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EMERGENCY TECHNOCENTRISM

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ABSTRACT

Elementary requirements for physical sustainability demand very rapid rates of decarbonisation. Within the environmental movement solutions have been sought through both ‘ecocentric’ and ‘technocentric’ approaches, one emphasising fundamental social and lifestyle changes, the other relatively superficial technical changes. In recent years, much scholarly attention has been paid to ecocentric measures, symbolised by the UN Sustainable Development Goals, and this has dominated teaching of ‘sustainability’ in higher education institutions. Using simple physical analogies, the article argues that there is a severe mismatch between the ecocentric approach and the physical requirement for rapid decarbonisation. Instead, a series of provisional technical measures appear necessary, which the authors call ‘Emergency Technocentrism’. The central paradox is that while this conclusion should be obvious, it is widely ignored and even disparaged in many scholarly circles, and greatly affects the tone of HE teaching. The article examines the reasons for the divergence of the ecocentric and technocentric perspectives, and finds that they tend to attract different kinds of practitioners, and develop surprisingly different assumptions and worldviews. Some basic principles are suggested for dealing rationally with the present environmental emergency, and it is suggested these should form the basis for a new approach to teaching and research in higher education.

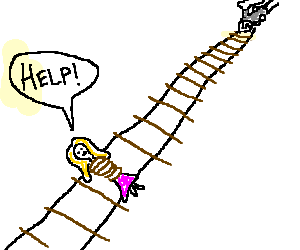
KEYWORDS:

Climate emergency, sustainability, ecocentrism, technocentrism, environmentalism, eco-modernisation, planetary boundaries, environmental education, institutional culture

THE PROBLEM AND THE PARADOX

The significance of the climatic temperature threshold of 1.5°C is widely apparent. The question is whether, and how, humanity will take steps to avoid crossing it. The timescale is short, with the IPCC recommending reduction of greenhouse gas emissions to net-zero by 2050 (IPCC, 2018). This is a change from positive growth of emissions at around 3% a year, to a *decrease* of about the same rate, maintained for thirty years – and even more rapid reductions (up to 10% a year) in wealthy economies (PWC, 2019). At present rates, the allowable global ‘emissions budget’ will be exhausted by 2030. The global situation is therefore both serious and urgent, so it is natural to ask what this implies for climate policy, and how it is to be approached within the Higher Education sector.

The climate crisis is often characterised as a ‘wicked problem’ (Stang and Ujvari, 2015) yet the underlying logic is paradoxically simple and illustrated graphically in Figure 1.



NO NO, USE A KNIFE, CUT HER FREE!

I’M UNDOING THE KNOTS

Figure : Cartoon representation of the underlying debate

At the risk of labouring the obvious, a person tied to a railway track is easily released simply by untying the knots. This is the preferred strategy if there are no trains, or if it is known there are none due. However, if a train *is* due, or indeed actually approaching, the ‘untying’ strategy is too slow. A faster, perhaps less elegant, strategy is necessary.

In the view of the authors, this represents the debate within the wider sustainability community. In one corner, as it were, we have those who might be called ‘knottists’, with a careful, humane ‘ecocentric’ approach [[[1]](#endnote-1)]. In the other corner we find a more ‘technocentric’ tendency arguing for a decisive switch of strategy, to a more brutal ‘never mind the niceties, cut the \*\*\*\*\*\* rope’ approach. We shall argue for the latter view, [[[2]](#endnote-2)] and spell out some of its implications. We shall label it ‘Emergency Technocentrism’ (ET).

The whole field is riddled with paradox [[[3]](#endnote-3)], but the most immediate paradox is simply this: If Figure 1 does represent the underlying logic of the situation, why cannot ‘knottists’ recognise the obvious need for a change of strategy?

PERSONAL BACKGROUNDS

By way of context, we should say a little about our backgrounds. The authors have been personally and professionally involved in environmental and ‘sustainability’ problems for many decades

( ). At first, they shared a general consensus within lay environmental circles, that the modern consumerist project is not compatible with biospheric stability; and that only a profound reorientation of lifestyles and aspirations would deliver a permanent solution. This might well have been, and indeed might still, be the case. However, in the intervening period, global-scale problems of physical sustainability have become worse, not better, and we appear to be running out of time. The question now is whether to re-emphasise the need for cultural shifts (faster un-knotting), or switch to an ‘emergency’ rapid-response mode based on technology and infrastructural changes (sharper knives, faster cuts).

TWO DISCOURSES

Although the two approaches are in principle complementary, this is not what we observe. There are two *separate* discourses, each with its associated community. One emphasises cultural, holistic, bottom-up ‘micro’ measures, the other top-down, focused, ‘macro’ technical measures. The first of these tends to be the domain of social scientists, the humanities, subjects such as Education for Sustainability, and social movements such as Transition Towns. The second tends to be the domain of physical scientists, engineers, civil servants and policy analysts. The two are compared in some detail in Table 2. To some extent these two ‘schools’ pursue their themes in cheerful ignorance of each other, and It is unusual to find active researchers ‘crossing the line’. But we have done so, and for good reasons that we hope to present in this article.

We shall argue that although both tendencies have played significant roles in the development of modern environmentalism, there has been a substantial cultural and institutional divergence – possibly reflecting of a long-standing schism in elite culture (Ortolano, 2009). Each contains self-reinforcing processes that have accentuated initial differences. The contrast between the two approaches can be expressed by sampling their activities and concerns. Table 1 shows a selection of session topics from the 4th conference on Sustainability in Higher Education in Swansea, 2019, and a contemporary list of topics from the UK Committee on Climate Change technical report *Net Zero* (2019).

|  |  |
| --- | --- |
| Items from SHE Conference 2019 | Items from CCC *Net Zero* Report |
| Nature and wellbeing  Global citizenship  Farmers Markets  Team teaching  Bike sharing  Sustainable fashion  Becoming a forest  Parenting  Permaculture | Abating direct emissions from ‘hard-to-decarbonise’ homes  Accelerated electrification and the GB electricity system  Bioenergy with carbon capture and storage,  Non-CO2 abatement in the UK agricultural sector by 2050  Zero Emission HGV Infrastructure Requirements  Power and Hydrogen  Low-carbon options for aviation and shipping  Reducing emissions from the waste sector  Low-carbon heat networks |

Table : Examples of typical categories of concern from the ecocentric tradition (Left) and the technocentric tradition (Right)

The differences in mood between the two lists in Table 1 are striking, but it will be almost certainly argued that they could be complementary, and apply to different agents within society: the left-hand list to individuals, households and small groups or businesses, while the right-hand list applies to government and industry. ‘Horses for courses’. Why can’t we do both?

Of course, in principle we can. However, as the authors will argue, the two tendencies have settled on mutually exclusive prescriptions and tend to be dismissive of each other’s potential roles. The ecocentric school would regard the technocentric approach as shallow and self-defeating: the ‘Old Lady Who Swallowed a Fly’ writ large. The technocratic school would argue that the ecocentric approach has proven too slow, and diffuses attention and activity across too broad a range of peripheral concerns.

In particular, the two approaches attach radically different meanings to the word ‘sustainability’: one is broad and ‘literary’, the other narrow and ‘literal’. This has a bearing on the character of teaching and research in sustainability in higher education, and is one of the reasons we have engaged in this debate.

Within universities, we have found that the term ‘sustainability’ and the academic niches associated with it, are largely occupied by the ecocentric school. Colleagues in other fields assume that this particular interpretation of the term is fully agreed and uncontested: a broad enlightenment project that aims to conduct the whole world to various ‘sunlit uplands’. It is undoubtedly attractive, and it is no wonder that many university staff outside the strict field of sustainability, have accepted it as ‘the consensus view of the specialists’. It leaves little room for the discussion of rapid technical transformation which we regard as logically and physically essential. Meanwhile, intrinsic conservatism within universities delays engagement with these necessary issues, and it takes a great deal of time and energy to establish a different agenda (Harper, 2019). This is time we do not have. The clock is ticking louder and louder.

We have been compelled therefore, to adopt a more combative stance, and to suggest that the holistic view on its own is inappropriate for tackling the real physical problems of sustainability. How did it come to this? How has one view become so extreme?

EXPLAINING THE DIVERGENCE

In some ways it is puzzling that such a difference has occurred, given that (arguably) both aspects could be complementary. As with many divergences, perhaps this goes back to a central narrative or metaphor, often referred to as a *paradigm* (Lakatos and Musgrave, 1990) on which whole worlds are subsequently constructed.

There are several candidates for such a founding narrative. One is this: that the seeds of environmental destruction are found in the secular, analytical mindset that emerged in the 17th century Europe, often labelled ‘the Enlightenment’. This was, is, essentially a mechanistic programme, able to create larger and larger technical processes that eventually escape control and – potentially – could destroy the earth.

This is a compelling narrative, but it is interpreted in two incompatible ways. On the ecocentric side, it is argued that a complete alternative programme to the basic mechanistic approach, must be found. On the technocentric side it is argued that once the ‘modern world’ created by the enlightenment project, has come into being, the only way to control it is through constant adjustments and interventions, largely of mechanistic kind. Here is the divergence in a nutshell. The ecocentric school wishes to rewind the tape of history to where we took a wrong turn, and *then* proceed; the technocentric school argues that we need to humanise, or perhaps ‘ecologise’ what we already have; this, the ecocentrics argue, simply cannot be done; to which the technocentrics reply, the dissolution of modernity is equally impossible, or at least impractical and certainly unethical, in the short timescale of the climate crisis.

We can essay a quick history of each tendency and how each embedded itself in a self-regarding world. Quite apart from the intellectual assumptions regarding the significance of the Enlightenment, there are bound to be social identity effects that are impossible to fully escape (Tajfel et al., 1979; Turner and Reynolds, 2010). Further, the sheer cultural differences between the two cannot be ignored, visible between the lines in Tables and 1 and 2 (Snow, 1959; Ortolano, 2009). Two cultures indeed!

THE TECHNOCENTRIC SCHOOL

In a larger sense the roots of ‘modernity’ go back far beyond the enlightenment (Henrich, 2020) but the physical impacts on climate are clearly due to growing populations, economic activity and amplifying technologies (Ehrlich and Holdren, 1968), notably of energy, all of which are permitted by the successful enlightenment project to ‘crack the codes’ of the universe: we know (roughly) how the physical world works, and this allows us to manipulate it on a large scale, a characteristic feature of technocentrism (McKibben, 1989; Merchant, 2019).

This code-cracking led to the industrial revolution, probably the key process in the modern predicament. Despite some *bien pensant* grumbling (Blake, 1804; Cobbett, 2005) the industrial revolution was immensely popular, permitting rapidly rising standards of living, and eventually highly effective political patterns such as social democracy. It is important to understand that the sheer filth of industrialisation was not generally regarded as a regrettable cost, but became celebrated as symbolic of newfound security and prosperity (Figure 2).

Figure 2 A Soviet-era poster. The text reads: "Factory Smoke: The breath of Soviet Russia"

Nevertheless, in the post-war period the physical downsides of heedless modernity were becoming obvious and this marks the beginning of modern environmentalism (Vogt, 1948; Bookchin, 1962; Carson, 1962; Platt, 1968). There followed a proliferation of NGOs, government agencies, regulations and inspectorates, along with new training programmes, jobs and careers (Turner et al., 1990).

We can see here the emergence of a professionalised environmental ‘movement’ emphasising technological responses to what are essentially physical problems. It reinforces itself through professional advancement, legislation, huge flows of money, and many undoubted achievements. To this movement can be credited solutions to many ‘classical’ environmental problems: urban air quality, acid rain, eutrophication, lead in petrol, toxic materials in paints and other products, bathing water quality. It also achieved the ‘repair’ of the infamous ozone hole, the establishment of nature reserves and other protected areas on land and in the sea, regulation of food additives, improved food security and supply, and widespread reduction of carbon intensities in energy supply and other industrial processes.

The technocentric programme tries to mitigate problems that emerge from the general trajectory of human development without fundamentally challenging the process. For this reason, it is sometimes labelled ‘eco-modernisation’ (Mol, Sonnenfeld and Spaargaren, 2009). It does not overly concern itself with underlying causes; it prefers to fix physical problems as they arise.

While this technocentric approach has achieved much, it struggles with global problems dominated by collective-action effects (Olson, 1965; Hardin, 1968), sometimes described as ‘market failures’ (Stern, 2006). These include climate/greenhouse emissions and biospheric integrity. These are indeed the present challenge and we shall return to them later.

THE ECOCENTRIC SCHOOL

The ecocentric critique is as much cultural as physical, drawing on a long tradition starting perhaps with the Romantic movement in the 18th century (Berlin, 2000) and continuing through the 19th (Ruskin, 1993; Morris, 1985; Kropotkin, 1974) and 20th (Schumacher 1973; Kohr, 2001; Illich, 1973). The critique is fundamental, aimed at most of the core features of modernity, those that have made it so successful: reason, quantification, instrumentalism, hierarchy, specialisation, science, analysis, growth, logic, data, convergent thought, record-keeping, individualism, materialism, reductionism, automation, technical complexity, machine metaphors, prosperity, extrinsic values and so on. There is an underlying feeling of a Faustian bargain, where humanity has gained material riches, but lost its soul (Lachman, 2017).

It is rather striking that to a large extent, the ecocentric world has not tried to cherry-pick the good and reject the bad: it has striven to create a complete anti-world which celebrates features directly opposite or antithetical to the technocentric world. It is a historical curiosity that this tendency arose on the fringes of western societies in the 1960s and 70s, and was then labelled ‘alternative’ (Roszak, 1969; Saunders, 1975) but is now much more widespread and indeed has captured a large part of the lay environmental movement and many teachers in higher education. It has created a special broad-spectrum meaning for the widely-used term ‘sustainability’. Key features are:

* An emphasis on demand, rather than modifications of supply
* Lifestyle change rather than applications of technology
* A sharp distinction between the Natural and the artificial
* Nature regarded as both sacred and fragile
* Direct engagement with the natural world: Deep Ecology
* Anti-authoritarian politics, equality, diffusion of power
* Decentralisation, self-sufficiency, community self-organisation
* Interest in pre-modern and non-agricultural societies
* Simpler technologies, voluntary simplicity
* Hostility to both markets and command-and-control economic systems
* Hostility to economic growth; steady-state or degrowth patterns favoured
* Holistic, intuitive perspectives, divergent thinking, emergent properties
* Intrinsic rather than extrinsic values, quality of life rather than standard of living
* Interest in esoteric and earth-centred spirituality or religious traditions
* Low-tech/organic food production, concern for ‘wholesome’ food
* Willingness to entertain apocalyptic/social collapse scenarios
* Conflation of mitigation and adaptation
* Susceptibility to conspiracy theories and fringe science

All this hangs together remarkably well as a coherent world-view. It is easily able to maintain its integrity through in-group reinforcement and the simple heuristic ‘whatever they do, we do the opposite’. Unfortunately, this generates an antipathy to *any* technocentric interventions, even of the obviously emergency kind represented by Figure 1. [[[4]](#endnote-4)]

Our difficulty should now be plain. We, the authors, are not unsympathetic to the ecocentric case and the ecocentric programme. But the current situation demands a rapid response, and it is difficult to see how broad-spectrum, holistic cultural programmes could bring results in time. A series of temporary technical fixes are more plausible, so we need to spell out how these might be applied, and what the implications might be.

It is probably fair to say this represents a divergence from the mainstream technocentric agenda, which is not very proactive, and finds strategic transitions difficult. Our rather distinctive approach might be labelled ‘Emergency Technocentrism’ (ET). As university teachers, we are concerned to introduce this emergency programme into university curricula as fast as possible. We believe that universities have a unique role to play in providing the necessary change-makers, along with appropriate skills, analysis and research (Harper, 2019).

A GENERAL OUTLINE OF THE APPROACH

Emergency Technocentrism strives to be rationally coherent and to match the requirements of The Situation. It focuses on severe global problems with incipient thresholds and aims to prevent the crossing of the thresholds with subsequent risks of irreversibility. It recognises two broad classes of such global problems:

* Global Heating, and associated knock-on effects (i.e. climate change in all its manifestations)
* Biodiversity/ecosystem services, and associated effects

The Biodiversity issue has been the Cinderella of sustainability debates, even though the UN Convention on Biodiversity (CBD) was signed at the same time as the Framework Convention on Climate Change (UNFCCC) in 1992. Attention to the matter has grown since the advent of the ‘Planetary Boundaries’ conceptual framework (Steffen, 2015), where at least five of the Planetary Boundaries concern what are broadly referred to as Ecosystem Services (ES). The conventional abbreviation is now BD/ES.



*Figure 2: Planetary Boundaries (Steffen et al., 2015. The sectors marked with solid red circles constitute ‘ecosystem services’. It can be observed that many of these exceed climate change in terms of boundary transgression.*

These two groups of problems have to be ‘solved’ in parallel, because they both risk serious irreversible conditions, and rather soon. Fortunately, many effective measures address both problems, and it is this subset that must be pursued. The windows for action are 20-40 years for entire world (Rockstrom et al., 2017), 10-20 years for the UK (CAT, 2013, PWC, 2019). ET recognises that these are collective global problems that cannot be fully solved locally, but to which each sovereign nation must contribute an appropriate share. The analysis therefore oscillates constantly from a global to a national perspective.

Given these time scales, it is obvious that rapid transitions are necessary, and that these need to be formulated as strategic plans with a clear view of the end goals, as in a military operation or a major national project such as the Apollo Programme (Randers and Gilding, 2010). Such a plan needs to unfold in the correct sequence and would require strong central direction and a solid consensus. It is true there is little peacetime precedent for the prosecution of such plans and such a rapid rate of directed investment. But logically there is no alternative, so this process must be on the table for general discussion, and would be an important subject for research and teaching. There is obviously a key role for higher education.

*Prevention vs adaptation*

Principal responses to the climate crisis fall into two classes often labelled ‘mitigation’ (trying to stop it or slow it down) and ‘adaptation’ (reducing the damage arising from climate processes). In our observation, the term ‘mitigation’ is not always understood clearly. Its other uses in English and its etymological roots [[[5]](#endnote-5)] imply some kind of ‘softening’ or rendering more benign. Sometimes it is even confused with adaptation. We feel these obscurities can be avoided simply by using the term ‘prevention’, because that is after all what we are trying to do: to *prevent* the crossing of the guardrail threshold, simply because there is a risk of irreversible change. In what follows, the term *prevention* is used for clarity, but is essentially coterminous with *mitigation*.

*Micro- and macro-sustainability*

We have drawn a contrast between small-scale, bottom up, largely cultural measures; and mass-scale, top-down technological measures. We can label these Micro- and Macro-sustainability respectively. Table 2 contrasts various features of the two, one of which approximates the assumptions and programme of the ET approach.

*Adaptation*

There are some unexpected corollaries of the ET analysis. One is that the extreme need to avoid crossing thresholds **rules out certain forms of adaptation**. This sounds surprising because the general understanding is that a balance should be sought between prevention and adaptation. However, again we run into the problem of opportunity costs. Furthermore, there is a severe mismatch in the political economy of the two, in the terms explored by some economists and game-theorists (Olson, 1956). [[[6]](#endnote-6)]

*Adaptation has concentrated benefits and dispersed costs.*

*Prevention has concentrated costs and dispersed benefits.*

In any competition for attention and resources therefore, adaptation will have a large advantage, as we can readily observe: in many sectors, the ‘climate change problem’ is already assumed to be about adaptation. [[[7]](#endnote-7)] Resources spent on adaptation are not available for prevention, but in terms of political economy, this is much stronger than the opportunity cost effect (Buchanan, 2017). The conclusion is this: that there is no need for those concerned with prevention to give it any further oxygen. It is bound to seize the lion’s share of resources anyway.

Further, a clear-headed analysis of climate-change adaptation shows that its effects are generally temporary and lead to an endless regression of increasingly desperate measures. The goal-posts do not stand still. Adaptation can be deeply attractive in the short term, but is ultimately a fool’s errand. [[[8]](#endnote-8)]

Note that we are not saying adaptation is wrong, or should not be studied. It just should not be part of a university programme dedicated to preventing the worst outcomes. Others will do it. There is no need to help them.

Having said this, there are overlaps, such as preventive measures that also serve adaptation. These are acceptable. For example, increasing organic matter in soils can both sequester CO2 and provide crop resilience against changed conditions. This subset will be an important topic for ET programmes in HE.

*Deep adaptation*

The standard meaning of ‘adaptation’ might be considered simple or ‘shallow’ adaptation. This contrasts with a novel approach associated with Jem Bendell, known a ‘deep adaptation’ (Bendell, 2017). In this perspective, prevention is already too late, so there is no problem of opportunity costs. Therefore, we need a much more strategic, long-term approach to adaptation rather than piecemeal reactions to climatic events.

This approach is logically coherent, but ethically eccentric. If the thresholds are passed, then there are much greater risks of fundamental changes and billions of deaths. Deep Adaptation is about how some can survive indefinitely: it does not address the question of *who*. Who are the saved and who are the damned? [[[9]](#endnote-9)]

The assumption that it is too late to prevent the crossing of the thresholds is defensible, given the looming deadlines and lack of progress on the matter since 1992. However, the ET approach insists on prevention while it is still technically possible, which for the time being, it is.

*Adaptation under ET*

Is there to be no adaptation at all in a rapid transition? Yes. ET-style programmes do entail considerable disruption and change, and populations need to be helped to adapt. But note this is *adaptation to planned prevention measures*, not adaptation to climatic *force majeure*. It would be part of the strategic planning.

We are minded to label this ‘reflexive adaptation’, with acknowledgements to the work of those late-20th century theorists who explored the notion of ‘reflexive modernity’: that the task of post-modern societies is to deal with issues they have themselves created. (Beck, Giddens and Lasch, 1994).

*The primacy of physical processes*

One common fallacy within much sustainability discourse, is that the physical and non-physical aspects of the problem are to be treated in parallel as co-equal aspects. For example, the 17 UN Sustainable Development Goals (SDGs) are widely used as a framework (UN, 2015), with the general assumption that they are all pursued on a broad front. Similar assumptions lie behind the ‘triple bottom line’ idea that sustainability has co-equal environmental, social and economic strands (Elkington, 1999). [[[10]](#endnote-10)] While these assumptions sound wise and humane, they fail to grasp the fundamental principle that the physical world necessarily dominates the situation, and physically plausible solutions must be at the heart of serious analysis. Of course, non-physical aspects feature hugely in delivery, but they must be built around a solid core of ‘physics’ rather than the other way about, which is what tends to happen.

From the ET perspective, the ‘Planetary Boundaries’ framework (Figure 2) is much more helpful than the UNSDGs, since it focuses on measurable physical factors, effect rates, and estimated boundaries. It has its limitations, but is an indispensable tool for providing a first-order check on ‘how we are doing’ (Steffen et al., 2015). In contrast, the SDGs have no time-scales or prioritisation and confound three clear physical goals (Nos 13,14 and 15) with fourteen others. In the logic of Figure 1, the SDGs are profoundly ‘knottist’.

*Infrastructure not lifestyles*

A further corollary is that **lifestyle changes are relatively unimportant**. This directly contradicts the perspectives found in Education for Sustainability and the green movement generally. Lifestyle changes are undertaken voluntarily by about 10% of the population, and typically result in 20-40% reductions in participating household carbon emissions, an overall effect of 0.1\*0.3 = about 3% of overall effects. This is ‘micro-sustainability’ as previously discussed, treated in more detail in Table 2.

If lifestyle changes are *not* voluntary but actually imposed, there is an almost certain prospect of resistance, inevitably encouraged by parts of the media and many politicians, leading to a permanent *gilets jaunes* style insurgency (Natalini, 2019). A transition programme would almost certainly lose these media battles, and it is important to try and avoid them. Emphasis must switch to relatively ‘invisible’ infrastructural changes (‘macro-sustainability’) that will allow everyday life to continue without undue disruption. It can be fairly convincingly demonstrated that such changes could bring large and rapid reductions in impacts, even to the level of the much-vaunted ‘net zero’ (CAT, 2010).

*Contributions from different disciplines*

Despite its emphasis on technology, ET is unavoidably an interdisciplinary framework. In the necessary transition process, it would be the task of pure science to analyse the problems and suggest potential solutions; and of engineers to design practical measures and apply them. These matters are challenging but do-able.

Much more difficult would be the many tasks for social scientists, economists and the political class, who would need to help the general population in ‘reflexive adaptation’ to the large infrastructural changes taking place. Admittedly these changes will often be at one remove – the countryside perhaps, or at sea – but sometimes they will be at least temporarily intrusive – building-retrofits, transport arrangements for example – and we will all need reassurance that our most cherished comforts and values are not permanently threatened.

FURTHER ELABORATION OF THE DISTINCTIONS

Table 2 contrasts many features of these two important schools of sustainability theory and practice.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | ECOCENTRIC PATTERNS | EMERGENCY TECHNOCENTRIC PATTERNS |
| General approach | Bottom-up, micro-changes | Top-down macro-changes |
| Tends to attract | Social scientists, educators, humanities teachers | Physical scientists  Engineers |
| Time horizon | Long: 100+ years | Short: 20-50 years |
| Ethical perspective | Humanistic values maintained; aversion to ranking | Emphasis on sequencing of action, ranking of processes and activities; ‘temporal veil of ignorance’ (1) |
| Style | Holistic, wide/soft focus, both-and | Quantitative, logical, either-or |
| Educational approach | Using sustainability patterns to educate students | Using educational techniques to communicate  sustainability patterns |
| Educational purpose | To produce better citizens with humanistic sustainability values and skills | To produce critically informed graduates and professional  fuss-makers |
| Attitude to ‘triple bottom line’ framework | The factors are co-equal: ‘Trinitarian’ | Physical factors primary: ‘Unitarian’ |
| Operating space for humanity | Raworth (2012) Doughnut | Rockström Planetary Boundaries (2) |
| Mode | Bottom-up, ‘leading by example’ | Top-down, ‘democratic dirigisme’ |
| Focus | Political/economic/social response to physical challenges | Physical response to physical challenges; social and economic factors considered secondary |
| Status | Orthodoxy, embracing a widely-understood meaning of ‘sustainability’ | Minority: Conception of sustainability too literal for widespread acceptance |
| Structural basis | Highly theorised;  academic ‘cult of complexity’? | Based on simple,  basic ‘Piagetian’ concepts (3) |
| Locus | More common in new universities | Uncommon in universities |

Table : Comparison of ecocentric and emergency-technocentric patterns

Most of the entries are self-explanatory, but perhaps a few comments are in order. The ‘temporal veil of ignorance’ is a reference to John Rawls’ construct of the ‘veil of ignorance’ regarding one’s position in society, to permit a more objective assessment of different social arrangements. The ‘temporal version’ here asks theorists to imagine they do not know which generation they will be born into (Rawls, 1971). The reference to ‘Trinitarian’ and ‘Unitarian’ views is a deliberate echo of the long-running dispute within Christianity over the doctrine of the Trinity, thought by some to be overly obscure and mystical (Tuggy, 2016). The so-called ‘operating space’ is a term introduced by Johan Rockstrom with reference to outer physical boundaries in a concentric ‘radar’ diagram (Steffen, 2015). This was hollowed out by Kate Raworth to introduce social and political factors, giving the form of an American-style doughnut (Raworth, 2012). The term ‘doughnut economics’ (Raworth, 2017) is sometimes used to signify a humane approach to economics. The reference to Piaget is simply that the ET community often uses simple models with conserved quantities, such as are used as child-development markers by developmental psychologists (Piaget, 1931). For example, a ten-year-old will not attempt to pour a gallon into a cup. ET places great store by such elementary realism.

SUMMARY

To summarise the distinctive features of the ET approach:

* There is a **double challenge** from both climate change and damage to ecosystem services
* They are both **very serious and very urgent**
* Both must be tackled **in parallel**
* They both require **physical solutions**
* There must be a **rapid transition** to the low-impact state
* This transition needs careful proactive **strategic** planning
* The emphasis must be on **prevention**, not adaptation
* The principal changes are **macro-scale transformation** of infrastructure, not lifestyles.

We hope it is obvious that this interdisciplinary but coherent approach makes an ideal basis for a university-level programme of teaching at either undergraduate or postgraduate level. It draws on widely-shared values and seeks internal consistency and ‘consilience’ among all the disciplines concerned. It suggests countless areas of research, not least in planning the transition. And it would be highly attractive to the rising generation of prospective students looking for university courses that match their ethical vision.

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1. The terms ‘ecocentric’ and ‘technocentric’ are widely used. Helpful definitions and examples can be found in O’Riordan (1981). Although practitioners in this field will find our use of these terms familiar and appropriate, a stricter interpretation would award the present authors the appellation ‘ecocentric’, since they emphasise the primacy of the real physical environment. Those who currently label themselves with this term might be better described as ‘anthropocentric’, since most of their concerns – such as the UNSDGs – are strictly human, and have little to do with the ecosphere. [↑](#endnote-ref-1)
2. Educated readers will doubtless pick up echoes of the tale of the Gordian Knot in ancient Phrygia, of which it was said ‘whoever looses this knot is destined to rule all Asia’. According to legend, it was shown to Alexander of Macedon, who rather unsportingly drew his sword and sliced it in half, then went on to fulfil his destiny. Alexander’s action might be considered to represent the technocentric approach, for better or worse. [↑](#endnote-ref-2)
3. Environmentalists were wryly amused when in 2008, Antony Giddens, a distinguished social scientist, noted the paradox that, while everyone recognised the seriousness and urgency of the climate situation, so little attention was being paid to it. This had been a commonplace for years, but Giddens had the chutzpah to name it after himself, *viz*., the Giddens Paradox (Giddens, 2008). Perhaps the paradox is understandable in general society, but less forgivable in the world of scholarship, where it might be considered to constitute a *trahison des clercs*. This had already been noted by Harper (2000), and remains the case, as indeed we are arguing here. [↑](#endnote-ref-3)
4. It defies Horace’s gentle reminder, *Dum vitant stulti vitia, in contraria corrunt*. (In shunning one set of faults, it is foolish simply to embrace the opposite). [↑](#endnote-ref-4)
5. The Latin root *mitis* means ‘mild’ or ‘gentle’. [↑](#endnote-ref-5)
6. It is surprising there is no commonly-accepted name for this important effect. It is even more surprising there is so little attention to the opposite case, that covers prevention, although the general theme forms the subject matter of George Marshall’s *Don’t Even Think About It: Why Our Brains are Wired to Ignore Climate Change* (2014). See also Hoffman (2015). [↑](#endnote-ref-6)
7. In agriculture for example, farmers are seeking drought-resistant crops. In recreational horticulture, designers are seeking advice on how to ‘future-proof’ their garden designs as a sales-point for prospective clients [↑](#endnote-ref-7)
8. The veteran environmentalist Mathias Wackernagel has dubbed this process ‘the race to lose last’ (<http://www.2052.info/glimpse6-3/>). [↑](#endnote-ref-8)
9. A key text here is *The New North* by Laurence Smith (2011), describing high-latitude places the global privileged classes might seek out in a climatically turbulent world, from Tierra del Fuego and the South Island of New Zealand to Greenland and Kamchatka. Such well-heeled refugees hope to be among the ‘saved’. [↑](#endnote-ref-9)
10. It is interesting that the originator of the concept has himself had second thoughts, see Elkington (2018). [↑](#endnote-ref-10)