlds are already ending⁷. In a very different setting, queer performance practices also question habitual temporal orderings and rhythms of life and create, in Elizabeth Grosz' analysis, a form of 'temporal drag' (Grosz, *quoted in* Freeman and Groom (2022)).

4.3. Anticipatory and reparative practices: What if we paid attention to diverse futures and pasts?

Sensitivity to the way that futures and pasts shape and inform perceptions of the present are a focus of practices in both Decolonial and Futures Studies. They invite us to ask whose ideas are shaping our visions of futures and pasts, which futures and pasts we attend to, over what time scales, based on what assumptions? These questions are at the heart of the longstanding practice of Futures Education (Hicks, 2002; Kim & Dator, 1999; Miller, 2018; Slaughter, 2012), and Futures Literacy (Bol & de Wolf, 2023; Mangnus et al., 2021), as well as speculative design (Selin, 2014), participatory climate fiction (Hannah, 2019); (Stripple et al., 2021); utopian action research and participatory futures workshops (Gayá & Brydon-Miller, 2017; Jungk & Müllert, 1987; Ramos, n.d.). They sit at the heart of reparative futures (Sriprakash et al., 2020) and decolonising futures work, such as the work of the Makhanda Black Kollektive, or Pupul Bisht, whose participatory storytelling with BIPOC communities in the US and girls in Mumbai (amongst others) is proliferating narratives from those historically excluded from dominant accounts of the future.⁸ Equally, traditions of Afro-futurist and Indigenous Futurisms in academic scholarship, science fiction, film-making and digital media offer powerful tools for pluralising and enriching the imagination of the future.⁹ These futurisms challenge linear temporalities, demand an exploration of how thinking with 'futures' can be a sensitising resource for critical reflection upon the history of colonial practices in the present and the possibility of new pathways to equality (Schultz, 2018; Womack, 2013).

4.4. Practices of temporal suspension and immersion: What if we tuned in to the present?

Attention to time can be dominated by a concern for the future and the past at the expense of the present. This is challenged by another set of traditions designed to sensitise us to the rich complexity of what both Donna Haraway and Roberto Poli, from very different traditions, describe as the 'thick present' (Haraway, 2016; Poli, 2019). In Sharon Todd's work, we see calls to move beyond an 'amnesiac' (Todd, 2022) attention to the present that characterises short-term thinking and presentism, to draw on both Buddhist and western humanist traditions to sense into the histories, tensions and depths of the always ongoing, always unfolding moment. Mika Bresolin proposes a pedagogy of scale, that conceptually opens up the subject to the impossibility of grasping the present moment in its entirety, drawing attention to the 'the cracks, the swirls, and the sudden openings in time, in here and now' (Mika-Bresolin, 2023, p. 8–9). Attending to the 'richness of the meanwhile' (Facer, 2016), given a mind that constantly time-travels to pasts and futures (Zittoun & Gillespie, 2016), however, takes intentional effort. Disrupting this time travelling is at the heart of practices such as meditation, but we can also see it in Jan Masschelein's 'poor pedagogy', which invites university students to walk cities along arbitrary lines, encouraging a dropping away through tiredness of old or expected ways of seeing, to

allow new forms of perception to arise through a fresh confrontation with what is emerging in the now (Masschelein, 2019). It is also part of creative practices that invite slowing down, to attend to the intake of the breath that anthropologist Tim Ingold describes as precisely the ‘moment of thought’ (Ingold, 2011) As poet Jason Allen-Paisant argues: ‘through poetry I can stop, listen, observe and participate, rather than simply react. [...] Poetry’s gift to me is a sense of deep time, and that is its sense of wholeness, of connection. Poetry is a reclamation of time. Of connection, rather than reaction. (Allen-Paisant, 2021) Such an invitation to ‘stop, listen, observe and participate rather than simply react’ is a practice that responds to Akomolefe’s argument that ‘the times are urgent, we have to slow down’. (Akomolefe & Benavides, n.d)

4.5. Practices of critical time-keeping: What if we measured time differently?

And finally, we are seeing a flowering of practices that help us to engage with the politics of time-making and time-keeping (Lyon, 2023). This takes many different forms, but its key features are to estrange students or public participants from the familiar time-keeping techniques. Kevin Birth for example, describes how he invites students to turn in assignments variously in relation to Christian, Jewish, Chinese, French revolutionary and personal calendars; invites students to explore why the clock in the classroom is divided into 12 numbers, 60 min, and why the hands turn ‘clockwise’ (Birth, 2022). This sensitisation is also visible in public arts such as the subtly subversive Corpus Christi Chronophage in Cambridge, a large street-level public clock that plays off digital/atomic time against the mechanical time of the clock, and foregrounds the inevitable threat of the end of time by enlarging the traditional grasshopper mechanism to a giant form, showing it as a monster that progressively eats through the seconds.¹⁰ In contrast, Katie Paterson’s ‘Future Library’ in Oslo comprises not a collection of books, but a set of secret manuscripts donated by authors and a forest which will be cut down in 100 years time to make the paper for the future publishing of these books.¹¹ We are also seeing the proliferation of a whole series of specific ‘clocks’ designed to challenge conventional timing mechanisms, from the famous Doomsday Clock marking humanity’s proximity to catastrophe, to the Clock of the Long Now marking time over millennia.¹²

These different clusters of temporal practices make visible that we have choices about how we might teach time and offer an insight into the diversity of approaches that we might adopt. Each provides a distinctive set of questions that we might want to consider as we seek to become more discriminating in our temporal imagining.

Practices of relational time	Rhythmic practices	Anticipatory and reparative practices	Practices of temporal suspension and immersion	Practices of critical timekeeping
Who are the different actors in this place and what are their time frames, rhythms and timing mechanisms?	What rhythms and arrhythmia am I part of?	What images or assumptions about futures and pasts are we working with? Which do we take for granted?	What is unfolding now?	How is time measured and by whom?
How does my timeframe relate to those of others in this place?	Where are practices synchronised or out of step? Whose rhythms ‘don’t fit’?	How might other stories of futures and pasts change how we see the present?	What if we paused for a moment, assumed we have time to think?	What deadlines and calendars are being used and why?
	What is opened up or closed down if these rhythms are disrupted?	When does this story start and when do we imagine it finishing?	What can we notice in the silence?	What counts as a clock?

What, then, is temporal pedagogy? Is it just any of these practices? In many ways, yes; they all offer practices to shift our perception of time from an invisible medium to the forefront of our attention. If we return to my earlier definition of the temporal imagination as (1) the provincialising and unsettling of habitual conceptions of time, (2) the attunement to the multiple temporal frames and processes in a situation and the injustices these are producing, and (3) the participation in dialogue with others who deploy different temporal frames and practices, however, something more may be needed.

That something more, I suggest, lies in two areas. First, if educators are not simply to replace one mode of thinking with time with another, the challenge is to deploy these practices in dialogue with each other. Drawing them into relationship with each other and understanding their traditions of thinking with and about time, helps us to recognise a *repertoire* of temporal lenses, to assist us in making conscious choices about the tools we wish to use to discriminate the workings of time in the world, as well as the potential epistemic consequences of these choices. Second, however, if the attention to justice implicit in concepts of geographical and sociological imagination is not to be lost, educators also need to create conditions to confront the tensions and contradictions in the timing mechanisms, rhythms, frames and timescapes we come to discern. A critical feature of temporal pedagogy, then, must also be a practice of public pedagogy in the sense described by Gert Biesta; namely, a pedagogy that provokes a public into being not only by inviting attention to latent plurality, but also demanding dialogue and indeed decision, on how we might act collectively in our common world in recognition of that plurality (Biesta, 2012). Temporal pedagogy in service of the temporal imagination in conditions of climate change, then, is not simply inviting us to trouble our assumptions, to attend to the socially constituted nature of time, or to experience and encounter the pluriversal temporalities of the world, but an invitation to participate in a dialogue about the timing mechanisms and frames that are being deployed to frame our understanding of climate change, their implications for climate justice, and how these might be otherwise. This is a practice that Jensen calls ‘temporal deliberation’ (Jensen, 2023

To elaborate one form this might take I finish with an embryonic example that combines a series of experimental temporal practices. This is not intended as proof of what temporal pedagogy can achieve, but as a gesture towards one of the many forms that it might take. The focus of this work is also oriented towards the foundational worldviews and ontologies that underpin climate change, rather than the immediate challenges that it presents.

It is a cold autumn day, a few hundred miles north of Stockholm in the university town of Uppsala. A group of people are gathering outside the pink castle, on a hill covered in beech trees rapidly carpeting the ground with yellow leaves.¹³ They are clustering outside the city’s art museum in response to an invitation to join a new form of dialogue about the future of the River Fyris that wends its way through the town. They are local politicians, students, interested members of the public, art lovers, academics. Many of the same group, the week before, had joined in a series of guided walks, which invited attention to the ancient lives of the lichen growing on the city’s trees, to the strange history of sheep farming at the castle, to the dynamic changes in meadow planting in the city’s public spaces (Mendy et al., 2019). Today, they enter the cool white basement of the castle for a talk by a local scientist on the life of the river that flows through the town and that is subject to significant debate about its future. They hear, from him, stories of the billions of life forms in each drop of water, of the many actors shaping the rhythms and flows of the water, they might also have heard of the river as a confluence of different timescales—some drops hours old, others thirty years old, depending on their passage through rocks and stones to arrive in the river.¹⁴

After the talk, the participants leave the castle and follow the path along the edge of the river, they are invited to attend closely to what they are seeing. The group is asked to stop from time to time to sense the rhythms of the flows of people, boats, traffic, water, attentive to the time of year and the changing of the seasons.¹⁵ They are called to listen to the birds and the trees, to notice the flow of rubble from a local building site pouring into the current. There are invitations to meditation, an attention to inner rhythms, a pause for thought. Participants talk

of how the river has changed and is changing, the complex times of exponential growth of algal blooms as the waters heat up and nitrate enters the river from the changing rhythms of farmers' lives. They wend their way for an hour or so along the riverbank, in talk and in silence, reflecting on the pasts and possible futures of the river, before turning through the fields and allotments to the old white art school building. Once inside, they form a 'Council of All Beings' each group taking on a different role and temporal experience in the river, telling stories of what it means to be part of these flows, where each of their stories will start and will end, where their rhythms are in conflict as farmers, bacteria, reeds, ducks, the sailing community, swimmers, fishermen play out their cycles.¹⁶ And as the council speaks, participants take turns to sit in the role of human witness, observing these tensions, these rhythms, considering whose voices are heard and whose ignored, what frames dominate our understanding of the river and what is lost in this process—and they are invited to make judgement—what does it take to care for this river? Whose rhythms matter? What timeframes should be used for actions in relation to the river? What can be done collectively? In the days that follow, I hear stories from the councillors of a deepened relationship with the river and of immediate action taken to stop the pollution from the building site. I hear of collaborations begun between artists and scientists.

This is not intended as an exemplary case, and it was never intended to stand as proof of what a temporal pedagogy might achieve, but it serves as a pointer towards one constellation of practices that might begin to cultivate the temporal imagination in relation to the complex social and ecological challenges of a warming world. First, the guided walks and the talks by biologists, invited participants to encounter the temporalities of more than human others, creating an interruption of habitual anthropocentric temporal frames. Second, the walk along the river, and the practice of the council of all beings encourages attentiveness to competing rhythms at play in this situation. Finally, the 'council of all beings' practice, demands reflection on what counts as justice for the different actors in relation with the river. This demand constitutes an invitation to move beyond the observation of simple difference, towards a statement of how things might have to become otherwise and begins to gesture towards a form of collective deliberation over what might constitute more just temporal regimes in relation to this river and its inhabitants.

5. Conclusion

Time is a situated, contested and political practice that defines matters of concern and structures the perception of possibility. Understanding temporal frames, rhythms and practices is essential to both confronting and recognising the workings of injustice in a warming world. Addressing temporal injustice, then, demands a 'temporal imagination' and the cultivation of this temporal imagination, should be a concern for both educators and those working in climate and environmental action.

The present limitations of our approach to both sensing and working with time in relation to climate change is, however, informed by an unreflexive and fragmented approach to 'teaching time' in schools and by the dominance of a standardised, clock-based, future-oriented timescape. To explore how we might take a different approach we can turn to practices in Social arts, Futures and Critical Time Studies, Indigenous Education, Environmental Humanities and climate activism. These, together, offer practices that might assist educators to challenge temporal assumptions and open up attentiveness to the ways that time, timing, rhythms and frames are at play in the world.

What we might call 'temporal pedagogy'—namely a pedagogy explicitly oriented towards cultivating the temporal imagination in pursuit of justice—however, will require the deployment of these techniques as part of a conscious repertoire, in which the origins and consequences of exploring time through these lenses are part of the discussion. Equally, temporal pedagogy requires not simply the recognition of difference but an invitation to explore, together, how

we might create common actions in the light of plural and at times conflicting temporalities and temporal frames. The previous section offers one example of how such a pedagogy might be deployed to explore, together, how more just temporal arrangements might be made. Taken together, these contributions aim to help educators and those concerned with climate and ecological action, to think through the present limitations of, and future possibilities for, teaching time to address climate injustice.

Notes

1. https://journals.sagepub.com/pb-assets/cmscontent/TAS/TAS_Teaching_time_CFP-1635332687.pdf
2. <https://www.sunkhronos.org/blog/spaces-times-the-rhythms-of-adult-education-research-symposium-series>.
3. <https://www.teachthefuture.uk/tracked-changes-project>.
4. See, for example, the debate over 15 minute cities: <https://www.newstatesman.com/ideas/2023/08/15-minute-cities-car-free-working-class-nightmare>.
5. Ice watch: <https://www.tate.org.uk/whats-on/tate-modern/olafur-eliasson-and-minik-rosing-ice-watch>; <https://www.dearclimate.net/installations/whale-fall-feast>; See also - Follow the Leaders: <https://theworld.org/stories/2014-03-26/what-politicians-debating-global-warming-will-look-soon>
6. <https://www.bristol.ac.uk/education/news/2022/cchange-ambassdor-input.html>.
7. See the extinction gong here <https://vimeo.com/369832497> and the day of remembrance for lost species here <https://globaldimension.org.uk/calendar/remembrance-day-for-lost-species/>.
8. <https://www.decolonizingfutures.org/>; <https://makhandablackkollektive.com/tesf/>; see also the film 'the soul's journey', which was recently used as evidence in a court case concerning offshore exploration in South Africa. <https://unworldoceansday.org/events/international-premiere-of-the-animation-indlela-yokuphil-a-the-souls-journey-when-indigenous-and-scientific-knowledge-work-in-solidarity-towards-inclusive-ocean-decision-m-2/>.
9. The breadth of the Afro-futurist movement can be seen in the recent exhibition at the National Museum of African American History and Culture, <https://nmaahc.si.edu/explore/exhibitions/afrofuturism>. See also the rise of the African Futures Institute, with specifically Africa-led futures practices at the forefront: <https://www.africanfuturesinstitute.com/>.
10. Chronophage: <https://www.corpus.cam.ac.uk/articles/secrets-corpus-clock> – given the deeply unsettling nature of the clock it is no surprise to read it was recently subject to a hammer attack.
11. Future Library: <https://www.futurelibrary.no/>.
12. Doomsday Clock <https://thebulletin.org/doomsday-clock/>; Clock of the Long Now: <https://longnow.org/clock/>.
13. Both activities are part of a series of events that I developed in collaboration with CEMUS, the Centre for Environment and Development Studies at Uppsala University and the Museum of Modern Art in Uppsala. Their overarching objective is to foster university-community dialogue in relation to climate change and social adaptation responses.
14. This observation was in fact offered to me by Penny Johnes, Professor of Hydrology a few years later, but I include it here to foreground the ways that different temporal frames can be made visible in these processes.
15. This process was led by Pella Theil & Henrik Hallgren.
16. <https://www.rainforestinfo.org.au/deep-eco/Joanna%20Macy.htm>.

Acknowledgements

This paper has benefited from the careful reading and comments of three reviewers as well as from discussions with doctoral students and colleagues at the Universities of Maynooth, Uppsala, KTH, SLU and Bristol and as part of Climaginaries series and Time and Adult Education network.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This paper was supported by the British Academy 'Times of a Just Transition' Global Convening Programme (GCPS2\100005) and by the ESRC 'Sociodigital Futures Research Centre' (ES/W002639/1).

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