

Contemporary Systems Thinking

Janet J. McIntyre-Mills
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Transformative Education for Regeneration and Wellbeing

A Critical Systemic Approach to Support
Multispecies Relationships and
Pathways to Sustainable Environments

 Springer

Contemporary Systems Thinking

Series Editor

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Contemporary Systems Thinking is a series of texts, each of which deals comparatively and/or critically with different aspects of holistic thinking at the frontiers of the discipline. Traditionally, writings by systems thinkers have been concerned with single theme propositions like General Systems Theory, Cybernetics, Operations Research, System Dynamics, Soft Systems Methodology and many others. Recently there have been attempts to fulfill a different yet equally important role by comparative analyses of viewpoints and approaches, each addressing disparate areas of study such as: modeling and simulation, measurement, management, 'problem solving' methods, international relations, social theory and last, but not exhaustively or least, philosophy. Bringing together many sources yields several achievements, among which is showing a great diversity of approaches, ideas and application areas that systems thinking contributes to (although, often with difficulties unresolved). There is a need for a series of books, each focusing in detail on the study areas mentioned above. While modeling and simulation are served well in the scientific literature, this is not the case for systems thinking in management, 'problem solving' methods, social theory, or philosophy to name a handful. Each book in this series makes a contribution by concentrating on one of these topics.

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IN MEMORY

So many people have suffered during the pandemic and some sadly have passed on.

We dedicate the volume to colleagues who have lost family or have been separated from loved ones who have contributed to this volume.

So many creatures have suffered through the ages in the name of science and in the name of fashion and for food.

This book is dedicated to the nameless and to Laika, a small brown dog who lived her life on the streets, then when she thought she was trained to obey and sent into space in an iron maiden.

To all the nameless creatures who have suffered and been used for research

May we learn that hypotheses do not need to be tested in ways that objectify

May we learn an ecology of mind and understand that what we do to others we do to ourselves

May we learn that we are our subject matter

Janet McIntyre-Mills

Summary: Transformative Education for Regeneration

Abstract The summary explains the meaning of transformative education and makes a case for a new form of thinking and practice to support social, economic and environmental regeneration that is relational in terms of its axiology. We need to consider the many social, political, cultural, biological, economic and environmental relationships that come into play when engaging in transformative thinking and practice. The volume makes an important contribution to critical, systemic thinking and practice by drawing on and extending the work of Freire and Foucault by adding a more explicitly gendered and multispecies focus that responds to the big issues of the day, namely poverty, climate change, displacement of species, hunger, pandemics and the digital divide.

Keywords Education • Critical • Systemic praxis • Transformation • Relationality re-generative education

Introduction: Re-conceptualising Education for Re-generative Development

The world has changed since Dewey (1916/2001) wrote about education but the basic premise, namely testing out ideas through participatory democracy, remains relevant in an increasingly globalised digital world in which social and environmental issues have no boundaries (Peters & Jandric, 2017).

‘Power and knowledge are linked’, and nowhere is Foucault’s linkage more marked than in the biopolitical determination of *what* species are valued and *why* and how our values shape the curricula at all levels of education (see Foucault & Gordon, 1980; Foucault, 2008).

How we see the world matters, quite literally because our relationships with others and nature are shaped by our values. The lack of understanding of our relationships constitute what Coll (2022:1) calls ‘a consciousness gap’, which he argues is the result of the disconnect between human beings and nature (Coll, 2022:26)

fostered by current neoliberal economics and governance systems. Coll advocates a change in values and praxis and draws on Buddhism and Taoism in his transformative approach to praxis.

Compassion, humility and wisdom are lacking in current approaches to the big challenges facing the world, namely climate change, displacement, pandemics, poverty and conflict (see McIntyre-Mills & Corcoran Nantes, 2021, McIntyre-Mills, 2021a, b, c, d, e, f, g, h), because the human rights of a *minority* cannot be protected at the expense of *the majority* of living systems *in this generation and the next* (Meadows & Randers, 1992; Stiglitz et al., 2010, 2011; IPPC, 2021).

This volume makes a case for a new relational approach to transformative education based on valuing relationships and engaging in pilots that prefigure change. Our critical pedagogy extends an understanding of oppression (Freire, 1980) to address *the importance of personal and group agency* for promoting both social and environmental justice. Our world view is shaped by honouring the ontology of kinship with nature as expressed by indigenous custodians underwritten by working across cultures and disciplines using a cross-cultural approach and mixed methodology. Axiologically, it is based on the notion of transformative research and education that promotes a non-anthropocentric approach; we place local custodianship centre stage, whilst also addressing and updating gender norms. All change begins with a change in values. An understanding of the dire impacts of climate change and ‘business as usual’ is indeed understood, and new governance structures, such as the proposed Ecocide Law (Higgins et al., 2013; Thunberg, 2021¹), are urgently needed (see chapters “Regenerative Education and Safe Habitats for Diverse Species: Caterpillar Dreaming Butterfly Being”, “Dis-Ability, Differently Abled and Sentient Beings: Transformative Regeneration: The Need for Public Education on Vulnerability and Interbeing” and “Systemic Praxis and Education to Protect the Commons” of this volume).

The volume strives to address the question: What should/could transformation entail? In the pathways to wellbeing prototype (McIntyre-Mills et al., 2014), people were asked to explore what they have, what they need and what they are willing to add or discard in order to move away from *Business as usual* towards supporting what Joseph Stiglitz et al. (2010) call ‘Wellbeing Stocks’.² They are asked to express their thoughts and perceptions based on their own feelings and opinions. In chapters “Learning from Nature’s Classroom: Reframing Economics, Accounting and Accountability”, “AA!!Venda Women and Social Enterprise: Stepwise Process to Regenerative and Sustainable Living” and “Systemic Praxis and Education to Protect the Commons”, we discuss the current design through which we hope to

¹<https://twitter.com/GretaThunberg/status/14567314879282053216> Nov 2021

²The definition is as follows: ‘1. Material living standards (income, consumption and wealth), 2. Health, 3. Education, 4. Personal activities including work, 5. Political voice and governance, 6. Social connections and relationships, 7. Environment (present and future conditions), 8. Insecurity, of an economy as well as a physical nature’. This definition of wellbeing stocks fits well with the way in which both Indigenous and Non-Indigenous Australians connect with country in Australia and elsewhere and the way in which critical systems thinkers and complexity theorists understand.

enable local residents to map and monitor local wellbeing stocks and, in particular, environmental wellbeing on which everything else depends. We need to learn how to live differently. Imagine if we could design schools, universities³ and centres which support action learning in order to integrate teaching, research, community and professional service? The contributions created for this book can all be said to be resources that help us to advance our imaginations towards this end.

We address scenarios and implications each scenario poses for educational transformation, for example:

*Scenario A: The implications of education as usual or neo-liberal factory education that poses a threat as it **does not** address the convergent social, economic and environmental challenges.*

Scenario B: Taking steps towards alternative forms of education at the primary, secondary and tertiary level whereby each level is linked with vocational education and training that addresses the socio-economic and environmental challenges to support changes by taking daily steps towards transformation, an approach that could be regarded as too little, too late and thus ineffectual given the extent of current challenges.

Scenario C: Transformative public education that focuses on relationships and balances individual and collective needs (social, economic and environmental), in order to enhance protection across rural and urban areas by protecting habitat, reducing emissions in order to prefigure transformative praxis in support of zero emissions.

Transformative education from the perspective of contributors to this volume advocates for critical and systemic approach plus applied learning. For us, the focus is on combining face-to-face learning in the community that draws on the local tacit knowledge and is supported by a community of practice that enables people to learn, while they learn and grow a future together in learning organisations and communities that build, sustain or re-generate respectful relationships with others. Our focus is on moving from dualism between human beings and other species to supporting relationships that protect living systems as detailed in the case studies in chapters “[The Power of Story: Ocean View Organic Farmers Cooperative, Cape Town, South Africa: Growing Food with Heart and Soul](#)”, “[Learning from Nature’s Classroom: Reframing Economics, Accounting and Accountability](#)”, “[Sacred Groves of the Tolon District of the Northern Region, Ghana: Where Spirituality Meets Education](#)”,

³International students have propped up Australian universities through subsidising local students, many hope to remain in Australia and many more hope to continue their careers as academics. The casualisation of work for many years helped to provide students the opportunity to make the first step towards becoming early career academics. The COVID-19 pandemic highlighted the challenges facing universities reliant on international students who were unable to return or to take up new positions as the borders closed. The casualisation of academic work has also attracted attention in the Australian news during the pandemic when universities were excluded from government subsidies to prop up the earnings of people at risk of losing their jobs. But the structural problems go far deeper, the question has to be asked, what is the point of teaching compartmentalised, discipline-based courses that perpetuate the status quo, namely an economy that exploits people plants, animals and the habitat on which we all depend?

“AA!!Venda Women and Social Enterprise: Stepwise Process to Regenerative and Sustainable Living” and “Women, Education and Socialisation: Transforming Gender and Power in the MST, São Paulo, Brasil” in which contributors explain the way they engage in public education to increase organic farming, to adapt and apply the Indonesian model of *one village one /or many enterprises*,⁴ to support circular green economies and to enable people to earn, learn and grow together. This is supported by the theory chapters in “Combining Focus and Circumspection: An Education in Natural Inclusion” and “The γ – Principle of Natural Inclusion: From Competition Versus Cooperation to Heartfelt Relay” by Alan Rayner and chapter “Systemic Praxis and Education to Protect the Commons” on new architectures and forms of education to protect the commons and by theory chapters that make a case for compassion and recognition of rights for sentient beings based on an awareness that consciousness is not the preserve of human beings (chapters “Dis-Ability, Differently Abled and Sentient Beings: Transformative Regeneration: The Need for Public Education on Vulnerability and Interbeing” and “Public Education on the Rights of Sentient Beings to a Life and Death Free of Suffering”). This point has been made by Indigenous and spiritual leaders, physicists and plant and animal researchers.

Overall, the chapters address the potential to develop alternative ways of supporting education to address poverty through *hands-on intervention* to enable active learning in ways that protect and re-generate habitat. The themes addressed in the book include education to support non-anthropocentrism and *multispecies* relationships. Some of the contributors will focus on re-generative education in a range of contexts to support opportunities for the marginalised. The focus on indigenous people, young people and differently abled and displaced peoples is also central. Creating employment opportunities in the area of food, energy and water security is a key theme underpinning the volume which builds on previous research on pathways to wellbeing to address complex health, housing and social inclusion as well as mitigation and adaptation to climate change by considering ‘if then’ scenarios inspired by the Mont Fleur approach (Kahane, 1992).

The Context and Rationale for Transformative Education

Gildersleeve and Kleinhesselink (2019:3) explain that:

... Our industrialization efforts have increased CO₂ in the atmosphere, changing weather patterns, the Earth’s temperature, and the ocean’s acidity. Looking forward, the Anthropocene’s potential consequences grow progressively distressing. Human-caused climate change is demonstrated through carbon dioxide levels that are the highest in human recorded history, rising sea levels, increasingly extreme weather events, melting permafrost. These happenings necessarily change the habitats of animals and other nonhumans,

⁴(OVAP, Morihiko Hiramatsu—Governor of Oita prefecture, 1979, Yogyakarta, 2014) was applied by President Jokowi in 2008–2009.

compromising their ability to live and thrive. Left unchecked, it is not unreasonable to contemplate that anthropogenic climate change may lead to a sixth mass extinction—and that we may be in the beginning of that extinction now.

The context and rationale for transformative education are poverty, pandemics and climate change, in which unemployment and hunger are exacerbated by lockdowns and the digital divide in many parts of the world, such as South Africa⁵ (Ramaphosa, 2021,⁶ as discussed in chapter “[Nurdles and Food Security: Education for Wellbeing and Implications for Pan-African Social and Environmental Justice](#)” of this volume, see, McIntyre-Mills, 2021a, b). The WHO⁷ and UN⁸ have also stressed the increased vulnerability of women to violence during Covid lockdowns.

Each of the projects discussed in this book contributes in a small way towards understanding the potential of transformative education in a bid to develop regenerative pathways to sustainable environments. Lessons are drawn from First Nations, such as the San, the Khoi of Southern Africa and other Indigenous heritages in Venda, Ghana, Aboriginal Australians and the Sundanese of Padjadjaran, West Java.

The San Bushman’s traditional greeting is ‘I saw you from afar and I am hungry’ (Van der Post, 1958). The divide between haves and have-nots has never been greater (Stiglitz, 2011; Oxfam, 2021; UNDESA Report, 2020) and is linked with climate change, deforestation, the loss of habitat, displacement of many species and loss (Shiva, 2021). Goodall (2021) argues that pandemics are the result of habitat loss and the way animals that have never been in contact are thrust together through the way they are farmed, trafficked or contained. Gorbalenya et al. (2020) also stress that cross-species infections are the root of the corona pandemic.

It is worth remembering that in the quest for land, property and accumulation of assets we have lost our sense of awe for nature and our understanding that we are dependent on it. It is appropriate that the Nobel Peace Prize was awarded to the

⁵The high levels of unemployment and the poverty facing families have resulted in higher levels of domestic violence and child abuse. Citing a 2017 report Ramaphosa (2020) said the cost of domestic violence to the South African economy is more than 28 billion and possibly exceeding 42 billion. In the wake of Covid-19, this is much higher and protests to end violence against women in South Africa were led in August 2018.

During the week of action to raise awareness on the need to stem violence against women for 16 days, it was stressed that the number of violent crimes against women and children during lockdown tripled. In November, the UN 16 days of activism against gender-based violence.

⁶ <https://www.news24.com/news24/columnists/cyrlramaphosa/cyrl-ramaphosa-gender-based-violence-it-is-time-to-turn-the-tide-on-the-scourge-20201123>

⁷ https://www.unwomen.org/en/news/in-focus/in-focus-gender-equality-in-covid-19-response/violence-against-women-during-covid-19?gclid=CjwKCAiAv_KMBhAzEiwAs-rXlKXl0Zi4NUIEhwf80u3MKmCzo1gyZZ-ceOOEpZLqW5yNF_07UljBRoCPPMQAvD_BwE

⁸ <https://www.unwomen.org/en/news/in-focus/in-focus-gender-equality-in-covid-19-response/violence-against-women-during-covid-19>

WFF in 2020 as food security has never been more important,⁹ but the role of nominee Chief Raoni Metuktire is equally important along with other Indigenous leaders who stressed the need to ‘defend nature’ and respect diversity (2020). It resulted in a four-page manifesto called the Piaracu Declaration¹⁰ representing 45 indigenous peoples in Brazil on 14 and 18 January 2020. The essence of the declaration is that forests sustain all life. The leaders condemn the ecocide committed by government. The current context of ‘existential risk’ (Bostom, 2011) requires an urgent response. We argue, transformative education needs to address social, economic and environmental issues in the interest of the common good and not in the narrow interests of a specific political party, social group or market segment. The opening question posed by Gildersleeve and Kleinhesselink (2019:1) is:

What does it mean for higher education that the human is remaking its environment and consequently, remaking itself? What future/now for the institution that was built to generate, harbor, share, and provide leadership for the knowledge that might support the human condition and its social experiments at living?

This volume suggests alternatives based on small pilots and ways in which to scale up a relational approach guided by *a priori* norms that underpin education for the common good and *a posteriori* indicators to measure performance – in terms of social, economic and environmental indicators of wellbeing to support the common good for current and future generations. In Systemic Ethics (McIntyre-Mills, 2014:27), I stress that:

The axiom to guide and balance new forms of democracy and governance is that we can be free and diverse at a local, national or transnational regional level to the extent that we do not undermine the collective good ... or the global commons. Initially, the concept of global commons was narrowly defined as ‘assets outside the national frontiers such as oceans,

⁹World Food Programme, Nobel Peace Prize 2020 – <https://www.nobelprize.org/prizes/peace/2020/press-release/#:~:text=The%20Nobel%20Peace%20Prize%202020%20was%20awarded%20to%20World%20Food,weapon%20of%20war%20and%20conflict.%22>. The need for international solidarity and multilateral cooperation is more conspicuous than ever: ‘The Norwegian Nobel Committee has decided to award the Nobel Peace Prize for 2020 to the World Food Programme (WFP) for its efforts to combat hunger, for its contribution to bettering conditions for peace in conflict-affected areas and for acting as a driving force in efforts to prevent the use of hunger as a weapon of war and conflict....The World Food Programme is the world’s largest humanitarian organisation addressing hunger and promoting food security. In 2019, the WFP provided assistance to close to 100 million people in 88 countries who are victims of acute food insecurity and hunger. In 2015, eradicating hunger was adopted as one of the UN’s Sustainable Development Goals. The WFP is the UN’s primary instrument for realising this goal. In recent years, the situation has taken a negative turn. In 2019, 135 million people suffered from acute hunger, the highest number in many years. Most of the increase was caused by war and armed conflict....’

¹⁰Agrocultures.org: ‘We are not alone. At this great meeting, we declare the resumption of the Forest People’s Alliance, which includes the Caatinga, Pantanal, Cerrado, Atlantic Forest and the Amazon. We will be together defending the protection of our territories. This struggle is not only for indigenous peoples, but for all of us, it is a struggle for the life of the planet.’

space and the Antarctic'. OECD definition <http://stats.oecd.org/glossary/search.asp>. Our area of concern is the extent to which resilience could be achieved through attitudinal and behavioural change fostered through participatory democracy and systemic governance that incorporates structured 'if then' considerations.

The chapters in this volume offer some ideas as to how education systems could support transformation. They build on Gildersleeve (2016), who reflects in her paper on the way in which academics become their work and their work responds to market demands to be productive in terms of commodified measures of output applied to research, teaching, administration and service. The speed at which work needs to be performed takes its toll on staff, students and family. To engage carefully with students and research participants takes time, as does research based on connecting with people and place.

The Audience and Focus

The audience at whom we are aiming includes policymakers, academics and practitioners who can influence the design content, structure and process of education to respond to the convergent challenges we face, namely poverty, hunger, climate change, displacement of multiple species and pandemics.

The focus is on social, economic and environmental challenges facing educators striving to address lockdowns, capacity building and the digital divide. Contributors from diverse cultures and geographical areas suggest ways forward based on praxis and small case studies. Underpinning all these contributions is the importance of developing ways to learn in more inclusive, dynamic, organic and democratic ways to support living systems. The needs of those who are not currently protected by citizenship rights are centre stage in our examples of attempts to re-frame education in ways that extend 'the frontiers of justice' (Nussbaum, 2006) to include: young people, the differently abled, the voiceless and sentient beings *within a system spanning organic and inorganic life*.

Transformative education aims to foster values and modes of regenerative living which respect and strive to connect with 'all that exists' (as named by Chilisa, 2020), namely, the 'living and the nonliving, the land, the earth, the animals, and others beings' (p. 24), which are not adequately protected through current approaches to democracy and governance (see McIntyre-Mills & Christakis, 2020 and chapter "[Systemic Praxis and Education to Protect the Commons](#)" of this volume).

Taxonomies are constructs based on values that need to be carefully re-considered in terms of the biopolitical consequences of policy decisions.

Educators and policymakers need an 'ecology of mind' (Bateson, 1972) and a more relational and responsive approach to 'natural inclusion' as suggested by Alan Rayner.

The volume is based on the premise that ‘A is better off when B is better off’, to cite Von Foerster’s (1995) well-known maxim, as such it:

- **Advocates for** teaching systemic ethics as a form of lifelong learning within nature’s classroom to support social and environmental justice. Critical systemic thinking is both an individual and a collective responsibility through many ways of knowing spanning the arts and sciences to inspire creativity with nature.
- **Contributes to** theory and practice by making suggestions as to how to re-frame the content, structure and process of education for transformation.
- **Makes a case for**
 - (a) a more relational understanding of human beings and other species
 - (b) a more integrated curriculum where learners across primary, secondary and tertiary levels are given the opportunity to explore many ways of knowing and to do applied learning. In many contexts, unemployment is a family issue and thus enabling intergenerational learning needs to be explored through vocational training that enables people to earn, learn and grow a future. In this volume, we also explore green co-operatives linked with a learning community.

Regenerative Praxis: Safe Habitats for Diverse Species with Diverse Capabilities and Needs

The book links the displacement of people with the displacement of plants and animals and how we need one another to ensure a sustainable way of life that works with rather than against nature. Diversity in nature is vital, and the social contract (as it is currently defined) does not go far enough to protect living systems of which we are a strand.

According to Carrington (2020):

Pandemics such as coronavirus are the result of humanity’s destruction of nature, according to leaders at the UN, WHO and WWF International, and the world has been ignoring this stark reality for decades. The illegal and unsustainable wildlife trade as well as the devastation of forests and other wild places were still the driving forces behind the increasing number of diseases leaping from wildlife to humans....

Trees absorb carbon dioxide and provide habitat for a range of species. The importance of safe habitats for multiple diverse species is a key point. Once species lose their habitats they come into contact with other species that have no immunity to their diseases.

Just as colonisation led to human epidemics such as smallpox or the great war led to the so-called Spanish Flu, we need to realise the importance of habitat protection for living systems.

Making a Case for Critical Systemic Pedagogy and Praxis

The aim of the book is to develop critical systemic thinking and practice applied to education; as such, it extends the boundaries of critical pedagogy. It advocates for transformative, mixed methods (McIntyre-Mills & Romm, 2019) using action learning and action research within and beyond formal learning contexts (McIntyre-Mills, 2018).¹¹

Re-generative, transformative education means working with nature and within nature's classroom and emphasises multispecies relationships (McIntyre-Mills & Corcoran Nantes, 2021).

We need to urgently 'grasp the nettle' and accept that business as usual needs to move towards taking urgent steps re-generating and transforming our environment to enable rural urban balance and protecting the wild areas and habitats for diverse species through addressing the concerns raised by the IPCC report (2020) and the plea to reduce emissions (United Nations, COP 2021).

A Relational Approach

As facilitators we need to remember that the observer and the object of the research are just two variables in a systemic relational context that needs to include the subjects, namely learners as an active part of the engagement process (McIntyre-Mills, 2021).

The subjective, objective and intersubjective domains are equally important when considering wicked complex problems (Rittel & Webber, 1982), such as poverty, climate change, conflict and pandemics. In many ways, the relationality of the subjective, objective and intersubjective domains shape policy in positive and negative ways; in other words, we can engage in education policy in ways that create turning points for the better or worse.

Our values and decisions shape the world in which we live, and thus public education and policy debates need to be informed by ecologists, zoologists, climatologists, physicists, economists, philosophers and social scientists who understand our interconnectedness if we are to have a hope of achieving policy transformations that re-generate (Wahl, 2010) and sustain the environment.

¹¹ The approach to research at this difficult time relied a great deal on communication via WhatsApp, Zoom, Skype and other digital platforms as well as some face-to-face engagement in South Africa in 2020 and in Indonesia during 2019 on which I draw in my contributions and joint chapters.

Part I: Education Praxis

This book includes authors from Africa, Middle East, Asia, Australia, North and South America and is based on working together with colleagues in a range of contexts. For some of the authors, English is not their first language; thus writing partnerships were considered to be preferable to enable co-creation. The project evolved through engaging with members of our networks and sending out invitations to potential authors, so the proposal was open-ended to enable creativity and flexibility. We engaged in zoom conversations to develop some of the chapters and combined zoom engagement with on-the-ground engagement where possible, given the need to remain safe during the Covid-19 pandemic. A reflection on the arts also helped to make sense of the pandemic whether the arts involve epic ballet in Jogjakarta or Jarusalema dance groups assembling in a minibus taxi rank near Masiphumelele in Cape Town, South Africa, to express solidarity by dancing during the pandemic or storytelling, drumming and community art.

The volume addresses the following three key themes, namely: (1) education thinking and practice, (2) extending the ‘frontiers of justice’ and (3) learning in 360 degrees, each of which will be summarised below.

The ability to connect with people in more remote areas is reliant on strong links with colleagues at NGOs or universities who in turn reach out to people within the community through face-to-face or facilitated conversations online. Working with graduates, long-standing colleagues and their networks made this book possible.

The pandemic has changed many aspects of teaching and learning. The digital divide has made the challenge of being able to afford to buy a phone or a computer out of reach for many who had relied on face-to-face engagement and minimal technology. The perceptions of how young people feel about the situation are summed up in *The Youth Submission Report* by South Africa’s African Peer Review Mechanism (APRM) civil society working group (2020/2021:99) draws on Statistics South Africa and stresses that:

According to Statistics South Africa, only 37% of South African households have constant access to the Internet, either by phones or computers. In provinces such as the North West or Limpopo, this figure drops to 3.6% and 1.6% respectively.

Being able to afford access to data bundles in South Africa is a burden that many find beyond their budget, given the high levels of unemployment and informal employment. The same ARP report (2020/21:47) stresses that:

“South Africa’s unemployment rate reached an all-time high of 32.5% in the fourth quarter of 2020” and cites Statistics South Africa, ‘Quarterly Labour Force Survey.’¹²

¹² Statistics South Africa, ‘Quarterly Labour Force Survey (QLFS) – Q4:2020’, http://www.statssa.gov.za/publications/P0211/Presentation%20QLFS%20Q4_2020.pdf

According to this report, the Gini Coefficient for poverty in South Africa¹³ in 2021 is estimated as 0.63 and remains one of the highest internationally, despite dropping from 0.65 in recent years. For those who are unfamiliar with the measure: 0 represents complete equality in society, and 1 represents complete inequality. It is likely that the pandemic has reversed many of these gains. Relying on access to computing is unrealistic in South Africa *unless* people are able to learn, earn and grow a future together through vocational training linked with formal and informal sectors that enables them to escape the digital divide and to earn a sustainable living. It is time to re-think the structure, content and process of delivering education in ways that do not favour urban centres at the expense of the rural and regional areas.

Public education is needed to address social and environmental justice to create movements to support passing an Ecocide Law (Higgins et al., 2013) to protect food, water and energy security, which has implications for international relations. With this in mind, the structuring of the book is as follows:

Chapter “[Regenerative Education and Safe Habitats for Diverse Species: Caterpillar Dreaming Butterfly Being](#)” by Janet McIntyre-Mills includes contributions on educational philosophy by Veronica McKay to make a case for a more critical and systemic curriculum. The chapter explores transformative approaches to education within the context of climate change, pandemics and the challenge of ecocide raised by First Nations and the Ecocide Movement.

Chapter “[Fluid, Organic Thinking and Relationality: Implications for Education and International Relations](#)” by Janet McIntyre-Mills provides a context for the transformative thinking and practice and an example of the need for more public education and gives details of the way contamination of the food chain can be impacted by small plastic pellets called nurdles and how these impact food security. Education for wellbeing has implications for post-national regional approaches to support social and environmental justice. The systemic circular approach is different from a linear systematic approach. Systemic ethical approaches (McIntyre-Mills, 2014, 2017) support ‘wellbeing stocks’ (Stiglitz et al., 2010) and approaches that work with people and the natural environment.

Chapter “[Nurdles and Food Security: Education for Wellbeing and Implications for Pan-African Social and Environmental Justice](#)” discusses the impact of plastic pollution in Fish Hoek, Cape Town, and the practical community development education and intervention that strives to introduce a sustainable and re-generative approach. The author McIntyre-Mills then reflects in a day-to-day diary on life in Fish Hoek and the impact of the legacy of apartheid on our relationships. Chapters “[Fluid, Organic Thinking and Relationality: Implications for Education and](#)

¹³<https://worldpopulationreview.com/country-rankings/gini-coefficient-by-country>, The review explains that “The Gini coefficient ranges from 0 (0%) to 1 (100%), with 0 representing perfect equality and 1 representing perfect inequality. If every resident of a nation had the same income, the Gini coefficient would be zero. If one resident earned all of the income in a nation and the rest earned zero, the Gini coefficient would be 1... In South Africa, the richest 10% hold 71% of the wealth, while the poorest 60% hold just 7% of the wealth. Additionally, more than half of South Africa’s population, about 55.5%, live in poverty, earning less than \$83 per month.”

International Relations” and **“Nurdles and Food Security: Education for Wellbeing and Implications for Pan-African Social and Environmental Justice”** focus on values and perspectives and ways to make a difference through addressing practical concerns, namely: food, energy and water security.

Chapter **“The Power of Story: Ocean View Organic Farmers Cooperative, Cape Town, South Africa: Growing Food with Heart and Soul”** is a vignette on Ocean View Organic Farm in Fish Hoek, South Africa, by Stephanie Swanepoel who discusses the innovative co-operative that provided inspiration for colleagues to start a co-operative in Venda (see chapter **“AA!!Venda Women and Social Enterprise: Stepwise Process to Regenerative and Sustainable Living”**).

Chapter **“Collective Action for Regeneration of the Web of Life in the Face of Disruptive Injustice”** is a case study by Francis Akena Adyanga and Norma Romm, who address the way a community in Uganda became active agents to speak out against the operations of a foreign-owned factory. They organized several focus group sessions with participants from various villages to enable participants to ‘reflect on the issues at stake’ and the possibility of working together towards realising their power to initiate transformative thinking and action to address the injustice.

Part II: Extending the ‘Frontiers of Justice’

Chapter **“Learning from Nature’s Classroom: Reframing Economics, Accounting and Accountability”** with contributions by Janet McIntyre-Mills, Rudolf Wirawan and Ida Widianingsih makes a case for vocational education linked with primary, secondary and tertiary institutions that educate participants to understand that destruction of the environment is not an inevitable approach to development. It is possible to earn, whilst we learn and grow a future together. The volunteer ecovillage team enables participants to develop skill sets, build capacity and potentially learn how to map and model their own carbon footprints. It is linked with the following website on ecovillage: https://www.wirasoftfoundation.org/en_GB/web/bic-sig.

The chapter advocates an alternative way of doing things by discussing steps to develop a circular economy linked with a virtual engagement site, dedicated to enabling people to create a viable future for themselves, others and living systems on which we depend. The pathways to wellbeing away from business as usual towards the regeneration of living systems and a sustainable, liveable environment for diverse species require a change in values so that social, economic and environmental indicators of wellbeing are co-created at a community level. The regenerative interventions in degraded landscapes can be supported, mapped and measured through non-linear or web-like pathways to wellbeing. The organic farming movement could be supported by setting up knowledge management structures that support the concepts of ubuntu and explaining how the concept of sharing areas with people and nature is applicable.

Chapter “[Transformative Education: Employing the Balanced Scorecard for Regenerative Development](#)” by Saad Algraini discusses the need for a balanced scorecard to guide re-generative development.¹⁴

It is paired with chapter “[Education and Gender Mainstreaming in a Patriarchal Setting: What Really Matters](#)” in a patriarchal Bangladesh setting, where power is gendered as discussed by Shajeda Aktar and SM Mokhlasur Rahman.

In chapter “[Gender Roles in Vietnam: A Metalogue on the Traditional and the New and Suggestions for Transformation](#)” by Huong Nguyen, Janet McIntyre-Mills and Yvonne Corcoran-Nantes, Huong engages in a metalogue with Janet and Yvonne to explore the nature of gender roles in Vietnam and the way that they have been shaped. Together they explore the potential for further opportunities for transformation that build on the leadership roles that women have shown during war and the pandemic.

Chapter “[Dis-Ability, Differently Abled and Sentient Beings: Transformative Regeneration: The Need for Public Education on Vulnerability and Interbeing](#)” by Janet McIntyre-Mills addresses the rights of the disabled, differently abled and sentient beings and makes a case for transformative regeneration by extending Butler’s approach to vulnerability. A case is made for extending the frontiers of justice, based on Nussbaum’s (2006) contribution, in order to improve the curriculum content of education to address the rights of sentient beings and to improve engagement with differently abled.

Chapter “[Public Education on the Rights of Sentient Beings to a Life and Death Free of Suffering](#)” by Janet McIntyre-Mills addresses education on the *rights of sentient beings to a life free of suffering*.

Chapter “[An Assault on Situational Complexity in the Arena of Education: The Potential of Structured Dialogic Design](#)” addresses the challenge for education to respond to complexity in a paper titled: *Assault on Situational Complexity in the Arena of Education: The Potential of Dialogical Design* by Alexander N. Christakis and Jeff Diedrich in which an approach to respond to complex needs is detailed.

Chapter “[Rethinking Teacher Education Practicum for Transformative and Regenerative University – Community Partnerships](#)” by Veronica McKay and Pinkie Mabunda makes a vital contribution to the volume by discussing the challenges faced by learners during the pandemic. The chapter discusses the role of the University of South Africa which aims to address the needs of students, many of

¹⁴Despite the divides between genders and cultures and the need to comply with a state that does not tolerate dissent from civil society or the media and is in an ongoing state of tension with its neighbour Yemen. A proxy war has raged between USA and Iran and has resulted in extreme poverty and fracturing of Yemen into tribal sub groupings. An offer of a truce has been made, but the future of Yemen is fragile according to a Brookings review (Johnsen, 2021).

whom live in ‘rural areas,¹⁵ urban townships¹⁶ and informal settlements¹⁷ – environments with very high poverty rates. The majority of these students require financial assistance to study and approximately half of the Unisa students are supported by the Government’s National Student Financial Assistance Scheme’.

Chapter “[Online Learning and the Pedagogy of Resilience, Agency and Protest: Lessons from the COVID-19 Experience](#)” by Pinkie Mabunda explores the literature on transformative education and its implications for South Africa. The chapter explores the way practicums help with transformative education by enabling student teachers to engage in action learning that enables them to obtain classroom experience. This chapter provides critical perspectives on transformative and regenerative discourses on teacher professional standards in practice. It also offers several case studies.

Chapter “[Transformative Exhibitions and Artistic Practices: Vision and Culture in the Educational Environment of the Museum](#)” by Rania Jaber and Yvonne Corcoran-Nantes discusses the importance of engaging with art through art galleries and museums which can be used to ‘invite interaction between people from different ethnic backgrounds and socio-cultural contexts’. They consider case studies from different settings and question ideas of ‘citizenship and belonging as well as thinking about heritage and multiculturalism from different geopolitical angles and demonstrate how museums can play a central role for disseminating knowledge and challenging notions of ourselves and others’.

Part III: Learning in 360 Degrees

Papers on this theme make the case for learning not only in classrooms, on line or face-to-face in educational institutions, but also through artistic expression and an understanding of from nature’s classroom about our ‘natural inclusion’ to use Alan Rayner’s concept detailed in this section – he stresses that relationality is ‘an inescapable inference from our human experience of the relationship between softness and hardness – receptivity and resistance and we need to move towards a more relational educational approach’ which embraces multiple species.

Chapter “[Sacred Groves of the Tolon District of the Northern Region, Ghana: Where Spirituality Meets Education](#)” by David Addae and Janet McIntyre-Mills discusses the need to undertake public education so that we can mobilise learning

¹⁵Areas usually without piped water or sanitation, electricity and tarred road infrastructure.

¹⁶Separate townships were established for Africans, Indians and people of mixed race. While the urban townships are underdeveloped when compared with urban suburbs where white people lived, they nevertheless offer more services than informal settlements and would be more organised than informal settlements.

¹⁷Informal settlements are unplanned and unauthorised residential areas. The informal dwellings are usually shacks made from corrugated iron sheets. These communities have poor quality housing, inadequate access to safe water and sanitation and insecure residential status.

together with practical intervention. The chapter discusses the potential of indigenous customs and Islamic faith to support government legislation to protect the sustainable development agenda. It is estimated that throughout Ghana sacred groves are protected by belief in the power of Jaagbo. The case study of Tolon in the Northern Region of Ghana is discussed with reference to Douglas' notion of sacred and profane and the implications for fostering Bateson's ecological mindset through public education that builds on indigenous values and customs and mainstreams the sense of awe and respect for the systemic role that forests play in protecting the wellbeing of living systems.

Chapter “[AA!!Venda Women and Social Enterprise: Stepwise Process to Regenerative and Sustainable Living](#)” by Patricia Lethole, Mphatheleni (Mphathe), Rudolf Wirawan and Janet McIntyre-Mills discusses the need to protect sacred areas such as the Fundudzi lake and Thathe Vondo Forest in Venda, Southern Africa. The chapter demonstrates the importance of environmental protection and sustainable employment options through setting up co-operatives that could be a way forward instead of destructive forms of development. The team explore ways to develop skill sets, build capacity and map and model their carbon footprints; it also enables them to engage with others to make better community decisions that support democracy, governance and a circular economy that enables them to earn, whilst they learn and grow a future together. Thus, it helps to pilot a scalable way forward.

Chapter “[Women, Education and Socialisation: Transforming Gender and Power in the MST, São Paulo, Brasil](#)” by Yvonne Corcoran Nantes discusses how women's transformative experience in the fight for land offers them knowledge and skills that see them develop individually and collectively revealing a different sense of self they had never possessed before. This has underwritten women's newly created individuality, autonomy and leadership in the construction of a crucible of empowerment that requires no power position. This chapter focuses on women's role in the movement, its development and longevity rooted in a transformative praxis that underwrote their philosophy and action.

Chapter “[Encounters and Mis-Encounters: The Process of Political Pedagogy Between Educators and Families of the Landless Movement \(MST\) Settlement of Pirituba II, South-Eastern Sao Paulo, Brasil \(1984–2006\)](#)” by Edvaneide Barbosa da Silva and Yvonne Corcoran-Nantes discusses the political agenda of the landless movement and the battle for a transformative curriculum underpinned by the Liberation Pedagogy of Paulo Freire. The chapter offers insights into the different teaching methods initially offered to the children of the MST and the relationship with their families. Moreover, it reveals the active role of the community in the school curriculum in efforts to narrow the political pedagogical gap between educators and the rural settlers in which pathways to the development of a transformative educational practice are created.

Chapters “[Combining Focus and Circumspection: An Education in Natural Inclusion](#)” and “[The \$\gamma\$ – Principle of Natural Inclusion: From Competition Versus Cooperation to Heartfelt Relay](#)” by Alan Rayner elaborate the concept of *natural inclusion* which needs to be re-introduced to education through enabling students to

understand this vital concept which he explains using a range of media.¹⁸ He encourages learning within nature and explains relationality as:

This flow of receiving, sustaining and passing on is at the heart of the ecological and evolutionary philosophy of ‘natural inclusion’ that I have been pioneering for the last 20 years.

Chapter “[Systemic Praxis and Education to Protect the Commons](#)” by Janet McIntyre-Mills in conversation with Tom Flannagan, Dennis Finlayson and Rudolf Wirawan sums up the main themes explored in the volume, namely, the need to protect the commons through transformative education and practice that helps to reframe the way in which human beings see themselves in relation to other living systems. It also stresses that technocratic approaches to poverty and climate change – without caring for sentient beings and nature – could lead to new forms of authoritarianism and exploitation. All decision-making needs to be guided by ethical decision-making on how to protect all the interdependent users of a shared habitat. The chapter makes the case that education, design and ethical interventions that undermine wellbeing – and contribute to pathology or the undermining of ecosystems – should be sanctioned in law.

Education to Enable Relationality: Finding a Voice With and for Living Systems

Overall, the volume advocates that the need for practical intervention is growing as a result of the way in which human beings treat the planet and other species. We are no longer top predator! (see McIntyre-Mills, 2021). Food, energy¹⁹ and water security will become increasingly problematic as democracy and governance are increasingly under threat, as demonstrated in a range of international contexts from United States to Myanmar and Hong Kong, to Philippines and South Africa.

¹⁸Alan is sensitive to the language of ‘connection’, ‘webs’, ‘hubs’, etc. In his words: ‘As you know, I am sensitive to this, and feel that if the move is to be towards a truly relational and fluid understanding of the nature of reality that language needs to be used very carefully and for many purposes avoided altogether. I generally find that the word “relate” works better for many purposes than “connect”, and that the latter is best used only to describe tangible linkage. The purpose of a spider’s web is to entrap life, not to facilitate its flow. As you also know, I also have reservations about the common reference to the “spaces in between”, because in reality space is continuous – it does not stop and start at figural boundaries – a fact that has still not been recognised in conventional mathematics. These are subtle but crucial points that I make in my own chapters on “natural inclusion”.’

¹⁹In South Africa, many people employed in mining and coal-based power generation are likely to lose their jobs. This makes it imperative to create social enterprise opportunities, see for instance: <https://techcentral.co.za/upheaval-coming-over-south-africas-shift-to-renewables/105035/> downloaded 18/02/2021.

As the attempt to achieve a shift away from a carbon intensive economy continues, it will become important to demonstrate alternative forms of vocational education and employment to help *prefigure* change. In this spirit, Elizabeth Wathuti,²⁰ a young climate change activist in Kenya, reminded the audience of the work of Nobel Laureate Wangari Maathai (2004) who planted over 30 million trees by creating a movement through which women were empowered to understand that forests, land and water systems need to be protected which requires a systemic approach.²¹

At the United Nations (2021), *Glasgow Climate Change Conference* by a young leader from Kenya, Elizabeth Wathuti stressed:

By the time I am 50, 86 million people will be displaced in Sub Saharan Africa alone....

Maphateleni Makaulule (see Lethole et al., chapter “[AA!!Venda Women and Social Enterprise: Stepwise Process to Regenerative and Sustainable Living](#)” this volume) advocates for the greater protection of forests and the use of alternatives to wood, such as bamboo which in itself has multiple uses. To this end, they have set up a co-operative to enable public education and vocational training. For example, bamboo is a strong and resilient building material which has multiple uses such as making furniture, clothing, acting as pipes or fencing and providing biofuel.

Re-regenerative interventions include using bamboo in Indonesia (chapter “[Learning from Nature’s Classroom: Reframing Economics, Accounting and Accountability](#)” of this volume) to protect steep landscapes from erosion and to provide an alternative to firewood – which is being addressed, for example, by the Tshidzivhe project in Venda, South Africa – in collaboration with the bamboo co-operative. This is important as the destruction of forests is one of the root causes of both climate change and pandemics.

In the wake of the United Nations Climate Change Summit in Glasgow, policy decisions are central. What kind of a future do we want? What sort of education will help to ensure that we achieve rapid transformation to address the necessity to lower carbon emissions as outlined in the recent IPCC (020) report?

Current social and economic structures are not only unsustainable but also the cause of the convergent crises: conflict, poverty and environmental collapse. Being able to earn, whilst we learn and grow a future together has never been more important. Water, food and energy insecurity have resulted in increased urbanization and loss of habitat, increased rural-urban imbalance and the need to re-connect with nature and over-reliance on a carbon-based economy as a result of inadequate governance and a lack of democratic representation and accountability which is focused on the increasing gap between rich and poor and the increased commodification of

²⁰ <https://mobile.twitter.com/lizwathuti/status/1455518577327542273>

²¹ <https://www.nobelprize.org/prizes/peace/2004/press-release/>

living systems²² (see McIntyre-Mills et al., 2018, 2019; McIntyre-Mills & Corcoran-Nantes, 2021).

The volume invites learning within and beyond formal organisations by inspiring people to learn not only by reading the books and articles by others, but by creating and growing their own futures, trying to re-generate their communities by connecting with people, plants and animals and treating the land, rivers and oceans with respect – not as infinite resources or dumping grounds.

Some of the most important actions and re-actions include the stance taken by young people to sue governments for destroying their future²³ or First Nations who wish to retain their history, written in the landscape which is increasingly at risk. The sacking of three CEOs for allowing the ancient Juukan Gorge²⁴ in Australia to be destroyed is just one recent example.

Donna Haraway insisted that those who are marginalised need to be the designers, not the object of other people's designs.

Gregory Bateson's (1972) 'ecology of mind' emphasises the positive and negative aspects of the way we think about the world. The pathology of assuming that algorithms can *predict* based on simple binary logic that is de-linked from embodied warm human beings is the greatest challenge. His daughter Nora Bateson (2021) therefore refers to the need for *warm data* based on stories.

If we spend too much time in front of computers in cyberspace (Gergen, 1991), it will have consequences on our ability to relate to one another face to face (Greenfield, 2008, 2015); nevertheless, online engagement can be used in creative ways. The potential for online engagement was explored by presenters.

Plenary speakers at the International Society for Systems Sciences conference (8–13 July 2021) such as Nora Bateson created enthusiasm and energy when she discussed the potential for learning to see differently through developing an 'ecology of mind'²⁵ and through 'side-by-side' learning in different contexts.

²² 'Escaping the chicken coop' is the core theme in Adiga's (2008) debut novel 'White Tiger', a story of the life of a trapped so-called 'low caste' worker who escapes poverty in India. As a child he shows talent at school and is said to be exceptional by a school inspector who likens him to the rare 'White Tiger'. Adiga's protagonist uses the analogy of chickens lined up in cages facing their own death as they are systematically slaughtered and sold as commodities. He sees himself as justified in fighting his way out of unrewarded servitude by stealing money that was being used to corrupt politicians. Ironically calls his taxi business 'White Tiger' as a commentary on racism and a recognition that he had indeed fulfilled his dream to be exceptional by slaughtering his master.

²³ Taylor, M, Holden, E Collyns, D Standaert, M. and Kassam, A. <https://www.theguardian.com/environment/2021/may/07/the-young-people-taking-their-countries-to-court-over-climate-inaction>

²⁴ 'On Thursday 11 June 2020 The Senate referred the following inquiry to the Joint Standing Committee on Northern Australia for inquiry and report by 30 September 2020: The destruction of 46,000 year old caves at the Juukan Gorge in the Pilbara region of Western Australia.' https://www.aph.gov.au/Parliamentary_Business/Committees/Joint/Northern_Australia/CavesatJuukanGorge Inquiry into the destruction of 46,000 year old caves at the Juukan Gorge in the Pilbara region of Western Australia.

²⁵ <https://www.youtube.com/watch?v=jJ4Rdkml1iBA>

Engaging in dialogue helps to test out ideas, so the closest we can get to truth is through dialogue (McIntyre-Mills, 2000). All nature is in communication; it is the means by which living systems relate to one another, and this is a ‘living dynamic’, to use Nora Bateson’s term (2011). In a plenary speech (2021), Nora Bateson shared memories of learning from her father and from her grandfather’s legacy and elaborated on the importance of ‘warm data’ and the notion that telling stories can change the way people see their own stories. This resonated with the spirit of this book as did her notion of the importance of making sense of people’s experiences in context by considering stories at different levels (micro to macro) and across species. Nora Bateson calls this process anticipatory as it addresses the unseen and through engagement brings unseen issues to the surface – a process she calls ‘aphanipoesis’ from the Greek words ‘Afani’, meaning ‘unseen’ and ‘poesis’ which is engaged forms of creativity.

All forms of life relate to their context. It is this relationality of consciousness in which I am interested as an action learner and which is perhaps different from what Maturana and Varela (1980) called ‘autopoiesis’ a form of self-generation which can be seen across many living systems. Perhaps human beings have the ability to generate a new higher level of consciousness?

In the documentary (Nora Bateson et al., 2011) about her father’s notion of ‘taking steps towards an ecology of mind’, Gregory Bateson discusses the five fingers on our hand and the importance of *the spaces in between* which make it possible for the fingers *to relate to one another* and to the world in which we live. The flexibility of the fingers helped our creativity and our evolution as toolmakers and then as increasingly capable of conceptualisation. His understanding of the importance of relationships in context is the basis of an ‘ecology of mind’ that we need to foster everyday as we live our lives.

Creative thinking on alternatives²⁶ and syntheses need to be encouraged.²⁷ Places of learning need to avoid draining the fluidity of life into dry segmented disciplines.

²⁶As a child I wanted to know why we could not count our fingers or toes and the spaces in between? It would have been useful to discuss conventions such as Dewey’s digital system as well as other conventions. If we count the spaces in between we get 9, a recurring number; it seemed to me not a bad idea because we need to understand continuums! A more wholistic approach to understanding the world and how mathematics could help to understand, map or model could have addressed my concerns.

²⁷Categories are constructs and clearly the values with which I was confronted seemed wanting. Living in South Africa raised daily questions about race, culture, language and religion, sanity and insanity. Gender rights were also an obvious concern. Why were there so few boys encouraged to pursue their talents as dancers, for example? The strength of a dancer equals the strength of any sports person. As a child I could also never understand why human rights did not include animal rights and why it was possible to love pets, but to abuse other animals. This led to early struggles about the nature of food. When presented with a thesis or argument, gaps and alternative anti-theses sprang to mind but could not be explored until I reached university. I chose to do research on schizophrenia as the opportunity arose through an invitation extended by a psychiatrist at Valkenberg Hospital for mentally ill to the head of the sociology department at the University of Cape Town. It resulted in my following networks out of the hospital to learn how Xhosa speaking patients sought help from both indigenous healers and biomedically trained doctors and nurses. The Xhosa speaking staff were mostly nurses or social workers in the apartheid era with the exception of a psychiatrist who had learned to speak Xhosa as a child. At his invitation, I undertook research on how ‘the calling by the ancestors’ was interpreted within a context of limited resources and the need to access food.

This is why education policy needs to promote critical, systemic and applied learning within an integrated curriculum to support the common good (see McIntyre-Mills, 2010; McIntyre-Mills et al., 2019a, b).

The volume builds on and extends the public education implications of the lack of representation, accountability, regeneration and sustainability leading to the big challenges of the day (poverty, displacement, loss of habitat, cross-species infection (Goodall, 2020; Gorbalenya et al., 2020), conflict and pandemics), which could be addressed through re-framing educational structures, processes and content. The volume makes the case for lessons to be learned from nature's classroom and applied to protecting living systems. The capability to show compassion is vital for our shared survival and is the need to re-structure our education systems.

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Chapter “[Systemic Praxis to Protect the Commons: The Potential of a Community of Practice to Inspire Agency and Hope?](#)” by Janet McIntyre-Mills in conversation with Tom Flanagan, Dennis Finlayson and Rudolf Wirawan is adapted from an earlier version of an online conference paper delivered to the International Systems, July 2021, titled ‘The art of the impossible’. A version appears in an online publication with a commons licence and appears as ‘Architectures to protect the commons: a community of practice to inspire agency and hope’.

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