Fractality: a key to global citizenship and ecological justice

David Levick
University of Western Sydney
d.levick@uws.edu.au
2004

Abstract

This paper develops the notion of fractality as a concept-of-choice upon which to build a way of knowing or paradigm that may better resonate with the complexities of the human experience of the 21st Century and thus lead to responses different from the winner-loser, us-and-them, for-us-or-against-us polarisation. Fractality is a concept from Mathematics and Complexity Theory; it being an entity that has self-similarity at many scales of focus. It is the scientific expression of the Golden Rule. At different scales of focus, the human fractal can be described as an individual human being, his or her family, the population of his or her town or city, the population of his or her State, Province or Department, the population of his or her nation or the global population in its entirety within the universe. The concept of a fractal makes this complexity manageable to comprehend: because understanding the fractal at one scale of focus is to understand the fractal at all scales of focus, though not with the same degree of precision. This perception of self as self, self as family, self as township, self as national population and self as global population has significant implications for how we choose to govern, decide and act as humans in relation to each other and to our environments, particularly from the perspectives of what it means to be just, equitable, ethical and moral. This paper presents a way of knowing developed from fractality and explores some of its implications for how we can decide what is just, equitable, ethical and moral not only for ourselves as humans but for the environment as well.

The knowing-living dynamic

Our ways of knowing and ways of doing things in the world are in a dynamic relationship, each affecting the other. Our preferred, and often currently successful, ways of knowing inform what is correct, appropriate and acceptable decision-making and action-taking in the world. For example, among Australian Aborigines, it is not appropriate to kill a particular animal species if that species is one's totem – it is known that there is a shared spiritual connection between the knower and that species. Similarly, among scientists, one better describes reality by carrying out experiments to determine what reality isn't – it is known that reality is too vast to determine what it is specifically; better to determine specifically what it isn't and thus gradually narrow down the possibilities.
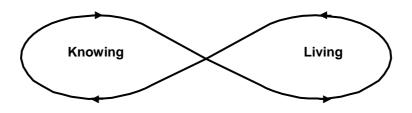

Figure 1: There is an interactive relationship between human knowing and living: the way we know influences the way we live, and the way we live influences what we value as knowledge. If we want to live as global citizens and in a sustainable environment, then our knowing needs to resonate with and support this.

The environments in which we live, and the requirements of sustaining ourselves in them, also inform what is appropriate 'knowing'. For example, Australian Aborigines lived for thousands of years in an extreme environment, with extremes of temperature, bushfire and drought. An individual's survival meant reliance on other family and tribal members. Thus, it became 'known' that relationships matter, so no decisions or actions are taken unless the right relationship has been established. Similarly, among scientists, the experience of similar phenomena and repeatable results from experiments lead to the development of generalisations and formulae that can be incorporated into one's way of knowing to predict similar occurrences in the future.

This dynamic is also scaled, with a broad way of knowing encompassing and dominating many others, such as the scientific way of knowing, and all the branches of science that it encompasses, from physics to chemistry to astronomy and zoology. But just as this broad way of knowing encompasses more specific ways of knowing of the same family, it is also the foundational perspective from which other ways of knowing are interpreted, and often, discredited, because the assumptions, ontology and epistemology of each are often at variance.

Western civilisation has moved through favoured and 'authorised' ways of knowing or paradigms. Among these have been:
- The Medieval Paradigm: dominated by Pantheism (a God-centred and God-directed universe), relying on Divine knowledge, as conveyed in the Old and New Testaments and through the authority of the priesthood; up to about the 17th Century. In this paradigm, God, by way of the Church, held the authority to determine what constituted valid knowledge. "Belief" and "Faith" guided knowledge-creation. Scientists were discredited and persecuted for expressing their ways of knowing based on different assumptions and rationale.
- The Enlightenment and Modernist Paradigm: dominated by Rationalism, Positivism, Empiricism, Cartesianism and Dualism (with experience and reasoning being the reliable source of knowledge); from the 17th to 19th and early 20th Centuries. In this paradigm, "Reason" and "Logic" guided knowledge-creation, with authority to determine valid knowledge lying with the State, rather than the Church. Ecclesiastics, under this dominant paradigm, were persecuted and scorned for their folly.
- Post-modernism and Post-structuralism approaches of Relativism, Pluralism and Constructivism (where truth and value are relative to the observer, that there are many such relative perspectives and that nothing real exists beyond our constructed conceptions of such things); from the 20th to 21st Centuries. In this paradigm, input of the "senses" is also given credibility, alongside Reason and Logic, leading to a multiplicity of explanations. Authority to determine valid knowledge from this stance lies with the individual. This paradigm casts doubt on the notion of a unitary body of knowledge in the custody of professionals and experts who 'know'. Under this dominant paradigm, everyone is vying for authority and acceptance of his or her own way of knowing as being the best one. I suggest we learn about a variety of ways of knowing, determine their best fields of application and their limitations, and choose to work with a way of knowing best suited to the conditions and requirements at hand. For instance, if I want to build and fly in an airplane, I want the designers and engineers to operate with a scientific way of knowing. If I want to enjoy the flight, I want the air stewards and stewardesses and the airport staff to operate with a more humanist, postmodern way of knowing, appreciating that every passenger is different.
- The Economic Rationalist Paradigm: dominated by Knowledge Management and Efficiency. The quest for productivity and efficiency, for maximum bottom-line economic profit, has gained a footing as the primary way of knowing in the West in the past decade. In this paradigm, authority is determined by the "number crunchers", who determine what is valid action that will lead to maximum efficiency. Valid knowledge is that which contributes to the financial success of the institution. Accountants and managers give little credibility to humanist ways of knowing and, if so, it is to further the likelihood of profit maximisation. The collapse of Communism has emboldened the Capitalists, giving them the confidence to assert that the Capitalist way of knowing is *the* 'successful' way of knowing.

From the past to a desired future

The increased interconnectedness of the peoples of the world, through more sophisticated communication and more efficient modes of transport, has led to the increased likelihood of the consequences of our actions affecting more and more people, or at least coming to their attention and being judged by them, according to their own favoured ways of knowing. And many are not liking what they see or are experiencing first-hand.

In the past, humanity has been able to adjust to this interaction because it took place at a steadier pace and on smaller scales of influence than is being experienced in the 21st Century. It was either a case of understanding being generated over a longer time frame and on creeping geographical scales, so that people of different ways of knowing were able to adjust to each other, or it was a case of one people being entirely overtaken by a more powerful and dominant culture that disempowered and often obliterated the 'weaker' way of knowing and doing. The weaker were not known to 'others', so their plight (and sometimes extinction) often went unnoticed by anyone other than their conqueror.

With near instantaneous communication at a global level and the scale of influence of our actions extending virtually around the globe as well, peoples of different ways of knowing are not having the same timeframe of opportunity in order to experience or build understanding about others' ways of knowing. And physical colonisation or invasion is now generally unacceptable as well.

Instead of leading to greater understanding among the people's of the world, this awareness that others think and act differently seems to be leading to conflict; for example, acts of terrorism and the War on Terrorism, the formation of the State of Israel and the claim of the Palestinians to the same territory, international trade agreements and protests against the World Trade Organisation. These conflicting ways of knowing are now being played out as conflicting ways of living – or, more correctly described, ways of dying – both for humans themselves and the environments in which they live.

It is as if decisions and actions taken from the framework of one way of knowing inadvertently conflict with what others, from another framework of knowing, consider to be just, fair, ethical, right and justifiable. The knowing-living dynamic is way out of balance with the lived experience of 21st Century humanity and its environment. Furthermore, humanity, for the greater part, is aconscious of even being under the influence of an ideology or preferred way of knowing and of how it influences one's life.

At this level, the knowing-living dynamic manifests itself as a dynamic between ideology and resources.
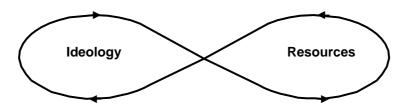

Figure 2:   The interactive relationship between human knowing and living manifests itself at another level as a dynamic between ideology and resources.

The strengthening of the ideology and identity of self and the ongoing quest for additional resources to maintain that identity are at the heart of the requirement of peoples of different ways of knowing to interact. Whether by trade or colonisation or invasion, the interaction of these peoples with different ways of knowing manifests a power differential. The greater the power held by a people, the more likely it is that they can control a larger pool of resources, and thus maintain and even strengthen their identity – at the expense of another people's

resources and identity. The extent of one's resources usually comes to be one's territory – a physical entity that can be maintained and defended against others who require the same resources. The collapse of Communism has given Capitalists the impression that the former Communist 'territory' is now Capitalist territory.

The luxury of time and of gradually becoming familiar with others and adjusting to their ways of knowing is no more. During the American Civil War, peoples of both the Union and the Confederacy lamented the end of true civilisation if the other side were to win; however, the resolution of the conflict saw the development of a new way of knowing that embraced both peoples at a higher level of understanding about what it meant to be American, and a new civilisation flourished.[1] Their choice was made after great suffering and human sacrifice. It is suggested in this paper that this suffering and human sacrifice can be avoided if we firstly learn about and become conscious of the knowing-living dynamic and, secondly, choose ways of knowing that cultivate and reflect the way of living that we desire.

Might it be possible to build a higher level way of knowing that allows people who favour one way of knowing, in a particular time and place, to make decisions and to interact with others of a different way of knowing, from a different place, without threatening either's resources and identity? Might this new way of knowing reflect the development of global citizenship and ecological justice – one of the current narratives favoured in the world?

Defining a new territory

Given that much of the conflict in the world stems from a sense of issues that are considered – from local ways of knowing – as unjust, unfair, unethical, wrong and unjustifiable, then any new way of knowing that seeks to redress these deficiencies will need to establish a new relationship between identity and resources and the power exercised to maintain each. This new identity is associated with the concept of global citizenship, and the new territory (of resources) with our shared global environment.

Humanity has, in the past, given precedence and allegiance to constructed and arbitrary territories in the form of family, tribe, city and nation. However, the relationships within the environment were never bound: each human intervention had the potential to affect the entire global environment. There was, and still lingers, a mismatch between the scale of environmental relationships and the scale of human relationships. But this is changing, human relationships are broadening to the global scale, yet we continue to make use of ways of knowing that were only adequate to our national or continental ways of knowing. Moreover, some human actions in one part of the planet are causing ecological damage in others' territories. Both the physical territory of our resources and the territory of our ideologies are being insidiously invaded by 'others'; the former through environmental degradation and the latter through the Internet. The marking of one's territory no longer stops these types of 'invaders': neither acid rain nor Internet access stops at a national border.

The concept of identity required to deal with these new experiences is 'global citizenship', and the arbitrary boundary of the territory required to deal with these new experiences is the entire planet.

Fractality – as a metaphor for the nature and identity of the knower – influences the knowing-living dynamic in ways that might foster a better match between global citizenship and a global environment so that 'justice' for both human society and the environment can be developed.

---

[1] " ... It will be a glorious day for our country when all the children within its borders shall learn that the four years of fratricidal war between the North and South was waged by neither with criminal or unworthy intent, but by both to protect what they conceived to be threatened rights and imperiled liberty: that the issues which divided the sections were born when the Republic was born, and were forever buried in an ocean of fraternal blood."

– Lieutenant General John B. Gordon, CSA

Fractality

Fractality is self-similarity at many scales of focus (Mandelbrot, 1983). It is easily confused with nested systems and embeddedness − a confusion that is reinforced by efforts to model and portray fractality. Fractality, when modeled on a page, looks like a self-similar structure at many levels of focus (as in Figure 3). Fractality, when conceptualized by the human mind, is the appreciation of self-similarity at many scales *simultaneously*, such that the fractal *is* all scales of focus simultaneously. For instance, an individual human being experiences joys and sorrows, prosperous times and hardship; so too does that individual's family; so too does that individual's community, as does the population of his city, even his state, his nation and, ultimately, humankind itself. From this perspective of self-similarity, each of these several entities (individual, family, community, city, state, nation, humanity) can be described as a single fractal: an entity that experiences joys and sorrows, prosperous times and hardship in its environment − regardless of the scale of focus. An influence at any scale of focus will affect the fractal at all its scales of focus, because the fractal is a singularity.

In my experience, fractality has been the most challenging for listeners or readers to grasp because of its existence in a conceptual form only. As soon as one moves to consider the physical reality of these different scales of focus of the fractal entity, fractality vanishes. Yet it is its ability to embrace simultaneously the miniature and the global that fractality offers new perspectives for living as global citizens and interacting justly with our environment.
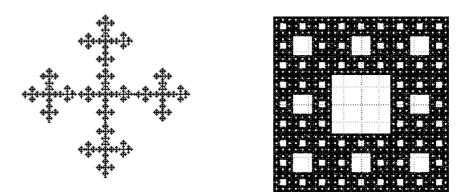

Figure 3: The above models are symbolic of fractality − the characteristic of self-similarity at many scales of focus. Fractality should not be confused with embeddedness or nesting. This is where the conceptualisation of fractality can only be held in the human mind; all attempts at modeling fall short, because they cannot maintain the self-similarity at all scales of focus simultaneously.

A way of knowing based on fractality

If fractality is self-similarity at many scales of focus, then a knower, adopting a way of knowing based on this, would see himself as an individual, as his family, as his local community, as his regional population, as his national population and as the whole of humanity − simultaneously. He is each and all of these at once. He identifies with the fractal: a human entity living in an environment. The human and environment components of this fractal are as inseparable as the mind and the body in a complete human; take away either and the entity is no longer complete.

If one scale of focus is affected by change, all scales of focus are affected. In making a decision about a particular line of action, the knower would take into consideration the effects and consequences of these actions on each of these scales of focus, otherwise he might inadvertently harm himself, because there is no separation among the various scales of focus. It is like the action of dye in water: one cannot dye a particular droplet in a whole glass of water; the entire glass is affected if any dye is added. A change to the fractal at any scale

of focus affects the fractal at all scales of focus, albeit the extent of the influence will be different.

It is important to recognise that there is no 'other' in this way of knowing; the knower and what can be known are embraced in the singularity of the fractal, as are all its potential scales of focus. Thus, if the knower is aware that an action developed within this framework of knowing will negatively affect the environment or a group of people, then the knower will be aware that he is affecting himself negatively, because he *is* that group of people, when appreciated fractally, and that environment is his own environment.

The knowing-living dynamic through fractality

In the past, our ways of knowing were often geographically and temporally bound, being associated with a particular time and place. As mentioned earlier, with the increased interaction among humans, these idiosyncratic ways of knowing are often considered quaint or exotic, but they have also led to bloodshed, war and even genocide. A way of knowing developed in one time and place is often unsuitable for a different time and place; for instance, traditional Aboriginal ways of knowing developed and used successfully in Australia up until the end of the 18th Century were overwhelmed in an 18th Century England (as found out by some of its Aboriginal visitors. And the way of knowing developed and used in 18th Century England showed itself to be equally useless for survival in Australia when Europeans decided to settle on the eastern coastline; they had to recreate 'England' as best they could in an alien landscape so that their way of knowing could also be transplanted. Similarly, a way of knowing developed and which proves useful at one scale might not prove as useful at a different scale of application. The liberality and individualism of American democracy is associated with one of the most successful countries in the world, while the discipline and sense of community of Islam is associated with a culture that has successfully girdled the equator of the world. However, it is apparent that while the peoples of the world are comfortable for these ways of knowing to operate at the national or continental level, they are not comfortable in accepting the values that either of these ways of knowing promote to inform appropriate *global* interaction.

Despite their differences at one level, a higher-order similarity between each of these cultural ways of knowing may be discerned: they are based on knowing that separates the knower from his or her environment. There is me and there is 'other' – everything that is not me. This dichotomy allows for the development of conflict when 'me' and 'other' do not agree, because we value differently. Resolution is sought by having the 'other' adopt our way of valuing and knowing, by adopting our perspective and this is achieved either through persuasion, coercion or outright invasion.

This contrasts with the singularity of fractality and the power differential it fosters. If 'I' am the fractal, then 'I' am 'you' and I see 'you' as 'me'; 'I' am 'all'. There is no 'other' with whom to enter into conflict. The perspective offered by each manifestation of the fractal, whether it is your perspective or mine, is a perspective of the fractal, to be assessed according to its effects on all scales of focus. If action leading from that perspective is likely to have a negative consequence at any scale of focus, then the fractally-informed decision-makers need to consider other options and *consciously choose* the action leading to the least negative consequences. 'Conflict', in such a fractal setting, moves away from being the manifestation of unresolvable difference between particular persons or people who hold to different ways of knowing, to being 'diversity' of perspectives within the single human-environment fractal; to move forward is for the fractal (at whatever scale) to choose consciously the most appropriate perspective. It is as if a single individual weighs up the possible ways forward that come to his or her mind. One half of the brain does not suddenly declare war on the other half of the same individual's brain; it simply decides on one pathway forward and moves on as a single unit, as a whole body.

Given that one of the desired futures for humanity and the earth is the development of a global citizenry living justly with its environment, then humanity would need to lessen its negative impacts on the environment if it is to achieve this, and improve its own cohesion.

Adopting a fractal way of knowing fosters cohesion among people, because it gives greater value to our similarity (than to our differences) and provides a means of appreciating and embracing all levels of human organisation simultaneously. In identifying the fractal, the environment is appreciated as being integral; thus, damage to the environment from such a way of knowing is damage to the fractal, and damage to the fractal is damage to me, to you, to my family, to my country and to the world. And that's not what we desire.

As mentioned earlier, each human is mostly unconscious or aconscious of the influence of his or her preferred ways of knowing. A most important step in the development of global citizenship and ecological justice is consciousness in knowing: knowing why one has chosen one way of knowing over another in given circumstances and knowing why it is the most appropriate way of knowing for those circumstances.

Ethics and fractality

As mentioned above, there is a dynamic relationship between the way we know and the way we live. If the pursuit of knowledge is considered paramount, some knowledge producers will do whatever it takes to find out more. Some will seek to clone a human being, some to take stem cells from frozen (but 'living') human embryos, some to expose fellow human beings to atomic explosions to determine its effects. Everything can be sacrificed, including other humans, in the pursuit of knowledge or the implementation of an ideology. This is akin to the more personal example of your best friend running off with your girlfriend or boyfriend. The selfish desire of the two new lovers overrides the values of decorum and respect for their friend. Rather than subordinate their selfish desires and elevate their respect for the conventions of propriety and for their friend – which would mean a respect for all parties involved – the new lovers choose what is only to their own selfish advantage. Similarly, this occurs at a national scale, where several countries will align themselves in such a way that other countries are disadvantaged. It can also be seen in the narrative associated with 'sustainability': it is a narrative usually promoted by comfortable and formally educated Westerners who want to sustain their own way of living, and thus, sustainability will mean others adopting their way of knowing as well.

In ways of knowing that separate 'me' from 'other', ethics can also be separated and dismissed or ignored. To be fractally informed, however, is to appreciate the ethical dimensions of decisions, because one has a responsibility to the good health of the fractal, because its good health is one's own good health.

To choose to be fractally informed is to give paramount value to the nobility of humanity and planet earth, for they are integral to the fractal and, thus, to the way of knowing based on that fractal. Their destruction is one's own destruction. In most cultures, self-destruction is viewed as being unhealthy, and it is understood that it is a healthy civilisation we are seeking to promote. If any scale of humanity is to be disadvantaged by a decision of a fractally-informed knower, then the subsequent action is incongruent with that way of knowing and should be abandoned.

It could be argued that scientific knowing gives primacy to the revelation of 'truth', with the means to find that truth usually, but not always, tempered by ethical considerations. These ethical boundaries are determined by those with power in society. Ethics are extrinsic to the scientific way of knowing and must be applied from another way of knowing that, supposedly, knows better about what is good and bad, right and wrong, worthy and unworthy. Knowing based on fractality gives primacy to the health of the fractal – a human entity in its environment – with ethical considerations integral to this health and determined by the knower. The majority of people can discern what is best for their own well-being, so power is distributed to all knowers and scales of knowing. In knowing fractally, the ethical considerations are intrinsic to the way of knowing: the fractal participant can himself determine what is good or bad, right or wrong, worthy or unworthy for his own well-being, and thus, for the well-being of all.

Resourcing through knowing fractally

Through knowing fractally, it is possible to recognise and cultivate a new relationship between resources and power. If any of the manifestations of the human-environment fractal are seen to be disadvantaged or disempowered because of a lack of resources, then the fractal at all scales of focus is disadvantaged or disempowered. It is not enough to enrich one local or national manifestation of the fractal and to say that all are thus enriched; this opportunity for becoming enriched needs to be manifested at its greatest scale of focus – the global – because that is the greatest potential scale of manifestation of the fractal, and thus should be the most greatly resourced and the most 'powerful'. Fractality is scaled, and thus, as the scale broadens, so too does the influence of the power held by that scale. Thus, it is not appropriate that a local manifestation of the fractal holds or controls more resources and thus exhibits greater power and influence than does a national or global manifestation of the fractal. Such an imbalance is incongruent with the way of knowing. It is unjust!

The environment, through knowing fractally, is a 'trust' of the fractal, and because the extent of the interrelationships in the environment are global, then the global fractal scale of the 'human in its environment' needs to be given primary consideration by all scales of the fractal, knowing that an action at one scale of focus could have global environmental consequences.

Resources desired by humanity are not equally distributed throughout the global environment, however, and different scales and locations of the human-environment fractal vary in their 'richness' of resources. From a fractally informed perspective, these resources are not held in ownership by the local fractal where they are located, but are a trust of the global fractal. It is not the purpose of this paper to develop a new economic program for the world, rather, it is to spell out the principle that, through knowing fractally, each scale of fractal focus should exhibit a proportionally scaled influence if the actions are to be congruent with the way of knowing. This principle has implications for human governance.

Fractal identity and governance

I am a citizen of Richmond; I am a citizen of the Hawkesbury; I am a citizen of New South Wales; I am a citizen of Australia; I am a global citizen – simultaneously. Through knowing fractally and honouring the concept that each scale of fractal focus should exhibit a proportionally scaled influence, the concept of my being a global citizen has greater influence than my being an Australian, which itself has greater influence than my being a citizen of New South Wales, which itself has greater influence than my being a citizen of the Hawkesbury, which, in turn, has greater influence than my being a citizen of Richmond.

The same principle applies to human governance and its influence: the governance of my local council will have less influence than the governance of my State, which will have less influence than the governance of my Nation. It is the next scale of focus – the governance exhibited by the World – that is currently proving problematic. The establishment of the League of Nations and now the United Nations are attempts at formalising this fractal scale of influence, however, it appears that this global governance is being established without its concomitant prerogative to resources and, thus, influence. The power of veto, held by some nation-members, is inconsistent with the concept of fractality, because it gives a lesser manifestation of the fractal greater influence than the greater manifestation of the fractal.

Global citizenship and ecological justice

Among the problems facing humanity are the experiences of our environmental influence and our ideologies transcending the territorial boundaries within which they were 'created'. The Internet, in fostering global communication; advances in transport, fostering global experiences; and trade, fostering the distribution of global resources – each is contributing towards a way of living for which we have no matching and adequate way of knowing. Knowing through fractality transcends the boundary of scale of living. To consciously choose this way of knowing may present a pathway forward for the development of a sense of global

citizenship and to promote and foster ecological justice. The Internet, while it has inadvertently led to the circumstance of global interaction beyond the user's way of knowing, may prove to be the means of fostering the 'connectedness' reflected in a knowing fractally.

Just as it has been possible for many countries to be formed through the union of various colonial states, such as the United States of America, Canada, Australia and the United Arab Emirates, it is also possible – through conscious choice – to establish a global federation based on a fractal way of knowing. Should this be done, the new human identity of 'global citizen' will be formalised, and the new level of global governance appropriately resourced. With this resourcing will come the legitimate power of influence over lesser fractal scales, especially in the area of environmental issues – whose influence parallels the level of global governance. In exercising this power legitimately, it should prove possible to 'harness' the earth's resources in a more equitable fashion so that each fractal scale benefits, and not to the detriment of the environment itself.

References

Gordon, Lieutenant-General J.B. Gordon, cited at 'Causes of the Civil War', URL: www.civilwarhome.com/confederatecauses.htm (undated); accessed 14 Jan 2004.

Mandelbrot, B. 1983. *The Fractal Geometry of Nature*. New York: Freeman.